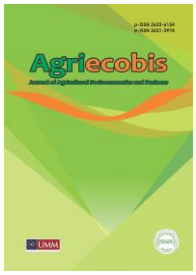
Universitas Muhammadiyah Malang, East Java, Indonesia

Agriecobis
(Journal of Agricultural Socioeconomics and Business)

p-ISSN 2662-6154, e-ISSN 2621-3974 // Vol. 7 No. 02 October 2024, pp. 98-107



Research Article

Determinants of Indonesia's Plantation Commodities Trade Flows with ASEAN: Insights from a Gravity Model Approach

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ARTICLE INFO

Article history
Received July 8, 2024
Revised August 1, 2024
Accepted October 4, 2024
Published October 31, 2024

Keywords
ASEAN Trade
Gravity Model
Panel Data
Plantation Product

ABSTRACT

The trade relationship between Indonesia and ASEAN countries in plantation products exhibits fluctuations in export and import activities. This study aims to identify the factors influencing Indonesia's Plantation Commodities Trade Flows with ASEAN countries. The research utilizes secondary data from eight ASEAN countries-Indonesia, Cambodia, Malaysia, Singapore, Thailand, Vietnam, Myanmar, and the Philippines-over a 15-year period (2008–2022). A panel data regression analysis, based on the Gravity Model, was conducted to achieve the research objectives. The variables examined include Indonesia's Plantation Commodities Trade Flows, Indonesia's GDP, partner countries' GDP, exchange rates, economic distance, population, and inflation. The analysis revealed that fluctuations in Indonesia's Plantation Commodities Trade Flows are driven by variations in export and import values. The regression results identified Indonesia's GDP, partner countries' GDP, economic distance, and exchange rates as significant factors affecting trade flows, while population and inflation had no significant impact.

INTRODUCTION

International trade plays a crucial role in enhancing the economic performance of participating countries. It occurs through agreements and cooperation between nations, encompassing both import and export activities. By specializing in the production of specific goods and services, countries can boost their economic growth (Amir et al. 2020). The primary objective of international trade is to provide mutual benefits to the nations involved by facilitating the exchange of competitive products (Ibrahim & Halkam, 2021). Countries often rely more on exports than imports to stimulate economic growth. A stronger emphasis on exports can lead to increased national income and overall economic expansion.

The flow of export and import trade significantly influences a country's economic growth. Both exports and imports exert considerable effects in both the long and short term (Astuti & Ayuningtyas, 2018; Hodijah & Angelina, 2021). While export activities enhance the economy and positively impact the economic sector, imports can have an adverse effect by potentially hindering economic growth (Puspandari et al., 2022; Nur et al., 2023). As international trade becomes increasingly accessible in terms of market opportunities, developing countries like Indonesia can experience positive effects from open trade if they effectively leverage these opportunities without

becoming overly reliant on imported goods. Conversely, Indonesia may face negative consequences if it fails to capitalize on export opportunities and instead focuses on consuming imports. Thus, adapting to the evolving landscape of global trade presents both challenges and opportunities for Indonesia in this modern era.

The agricultural sector plays a crucial role in international trade, significantly contributing to both exports and imports. In 2022, the value of agricultural product imports reached USD 2,432,287 million, while exports totaled USD 2,325,521 million (see Figure 1). The higher value of agricultural imports compared to exports indicates that many countries still rely on foreign supplies to meet domestic demand. From 2018 to 2022, trade in agricultural products exhibited a general upward trend. The average annual growth rate for agricultural product exports during this period was 6.74%, while imports grew at an average rate of 7.37%. Notably, 2021 witnessed the highest growth, with exports increasing by 18.7% and imports by 19.2%.

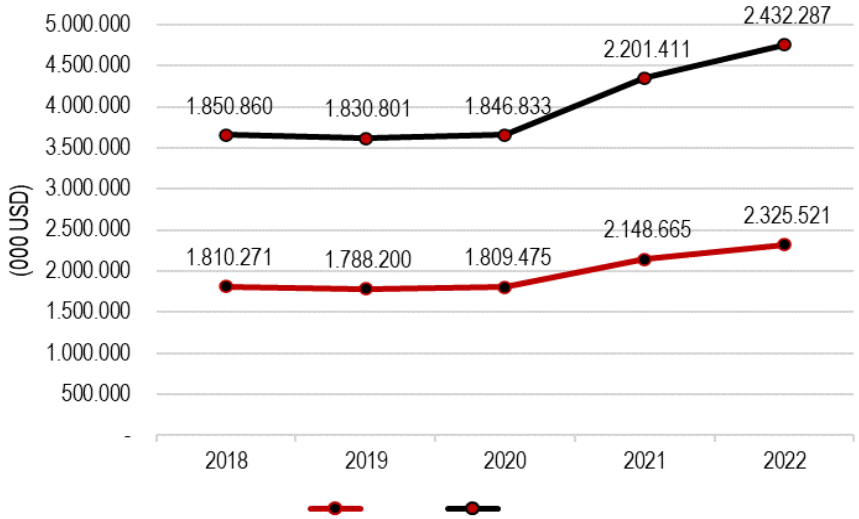

Figure 1. World Export and Import of Agricultural Products
Source: World Trade Organization (2024)

Figure 2 illustrates a significant disparity between the values of exports and imports of Indonesian agricultural products. Exports of agricultural goods consistently exceed import values (see Figure 2). The trends for both exports and imports align with the global patterns observed in agricultural product trade, with both experiencing notable spikes between 2021 and 2022. Over the past five years, the average annual growth rate for agricultural product exports reached 12.40%, while imports grew at an average rate of 7.62%. The most substantial growth in the export rate of Indonesian agricultural products occurred in 2021, increasing by 38.93% compared to the previous year. Similarly, imports also saw their highest growth in 2021, rising by 30.34% from the prior year's figures.

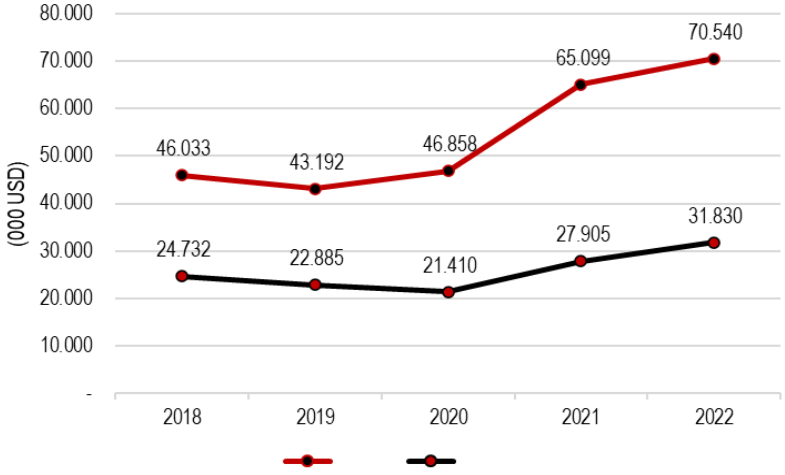

Figure 2. Export and Import of Indonesian Agricultural Products
Source: World Trade Organization (2024)

As a country engaged in global trade, Indonesia frequently collaborates with other nations and regional blocs to expand its trade network. A significant part of this cooperation involves neighboring ASEAN countries, due to their geographic proximity. ASEAN, which includes Indonesia, Malaysia, Vietnam, Thailand, the Philippines, Cambodia, Myanmar, Singapore, Timor-Leste, Brunei Darussalam, and Laos, plays a central role in Indonesia's trade activities, particularly in the exchange of agricultural products. Several factors influence a country's decision to engage in international trade. These factors include: 1) the importing country's inability to produce certain goods domestically, which can be sourced from exporting countries; 2) the need to import advanced technologies; 3) the desire to expand and increase market share; and 4) the advantages of product specialization for the exporting country (Ibrahim & Halkam, 2021).

Indonesia collaborates with ASEAN countries to trade its agricultural products, which encompass various subsectors. The plantation subsector, a vital component of the agricultural sector, plays a significant role in both export and import activities. It is essential for trade flows, particularly regarding Indonesia's agricultural trade. Indonesia boasts a diverse range of plantation products with competitive advantages in international markets. For instance, coconut products, including copra, coconut oil, and coconut cooking oil (Rinaldi & Karyani, 2015), have a comparative advantage in Malaysia (Darnita et al., 2021). The palm oil commodity, which represented a substantial 55.33% share of the global market from 2012 to 2019, demonstrates strong competitiveness, particularly in India, the Netherlands, China, and Kenya (Sulaiman et al., 2024) for its derivative products (Lugo-Arias et al., 2024; Tandra et al., 2022). Other competitive commodities include cocoa, which holds advantages in markets such as China, Malaysia, Germany, Singapore, and the United States (Augustin et al., 2022). Additionally, Indonesia's natural rubber has competitive positioning in Singapore but lacks comparative advantage in Cambodia, Malaysia, Myanmar, and Thailand (Sirait & Wibowo, 2021). Lastly, while coffee maintains a comparative advantage in the international market, its competitiveness has begun to decline (Amanda & Rosiana, 2023). Table 1. provides data on Indonesia's trade flows with ASEAN countries, highlighting its trading partnerships.

METHOD

The research on the export and import trade flows of Indonesia's plantation commodities with ASEAN countries utilizes secondary data, as detailed in Table 1. The analysis employs panel data, which combines cross-sectional and time-series data. Table 1 outlines the types and sources of data utilized in this study.

Table 1. Types and Sources of Data

No	Data	Sources of Data	Unit
1	Exports and imports	ITC Trade Map	USD
2	Gross Domestic Product (GDP)	World Bank	USD
3	Economic distance between countries	CEPII	Km/USD
4	Population	World Bank	individuals
5	Inflation	World Bank	%
6	Exchange rate	World Bank	USD

Source: Data processed, 2024

This research covers a time period of fifteen years, from 2008 to 2022, utilizing time series data. The cross-sectional data includes import and export figures for plantation commodities among ASEAN countries, as well as GDP, economic distance, population, inflation, and exchange rates. The ASEAN countries analyzed in this study are Indonesia, Cambodia, Malaysia, Singapore, Thailand, Vietnam, Myanmar, and the Philippines, selected for their established trade relations in plantation commodities. Laos is excluded from this analysis due to the absence of trade flows in plantation commodities between Indonesia and Laos. The Harmonized System (HS) codes for the plantation commodities examined in this study include HS 0901 (coffee), HS 0902 (tea), HS 1511 (palm oil), HS 2401 (tobacco), HS 4001 (natural rubber), HS 1701 (sugarcane), HS 0907 (cloves), HS 0908 (nutmeg), HS 5201 (cotton), HS 1513 (coconut), and HS 1801 (cocoa).

This study employs quantitative analysis to determine the factors influencing Indonesia's plantation commodities trade with ASEAN countries, utilizing panel data regression based on the Gravity Model approach. According to Gujarati & Porter (2009), panel data regression comprises three types: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The selection among these models will be conducted using the Chow Test and the Hausman Test. The Chow Test assesses the suitability of either the CEM or FEM, with the following criteria:

H0: If the p-value > 0.05, the CEM is better than the FEM
H1: If the p-value < 0.05, the FEM is better than the CEM.

Conversely, the Hausman Test determines the more suitable model between the REM and FEM, with the criteria as follows:

H0: If the p-value > 0.05, the REM is better than the FEM.
H1: If the p-value < 0.05, the FEM is better than the REM.

Following the selection of the optimal model among the three available options, the analysis will proceed with several tests in the panel data regression utilizing the Gravity Model (Gujarati & Porter, 2009). These tests include the F-test, coefficient of determination (R^2), and t-test. The F-test evaluates whether all independent variables collectively influence the dependent variable. The coefficient of determination, or R^2, quantifies the proportion of variation in the dependent variable explained by the independent variables. In contrast, the t-test assesses the impact of each individual independent variable on the dependent variable.

The study employs panel data regression utilizing the Gravity Model, analyzed through Microsoft Excel and Stata version 17. Pohan et al., (2024) conducted similar research that identifies factors influencing agricultural commodity exports to ASEAN countries. The following section outlines the application of the Gravity Model in this research.

$$\text{Log\_Trade}_{ijt} = \alpha + \beta_1 \text{Log\_GDP}_{it} + \beta_2 \text{Log\_GDP}_{jt} + \beta_3 \text{Log\_EXC}_{ijt} + \beta_4 \text{Log\_JE}_{ijt} + \beta_5 \text{Log\_POP}_{jt} + \beta_6 \text{Log\_INF}_{it} + \varepsilon_{it} \quad (1)$$

where:
$Trade_{ijt}$ = Export and import of Indonesian plantation commodities to ASEAN countries
GDP_{it} = Gross Domestic Product of Indonesia
GDP_{jt} = Gross Domestic Product of partner countries (ASEAN)
$EXCi_{jt}$ = Exchange rate
JE_{ijt} = Economic distance between Indonesia and partner countries (ASEAN)
POP_{jt} = Population of partner countries (ASEAN)
INF_{jt} = Indonesia's inflation
E_{it} = Error term
α = Constant (Intercept)
β = Slope
t = Year of observation

The operational definitions of the variables used in this study are as follows:
1. Trade Flow refers to the total export and import values of Indonesia's plantation commodities with ASEAN countries, expressed in USD. International trade encompasses the exchange of goods and services between countries. Trade flows involve similar products produced by a country (Ibrahim & Halkam, 2021).
2. Gross Domestic Product (GDP) of Indonesia serves as an indicator of the country's economic development, also measured in USD. An increase in Indonesia's GDP enhances the population's purchasing power to import goods and strengthens the production capacity for exports.
3. GDP of Partner Countries indicates the economic development of each ASEAN nation that trades with Indonesia in plantation products, measured in USD. GDP represents the change in national income within a given year, irrespective of other economic aspects (Ibrahim & Halkam, 2021).
4. Exchange Rate represents the value of the Indonesian currency relative to the currencies of ASEAN partner countries, expressed against the US dollar. Fluctuations in the exchange rate can significantly impact trade volumes. The formula for the exchange rate variable is as follows.

$$\text{Exchange Rate} = \frac{EXC_i}{EXC_j} \quad (2)$$

Where:
EXC_i = Exchange rate of the Indonesian currency against the US dollar (US$)
EXC_j = Exchange rate of the partner country's currency against the US dollar (US$)

5. Economic Distance measures the geographical distance between Indonesia and ASEAN countries, adjusted for the GDP of each partner country, using the unit Km/USD. The following formula calculates economic distance (Li et al., 2008).

$$\text{Economic Distance} = \frac{Geographic\ Distance\ x\ GDP_j}{\Sigma GDP_j} \quad (3)$$

6. Population represents the number of inhabitants in each partner country. A higher population can influence economic growth positively by enhancing export performance or negatively by increasing imports.
7. Inflation is the sustained increase in the prices of goods and services in Indonesia over a specific period, expressed as a percentage.

RESULTS AND DISCUSSION

Indonesia's Plantation Commodities Trade Flows with ASEAN countries

Trade in Indonesia's plantation products can be evaluated based on the volumes of exports and imports with its trading partner countries. Indonesia engages in trade with eight ASEAN nations: Brunei Darussalam, Thailand, Malaysia, Singapore, the Philippines, Vietnam, Cambodia, and Myanmar. The plantation products involved include Indonesia's key commodities, which are significantly exported to international markets. These commodities comprise coffee, tea, oil palm, tobacco, natural rubber, sugar cane, cloves, nutmeg, cotton, coconut, and cocoa. The trade flow of Indonesia's plantation products is derived from the total value of exports and imports. From 2008 to 2022, the total trade flow of Indonesian plantation products reached approximately 63,000.36 million USD, with an average annual value of 4,200.024 million USD. Figure 3 illustrates the export and import trade flows of Indonesian plantation products with ASEAN countries during the period of 2008-2022.

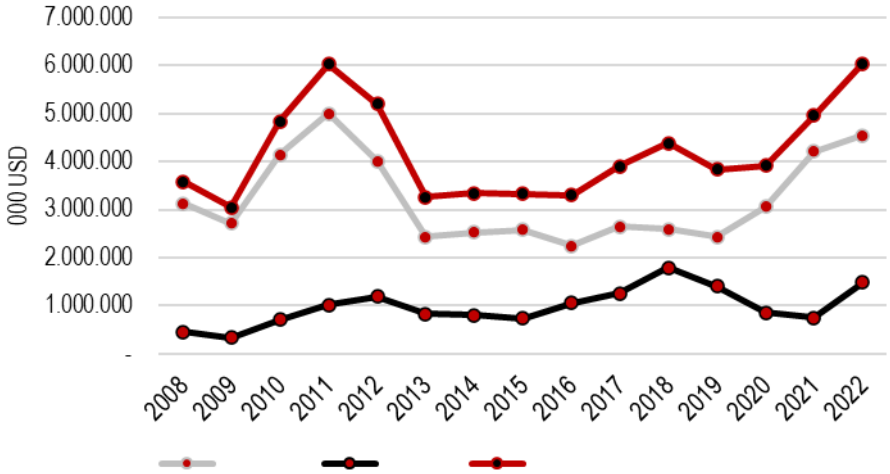

Figure 3. Exports, Imports, and Trade Flows of Indonesia's Plantation Products with ASEAN Countries
Source: Processed Data (2024)

Figure 3 illustrates the fluctuating trade flow of Indonesia's plantation products with ASEAN countries. These trade flows represent the combined total of exports and imports between Indonesia and its ASEAN partners. The graph indicates that the export value of Indonesia's plantation products consistently exceeds the import value, suggesting that Indonesia effectively satisfies its domestic demand for these products, thereby facilitating exports to ASEAN nations. The elevated export value highlights the significant contribution of plantation products to Indonesia's foreign exchange earnings. Additionally, the variability in export values influences the overall trade flow, resulting in corresponding fluctuations.

Over the fifteen-year period from 2008 to 2022, the trade flow of Indonesian plantation products peaked in 2011 and 2022, exceeding 6,000 million USD. In 2011, Indonesia's plantation trade flow with Malaysia reached its highest value of 3,098.905 million USD, primarily due to the substantial export of palm oil, which totaled 1,602.954 million USD. In contrast, the highest plantation trade flow in 2022 occurred with Vietnam, amounting to 1,087.214 million USD. Among the various plantation products, palm oil consistently emerged as the commodity with the

highest export value, totaling 31,080.627 million USD. Siahaan et al. (2023) highlight that palm oil demonstrates positive growth in both export value and volume, indicating a high level of competitiveness in the global market.

Determinants of Indonesia's Plantation Commodities Trade Flows with ASEAN Countries

The fluctuations in the export and import values of traded plantation products can be attributed to various factors, including Indonesia's Gross Domestic Product (GDP), the GDP of partner countries, exchange rates of partner countries against the USD, economic distance, population dynamics, and inflation rates. This study analyzes the determinants of trade flows of Indonesian plantation products within the ASEAN region using the Gravity Model approach. The Gravity Model employs several analytical frameworks, namely the Fixed Effect Model (FEM), Common Effect Model (CEM), and Random Effect Model (REM). Among these three models, one will be selected based on the results of several diagnostic tests. Table 2 presents the findings of the Chow and Hausman tests conducted to identify the appropriate panel data regression model.

Table 2. Results of Model Fit Test

No	Test	Prob.	Result
1	Chow Test	0,0000	REM
2	Hausman Test	0,4019	REM

The test results presented in Table 2 indicate that the selected model for analysis in this study is the Random Effect Model (REM). The Chow test reveals a p-value of 0.0000, which is less than the significance level of 0.05, confirming that REM is the most appropriate model. Similarly, the Hausman test yields a p-value of 0.4019, which exceeds the significance threshold of 0.05. These findings affirm that the REM is preferred over the Fixed Effect Model (FEM) and Common Effect Model (CEM) for panel regression.

The analysis using the REM produced a p-value of the F-statistic of 0.0000, indicating that all independent variables collectively exert a significant influence on the dependent variable, which is the flow of Indonesian plantation trade with ASEAN countries. Additionally, the REM analysis yielded an R-squared value of 0.7310, suggesting that 73% of the variation in the dependent variable can be explained by the independent variables included in the model, while the remaining 27% is attributable to factors not accounted for in the research model. Table 4 presents the estimation results of the Gravity Model, leading to the formulation of the model equation.

$$Log\_TRADE = -19{,}185 + 0{,}7882711\ Log\_GDPi + 1{,}579345\ Log\_GDPj - 0{,}1452959\ Log\_EXCij - 1{,}511029\ Log\_JEij + 0{,}1123905\ Log\_POPj - 0{,}0882124\ Log\_INFi + \varepsilon it$$

Tabel 3. Result of Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log_GDP_i	0,7882711	0,3716622	2,12	0,034**
Log_GDP_j	1,5793450	0,4407073	3,58	0,000*
Log_EXC_{ij}	-0,1452959	0,0580050	-2,50	0,012**
Log_JE_{ij}	-1,5110290	0,5007398	-3,02	0,003*
Log_POP_j	0,1123905	0,3392733	0,33	0,740
Log_INF_i	-0,0882124	0,1343070	-0,66	0,511
Constanta	-19,185	5,0446140	-3,80	0,000

Source: Processed Data (2024)
Where: (*) Significant at the 5% level of significance
(**) Significant at the 10% level of significance

The trade flows of Indonesia's plantation products are influenced by various factors. The analysis conducted using the Gravity Model, as presented in Table 3, reveals that four of the six independent variables significantly impact the trade flow of Indonesia's plantation products. The variables that demonstrate a significant effect include Indonesia's Gross Domestic Product (GDP), the GDP of partner countries, exchange rates, and economic distance.

Indonesia's Gross Domestic Product (GDP)

In this study, Indonesia serves as the host country, and its Gross Domestic Product (GDP) significantly affects the trade flow of plantation products with ASEAN countries. The analysis reveals a probability value of 0.034 for Indonesia's GDP variable (GDPi), which is below the 10% significance level. This finding indicates that Indonesia's GDP has a significant impact on the flow of plantation trade with ASEAN nations. The coefficient value for Indonesia's GDP is 0.78, suggesting that a 1% increase in Indonesia's GDP results in a 0.78% increase in the trade flow of Indonesian plantation products with ASEAN countries, holding other factors constant (ceteris paribus).

These results align with prior research conducted by Astuti et al., (2023), which asserts that Indonesia's GDP positively and significantly affects agricultural trade flows with other countries. Consequently, an increase in Indonesia's GDP can enhance both export and import values, leading to greater trade flows.

A country's national income positively influences its import and export activities. An increase in national income typically enhances the purchasing power of individuals, thereby boosting demand for foreign goods and services, which leads to higher import levels. Conversely, an increase in national income also strengthens the community's capacity to sustain the production of goods and services, resulting in greater exports to the global market. Yulianto & Djermor (2018) assert that Gross Domestic Product (GDP) reflects a country's productivity in producing goods and services, as well as the growth in public consumption of imported goods and services.

Partner Countries' Gross Domestic Product (GDP)

In addition to the host country's GDP, the GDP of partner countries significantly influences trade flows. The analysis reveals that the probability value for the GDP of partner countries (GDPj) is 0.000, which is below the 5% significance level. This finding indicates that the GDP of partner countries significantly impacts the trade flow of Indonesia's plantation products with ASEAN countries. The coefficient for the GDP of partner countries is 1.57, suggesting that a 1% increase in the GDP of partner countries correlates with a 1.57% increase in the trade flow of Indonesia's plantation products with ASEAN countries, ceteris paribus. Thus, the GDP of partner countries emerges as a crucial factor affecting trade flows from the host country. Consistent with the findings of Astuti et al., (2023), the GDP of partner countries positively and significantly influences the flow of Indonesian agricultural trade with other nations. Their research indicates that increased trade flows result from higher imports driven by rising public consumption and increased exports resulting from enhanced production in partner countries.

Partner countries with robust economies tend to rely on importing raw materials for their industries to produce finished goods for export (Narawinda & Ayuningsasi, 2023). Prior research indicates that the GDP of partner countries positively influences the flow of Indonesia's plantation trade. This finding aligns with the study by Cahyaningtyas & Aminata (2020), which asserts that the GDP of importing countries significantly impacts

trade by enhancing bilateral trade flows between the countries. As economic activity increases in a country, the trade flow from that country also rises (Astuti et al., 2023). The table below presents the GDP values and growth rates for each trading partner of Indonesian plantation products.

Tabel 4. Nilai GDP dan Trend Negara Mitra 2018-2022

ASEAN Countries	GDP (thousands in USD)	Growth Trend (%)
Brunei	14,519,197	2.57
Thailand	422,229,807	4.12
Malaysia	315,055,117	4.63
Singapore	319,163,406	6.82
Philippines	298,722,245	6.04
Vietnam	247,428,500	10.95
Camboja	19,003,624	7.87
Myanmar	60,226,607	5.59
Average	**212.043.563**	**6.07**

Source: Processed Data (2024)

Table 4 presents the GDP values of each ASEAN country that serves as a trading partner for Indonesia's plantation products. Thailand has the highest average GDP, amounting to 422,229,807 thousand USD. Conversely, Vietnam demonstrates the highest growth trend at 10.95%. This positive growth trend indicates an increase in economic activity or GDP among Indonesia's trading partner countries. Such developments present opportunities for Indonesia to enhance its cooperation with ASEAN nations, thereby increasing the flow of plantation product trade. Strengthened cooperation can facilitate access to new markets, potentially boosting domestic production for export and increasing imports of products from partner countries (Astuti et al., 2023)

Exchange Rate

In this study, the exchange rate serves as a variable representing the real exchange rate of each partner country against the U.S. dollar. The analysis reveals a probability value for the exchange rate (EXC) of 0.012, which is below the significant level of 10% (0.1%). This finding indicates that the exchange rate significantly influences the trade flow of Indonesia's plantation commodities with ASEAN countries. The coefficient for the exchange rate is -0.14, signifying that a 1% increase in the exchange rate leads to a 0.14% decrease in the trade flow of Indonesia's plantation commodities with ASEAN countries, ceteris paribus. Research by Chawarika et al. (2022) also supports the conclusion that the exchange rate exerts a significant and negative impact on agricultural trade flows. Devaluation, or a decline in a country's currency value relative to others, results in lower export prices

and higher import prices. This devaluation can trigger inflation, thereby reducing trade flows. As imports become more expensive, countries may limit their import activities. Furthermore, according to Mawardi (2023), the decline in export volumes corresponds to a decrease in domestic prices for those goods. Consequently, devaluation leads to a reduction in total imports due to the increased cost of these goods in the local currency.

Economic Distance

In this study, economic distance refers to the economic disparity between Indonesia and its ASEAN partner countries. The analysis yields a probability value for economic distance (ED) of 0.003, which is below the 5% significance level (0.05). This finding indicates that economic distance significantly affects the trade flow of Indonesia's plantation commodities with ASEAN countries. The coefficient for economic distance is -1.51, suggesting that a 1% increase in economic distance results in a 1.51% decrease in the trade flow of Indonesia's plantation commodities with ASEAN countries, ceteris paribus. Pohan et al. (2024) assert that the economic distance from the home country to the partner country negatively and significantly influences trade flows. As economic distance increases, transportation costs also rise, leading to a decline in both export and import activities. The findings of this study demonstrate that the economic distance between Indonesia and its ASEAN partners negatively impacts trade flows in plantation products. Furthermore, Krugman et al. (2012) contend that distance has an adverse relationship with trade between countries.

Population

The population of a country is a factor that can influence the value of trade, encompassing both exports and imports with other nations. The analysis reveals a probability value for population (POP) of 0.740, which exceeds the significance level of 10% (0.1). Consequently, we conclude that population does not significantly affect the trade flow of Indonesia's plantation commodities with ASEAN countries. This finding contrasts with the research conducted by Astuti et al., (2023), which indicates that the population of each partner country significantly influences the flow of Indonesian agricultural trade. Conversely, Bintoro & Khoirudin (2021) report that population does not significantly impact the value of Indonesian coffee exports to other countries, suggesting that population growth does not proportionately increase domestic coffee demand.

The coefficient of population indicates a positive relationship, suggesting that an increase in a country's population can enhance the trade flow of Indonesia's plantation commodities with ASEAN countries. This positive correlation aligns with the findings of Wardani & Mulatsih (2017), who assert that population growth in partner countries can elevate trade flows between nations. A larger population typically leads to increased demand and consumption of goods, thereby facilitating higher trade volumes. Furthermore, Salvatore (1997) posits that a country's population growth stimulates domestic demand, which in turn drives up imports and expands the labor force for production, resulting in increased exports. Purmiyati & Muhammad (2020) also emphasize that population size impacts trade from the demand perspective, as a larger population correlates with greater demand for goods.

Inflation

The inflation variable (INF) in this analysis does not significantly affect Indonesia's plantation commodities trade flow with ASEAN countries. This conclusion is supported by a probability value of 0.511, which exceeds the 10% significance level. The coefficient for inflation is negative, indicating that an increase in inflation within a country can diminish the trade flow of Indonesia's plantation commodities with ASEAN nations. Putri dan Jayadi (2023) also reported similar findings, noting that inflation does not significantly impact non-oil and gas exports to destination countries. They attributed this lack of significance to the influence of various other factors, such as GDP levels, costs and quality of raw materials, technology, tariffs, and tariff barriers.

While the results of this study indicate that inflation does not significantly affect trade flows, higher inflation can nonetheless lead to reduced trade flows, as evidenced by its negative coefficient. Research by Ashari et al. (2020) demonstrates that inflation negatively impacts export levels. Increased inflation raises the prices of goods, which in turn compels producers to decrease their output, ultimately resulting in a decline in export volume. This decrease in exports, coupled with lower prices for imported goods, can disrupt the balance of foreign currency flows. Consistent with the findings of Silaban and Nurlina (2022) and Fohoue et al. (2024), this study reaffirms that inflation adversely affects export value. The rising costs associated with inflation can lead to reduced production, thereby diminishing the quantity of exports to foreign markets.

CONCLUSION

The analysis results utilized the best model, the Random Effects Model (REM). The gravity model analysis revealed that Indonesia's GDP, the GDP of partner countries, exchange rates, and economic distance significantly influence Indonesia's plantation commodities trade flows with ASEAN countries. In contrast, the variables of

population and inflation do not significantly affect trade flows. The research concludes that government intervention remains essential in shaping Indonesia's trade dynamics within the plantation subsector. The data indicates that trade flows of Indonesia's plantation commodities with ASEAN countries have fluctuated over the past 15 years. As the primary driver of Indonesia's economic development, the government must enhance the export competitiveness of plantation products in the international market. To achieve this, the government should implement export strategies and policies aimed at fostering Indonesia's economic growth. Furthermore, to effectively manage inflation, the government needs to balance fiscal and monetary policies to stabilize the economy. Although the research findings suggest that inflation does not significantly affect export-import trade flows, it nonetheless exerts a negative influence on trade dynamics. An increase in inflation could lead to a decline in Indonesia's plantation commodities trade flow with ASEAN countries. Therefore, the government's role in controlling inflation is crucial for sustaining Indonesia's trade with other nations.

REFERENCES

Amanda, S., & Rosiana, N. (2023). Analisis Daya Saing Kopi Indonesia dalam Menghadapi Perdangan Kopi Dunia. *Forum Agribisnis*, 13(1), 1–11.

Amir, F., Dedi Budiman Hakim, & Tanti Novianti. (2020). Dampak Diversifikasi Ekspor Terhadap Pertumbuhan Ekonomi Negara-Negara Anggota ASEAN. *Jurnal Ekonomi Dan Kebijakan Pembangunan*, 7(2), 118–139. https://doi.org/10.29244/jekp.7.2.118-139

Astuti, E. P., Nurmalina, R., & Rifin, A. (2023). Pengaruh Hambatan Tarif Dan Sps Pada Perdagangan Pertanian Indonesia Dengan Negara G-20. *Buletin Ilmiah Litbang Perdagangan,* 17(1), 43–68.

Astuti, I. P., & Ayuningtyas, F. J. (2018). Pengaruh Ekspor Dan Impor Terhadap Pertumbuhan Ekonomi Di Indonesia. *Jurnal Ekonomi & Studi Pembangunan*, 19(1). https://doi.org/10.18196/jesp.19.1.3836

Augustin, N. P., Prasetyo, E., & Santoso, S. (2022). Analisis Daya Saing dan Trend Ekspor Kakao Indonesia ke Lima Negara Tujuan Tahun 2010-2019. *Jurnal Ekonomi Pertanian Dan Agribisnis*, 6(2), 442. https://doi.org/10.21776/ub.jepa.2022.006.02.10

Bintoro, D., & Khoirudin, R. (2021). Analisis Perdagangan Komoditas Kopi Antara Indonesia Dan 14 Negara Mitra Dengan Pendekatan Model Gravitasi. *Perwira Journal of Economics & Business*, 1(2), 18–27. https://doi.org/10.54199/pjeb.v1i2.31

Cahyaningtyas, D. P., & Aminata, J. (2020). Analisis Faktor-Faktor yang Mempengaruhi Perdagangan Indonesia dengan Negara-Negara Anggota APEC. *Jurnal Dinamika Ekonomi Pembangunan*, 3(3), 219–233. https://doi.org/10.14710/jdep.3.3.219-233

Chawarika, A., Madzokere, F., & Murimbika, A. (2022). Regional trade agreements and agricultural trade: An analysis of Zimbabwe's agricultural trade flows. *Cogent Economics and Finance*, 10(1), 1–15. https://doi.org/10.1080/23322039.2022.2048482

Darnita, S., Indra, & Safrida. (2021). The Competitiveness Analysis of Indonesian Coconut Export in Malaysian Market. *Jurnal Ilmiah Mahasiswa Pertanian*, 6(4), 219–225. Retrieved from www.jim.unsyiah.ac.id/JFP

Fohoue, U. D., Xin, W., & Momoh, B. (2024). the Impact of Population Growth on International Trade in Europe. *EPRA International Journal of Economic Growth and Environmental Issues*, 12(5), 1–5. https://doi.org/10.36713/epra16699

Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics. In Introductory Econometrics: A Practical Approach (5th ed.).* Ney York: McGraw-Hill.

Hodijah, S., & Angelina, G. P. (2021). Analisis Pengaruh Ekspor Dan Impor Terhadap Pertumbuhan Ekonomi Di Indonesia. *Jurnal Manajemen Terapan Dan Keuangan*, 10(01), 53–62. https://doi.org/10.22437/jmk.v10i01.12512

Ibrahim, H. R., & Halkam, H. (2021). *Perdagangan Internasional dan Strategi Pengendalian Impor*. Jakarta Selatan: Lembaga Penerbitan Universitas Nasional.

International Trade Centre. (2024). *Trade Statistics for International Business Development.* Retrieved from https://www.trademap.org/Index.aspx

Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2012). *International Economic*. In PEARSON (9th ed., Vol. 01). Boston: Pearson.

Lugo-Arias, E., Lugo-Arias, J., Vargas, S. B., de la Puente Pacheco, M. A., Granados, I. B., Heras, C. B., & Triana Hernández, D. (2024). *Determinants of the competitiveness of world palm oil exports: A cointegration analysis.* Transnational Corporations Review, 16(3). https://doi.org/10.1016/j.tncr.2024.200063

Mawardi, K. (2023). Dampak Nilai Tukar Mata Uang Terhadap Perdagangan Internasional. Ocean Engineering : *Jurnal Ilmu Teknik Dan Teknologi Maritim*, 2(1), 88–102. Retrieved from https://doi.org/10.58192/ocean.v2i2.959

Narawinda, A. A. S. D. S., & Ayuningsasi, A. A. K. (2023). Pengaruh Gdp Jepang, Kurs Yen, Dan Implementasi Ijepa Terhadap Nilai Ekspor Karet Indonesia Ke Jepang. *Buletin Studi Ekonomi*, 28(02), 168. https://doi.org/10.24843/bse.2023.v28.i02.p05

Nur, M., Agustin, H., Nur, N. M., & Riau, U. I. (2023). The Effect of Exports and Imports on Economic Growth in Indonesia Pengaruh Ekspor dan Impor Terhadap Pertumbuhan Ekonomi di Indonesia. *Management Studies and Entrepreneurship Journal,* 4(2), 1362–1372. Retrieved from http://journal.yrpipku.com/index.php/msej

Pohan, F., Rifin, A., & Nurmalina, R. (2024). Faktor-Faktor Yang Memengaruhi Aliran Perdagangan Produk Pertanian Antar Negara ASEAN. *Forum Agribisnis*, 14(1), 1–7. https://doi.org/10.29244/fagb.14.1.1-7

Puspandari, T., Priyatno, S. H., Novialumi, A., & Herwanti, L. (2022). Pengaruh Ekspor dan Impor terhadap Pertumbuhan Ekonomi di Indonesia. *JIIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(11), 4968–4971. https://doi.org/10.54371/jiip.v5i11.1146

Putri, O. P., & Jayadi, A. (2023). Pengaruh Inflasi, Tingkat Suku Bunga, Dan Nilai Tukar Terhadap Ekspor Non-Migas Indonesia Tahun 2010-2019. *MUC Tax Journal*, 1(1), 61–69. https://doi.org/10.61261/muctj.v1i1.24

Rinaldi, S. F., & Karyani. (2015). *Analisis Daya Saing Ekspor Komoditas Kopra Indonesia di Pasar Internasional*. Prosiding. Seminar Nasional Pembangunan Inklusif Di Sektor Pertanian II, 9-10 September, 1–14.

Salvatore, D. (1997). Ekonomi Internasional (5th ed.). Jakarta: Penerbit Erlangga.

Siahaan, J., Butar-butar, K., Lawolo, O., & Nainggolan, H. (2023). Daya Saing Perkebunan dan Kontribusinya terhadap Pertumbuhan Ekonomi Sumatera Utara Masa Covid-19. *Jurnal Agribisnis*, 25(1), 74–87. https://doi.org/https://doi.org/10.31849/agr.v25i1.12193

Silaban, R., & Nurlina. (2022). Pengaruh Nilai Tukar dan Inflasi terhadap Ekspor Non Migas di Indonesia. *Jurnal Samudra Ekonomika,* 6(1), 50–59. Retrieved from https://ejurnalunsam.id/index.php/jse/article/view/5123%0Ahttps://ejurnalunsam.id/index.php/jse/article/download/5123/3184

Sirait, R. A., & Wibowo, A. P. S. (2021). Daya Saing Karet Indonesia di Pasar ASEAN Sebelum dan Sesudah Penerapan Masyarakat Ekonomi ASEAN. *Jurnal Budget*: Isu Dan Masalah Keuangan Negara, 6(2), 144–162. https://doi.org/10.22212/jbudget.v6i2.113

Sulaiman, A. A., Amruddin, A., Bahrun, A. H., & Yuna, K. (2024). New Challenges and Opportunities of Indonesian Crude Palm Oil in International Trade. *Caraka Tani: Journal of Sustainable Agriculture*, 39(1), 94–106.

Tandra, H., Suroso, A. I., Syaukat, Y., & Najib, M. (2022). The Determinants of Competitiveness in Global Palm Oil Trade. *Economies*, 10(6), 132. https://doi.org/10.3390/economies10060132

Wardani, M. A., & Mulatsih, S. (2017). Jurnal Ekonomi dan Kebijakan Pembangunan, hlm. 1-15 Vol 6 No 2. *Jurnal Ekonomi Dan Kebijakan Pembangunan,* 6(1), 81–100.

World Trade Organization. (2024). *WTO Statistics*. Retrieved from https://stats.wto.org/

Yulianto, I., & Djermor, J. G. (2018). Analisis Penerapan ASEAN-India Free Trade Area (Aifta) Terhadap Perdagangan Dua Negara Indonesia Dengan India Menggunakan Gravity Model. *Jurnal BPPK : Badan Pendidikan Dan Pelatihan Keuangan*, 11(2), 35–48. https://doi.org/10.48108/jurnalbppk.v11i2.344