INDONESIAN COFFEE EXPORTS' COMPETITIVENESS AND DETERMINANTS

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Abstract: This study assesses the competitiveness of Indonesian coffee in relation to its primary global competitors - Brazil, Colombia, and Vietnam. Focusing on key export markets, including the United States, Japan, and Egypt, the research analyses factors influencing the demand for coffee exports. The study utilizes time series data (2004-2021) of coffee under HS code 090111 and applies Revealed Comparative Advantage (RCA), Export Product Dynamics (EPD), and the Linear Approximate Almost Ideal Demand System (LA-AIDS). Findings highlight Indonesian coffee's lower competitiveness, with Vietnam emerging as the top competitor. Additionally, demand determinants for Indonesian coffee have a smaller impact compared to those from other nations. Notably, Indonesian coffee exhibits price inelasticity in the U.S. market and high elasticity in Egypt. The study suggests strategies to improve competitiveness such as quality enhancement, product diversification, market access expansion through certification, and farmer capacity building to mitigate quality issues from green-picking practices.

Keywords: Indonesian coffee, coffee competitiveness, RCA, EPD, LA-AIDS

Abstrak: *Penelitian ini mengevaluasi daya saing kopi Indonesia dibandingkan dengan kompetitor global utamanya, yaitu Brasil, Kolombia, dan Vietnam. Mengkaji pasar ekspor kunci seperti Amerika Serikat, Jepang, dan Mesir, riset ini membedah faktor-faktor yang mempengaruhi kebutuhan ekspor kopi. Dengan memanfaatkan data berurutan dari tahun 2004 hingga 2021 berdasarkan kode HS 090111, metode yang digunakan antara lain Revealed Comparative Advantage (RCA), Export Product Dynamics(EPD), dan Linear Approximate Almost Ideal Demand System (LA-AIDS). Hasil penelitian menegaskan daya saing kopi Indonesia yang relatif lebih rendah, dengan Vietnam berposisi sebagai kompetitor utama. Lebih lanjut, determinan permintaan kopi Indonesia berdampak lebih ringan ketimbang negara-negara lain. Secara khusus, kopi Indonesia menunjukkan ketidakelastisan harga di pasar Amerika dan elastisitas yang tinggi di Mesir. Oleh karena itu, penelitian ini merekomendasikan beberapa strategi peningkatan daya saing seperti peningkatan kualitas, diversifikasi produk, perluasan akses pasar melalui sertifikasi, serta pengembangan kapabilitas petani untuk mengatasi isu kualitas akibat praktek pemetikan yang belum matang.*

Kata kunci: *kopi Indonesia, daya saing kopi, RCA, EPD, LA-AIDS*

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INTRODUCTION

The global market refers to the complex international trade network, where goods and services are exchanged between nations through formal agreements and arrangements (Sari and Tety, 2017). In the contemporary era of globalization, there has been a notable surge in international trade, leading to the emergence of a highly competitive market landscape. In order to thrive in this competitive environment, it is imperative to possess a comprehensive comprehension of product positioning and the competitive environment. A comprehensive marketing strategy can be formulated by thoroughly understanding the product's positioning, particularly within the agricultural commodities sector. The enhancement of competitiveness holds significant importance in the context of global trade, particularly due to the pivotal role played by agricultural commodities (Firmansyah et al. 2017).

Coffee is a prominent commodity that is extensively traded on the global scale, characterized by its significant market potential and competitiveness. Indonesia has gained recognition as a prominent coffee producer due to its diverse range of coffee varieties, including the highly sought-after civet coffee. Indonesian coffee's distinct flavor and fragrance make ia promising prospect for expanding international trade (Rahardjo et al. 2019). According to the International Coffee Organization's report, Indonesia is projected to maintain its position as the fourth largest global exporter of coffee in 2022, following Brazil, Vietnam, and Colombia. Brazil produces 30.39% of the global coffee supply, while Vietnam contributes 26.39%. Colombia accounts for 9.84% of the world's coffee production, and Indonesia's share amounts to 6.02% (International Coffee Organization, 2023).

The four nations engaged in exporting are engaged in dynamic competition within the global market. This phenomenon can be observed through the fluctuations in the market share of coffee beans among exporting countries in the target import nation over a period of time. The coffee bean market share pertains to the dynamic scenario wherein each coffee-producing nation undergoes fluctuations in domestic production, export volumes, and its overall contribution to global trade, which exhibit temporal variations. The alterations can be impacted by both internal and external factors within each respective country (Rosiana et al. 2018).

The four nations possess distinct coffee varieties, predominantly Robusta and Arabica coffee species. Nevertheless, there exists a disparity in the predominant coffee varieties across various countries. Vietnam and Indonesia are known for their extensive production of various varieties of robusta coffee. According to the International Coffee Organization's report for the year 2023, Brazil and Colombia are recognized as leading producers of a diverse range of Arabica coffee varieties. The productivity of coffee varies across countries and is influenced by various factors, such as the timing of the harvest season. The observed variations can be attributed to the geographical disparities between countries as well as the distinct coffee varieties cultivated in each region. The coffee harvest in Brazil and Indonesia typically spans from April to March, whereas in Vietnam and Colombia, it is typically observed from October to September (Manalu and Hartoyo, 2022).

The coffee production in Indonesia has experienced a moderate increase in recent years, although the growth has not been substantial. According to the data presented in Figures 1, the growth rate of coffee production from 2018 to 2023 was observed to be a modest 7.7%. The observed increase in export coffee production was of a modest magnitude, and subsequent to 2017, there has been a discernible decrease in this particular sector. In the year 2017, the quantity of coffee exported amounted to 467,790 tons, derived from a total coffee production of 717,962 tons. The quantity of coffee exports experienced a substantial decline, dropping from 756,051 tonnes of production to 279,961 tons in the year 2018. Subsequently, a gradual upward trend was observed in coffee production, culminating in the year 2021 with a total output of 387,264 tons out of the overall coffee production of 789,610 tons. The marginal growth in coffee production and the export share of less than 50% have affected the global competitiveness of Indonesian coffee (Ministry of Agriculture, 2023).

The coffee that is produced is exported to multiple countries. The primary recipient nations for Indonesian coffee exports encompass the United States, Egypt, and Japan. According to the Statistical of National Leading Estate Crops Commodity 2021-2023 published by the Ministry of Agriculture, the United States received coffee exports valued at US$194,204.4. Egypt received exports worth US$89,082.6, while Japan received exports worth US$65,515.36. European countries primarily dominated the remaining coffee exports.

In 2023, there was a substantial increase in exports comparedo tthe exports made to the United States, Japan, and Egypt in 2019 (Ministry of Agriculture, 2023).

A multitude of factors undeniably influences the exportation of a commodity. The study conducted by Parnadi and Loisa (2019) examines the competitiveness of Indonesian coffee exports in the global market, specifically in comparison to other coffee-producing nations such as Brazil, Colombia, and Vietnam. The findings of this research contribute to understanding Indonesia's competitive standing within the coffee export sector. Furthermore, Subhani et al. (2019) conducted a study aimed at assessing the impact of export volume, coffee production, domestic consumption, and Indonesia's GDP on the competitiveness of coffee exports in the global market. This study offers an analysis of the various determinants that impact the competitiveness of Indonesian coffee exports.

Additionally, several research have been conducted to examine the variables affecting coffee demand in the global market. Manalu and Hartoyo (2022) examinethe variables affecting coffee-exporting nations' market share in coffee-importing nations. The impact of domestic coffee pricing, prices charged by competitors, and internal market dynamics in the nation of importation, including inflation, currency exchange rates, GDP, and population, were all examined. The market research for the importing nation produced conflicting findings. Wijayanti (2021) conducted study into the variables influencing the performance of Indonesian coffee exports to the US. The findings indicated that population and currency rates had a considerable favorable impact on coffee exports.

On the other hand, the real GDP and global prices had little impact on Indonesian coffee exports. The trade in Indonesian coffee on the global market is finally examined by Savira et al. (2022). According to Savira et al. (2022), Indonesian coffee exports were negatively impacted by economic distance while the importing nation's GDP, exchange rate, and export policy simplification positively impacted them. These studies offer a greater understanding of the variables that influence coffee exports in terms of supply and competitiveness, which is crucial for comprehending global market dynamics. This study aims to examine the competitiveness of Indonesia's coffee exports to its main destination countries using the RCA and EPD method, as well as the various factors that influence this competitiveness using LA-AIDS method. The countries under analysis for their primary export destinations include the United States, Egypt, and Japan. The anticipated outcomes of the analysis are expected to offer insights into Indonesia's coffee export policy, specifically in relation to the country's efforts to attain the target outlined in the RPJPN. This target entails a projected increase in coffee exports by 24.3% by the year 2025. The framework for this research can be seen in Figure 2.

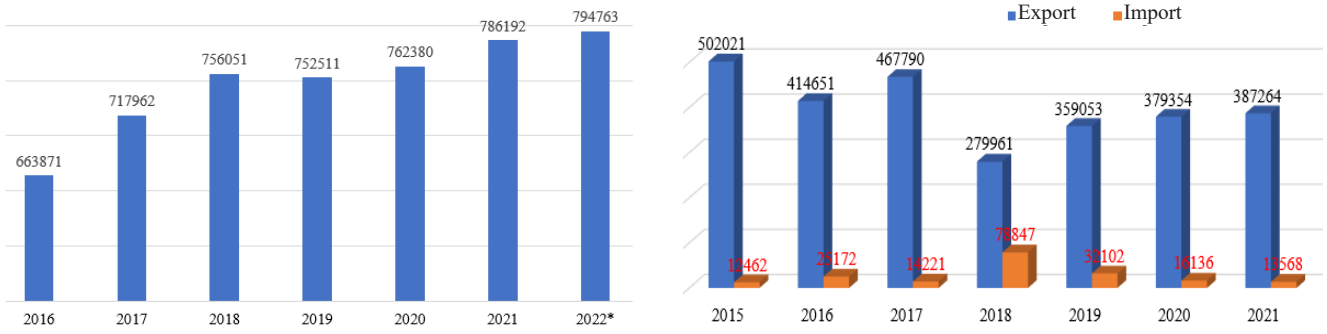

Figure 1. Coffee production 2016-2022 (*temporary) and import export of coffee volume 2015-2021

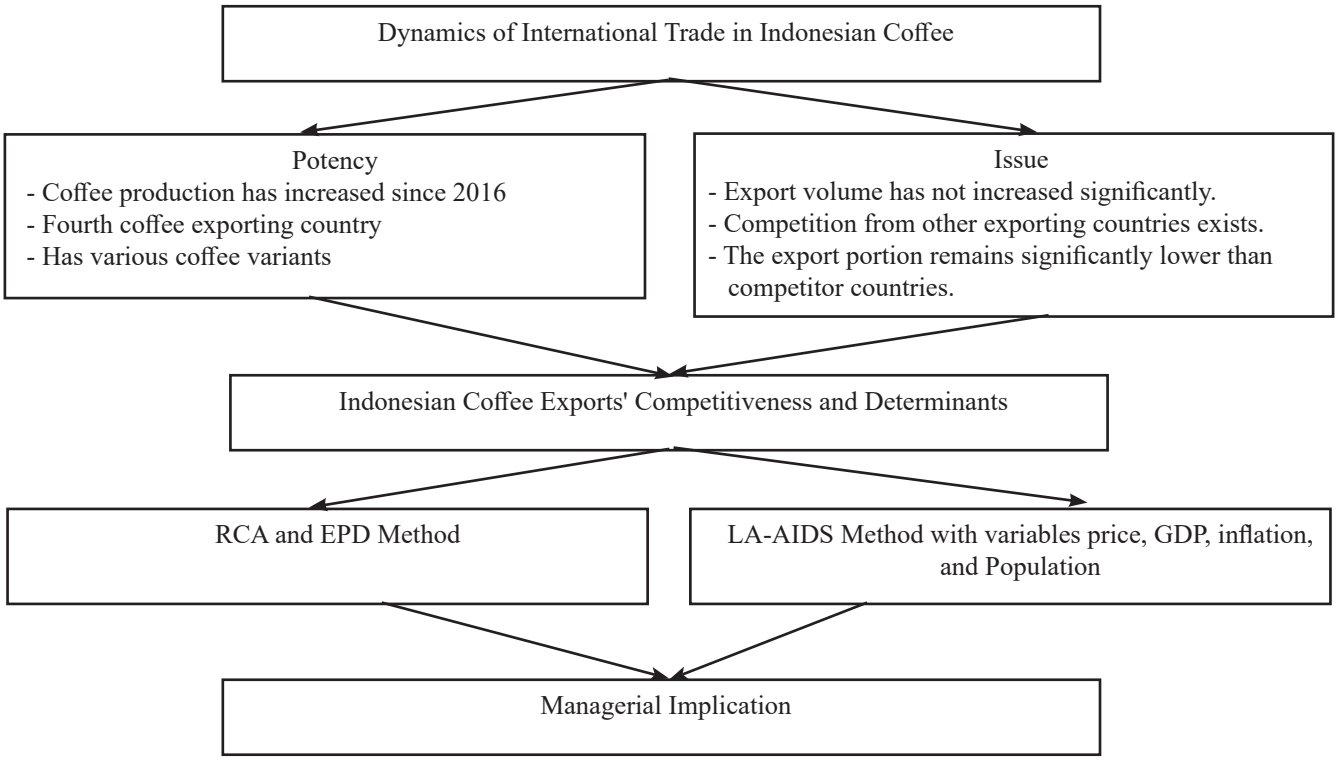

Figure 2. Research framework

METHODS

This research uses secondary data from various sources, including BPS, Trademap, UNComtrade, WTO, Ministry of Agriculture, BI, and World Bank. The data used is time series data from 2004–2021 to conduct a competitiveness analysis using the RCA and EPD methods then using LA-AIDS to determine its factors. In addition, to simplify the analysis, the EPD will divide the data into three time periods. The basis for selecting the time is based on the completeness of the data obtained from various sources. The type of coffee analyzed was with HS code 090111 (coffee, not roasted, not decaffeinated) because this type is the most widely exported coffee, accounting for 98.23% of total exports.

Revealed Comparative Advantages (RCA) analysis

In this research, RCA analysis is used to measure the competitiveness of Indonesian coffee with other countries. Several coffee-exporting countries in this research, Brazil, Vietnam, and Colombia, will be counted so that they can compare their advantages. The following is the RCA formula mathematically:

$$RCA = \frac{X_{ij}/X_{it}}{W_j/W_t} \quad (1)$$

Where: X_{ij} (Export value of commodity i from country j); X_{it} (Total value of the country's exports j); W_j (World export value of commodity i); W_t (Total value of world exports)

The index can interpret the competitiveness of a commodity. If the RCA index value < 1 means that the country does not yet have an average comparative advantage and competitiveness compared to other countries. If the RCA index value = 1, the country has the same comparative advantage as the average of other countries worldwide. If the RCA index value is > 1, the country has a comparative advantage and high competitiveness compared to the average of other countries worldwide. The higher the value of the RCA index, the higher the country's competitiveness in these commodities. Erkan and Yildimrici (2015) classify the strength of international competitiveness by classifying the RCA index, namely the non-competitive group with a value of $0 < RCA \leq 1$; the weakly competitive group with a value of $1 < RCA \leq 2$; the medium competitive group with a value of $2 < RCA \leq 4$; and a highly competitive group with an RCA value of > 4.

Export Product Dynamics (EPD) analysis

To find out the competitiveness of a product, as listed in Table 1, it can be converted from the quadrants contained in Figure 1, where the position of competitiveness will be in one of these quadrants. The position in this quadrant represents a product's business strength (X-axis) and market attractiveness (Y-axis). Mathematically, the business strength or market share (X-axis) of a product is formulated in equation (2), while market attractiveness (Y-axis) is formulated mathematically in equation (3).

$$X - axis = \frac{\sum_{t=1}^{t}\left(\frac{Xij}{Wij}\right)_t \times 100\% - \sum_{t=1}^{t}\left(\frac{Xij}{Wij}\right)_{t-1} x100\%}{T} \quad (2)$$

$$Y - axis = \frac{\sum_{t=1}^{t}\left(\frac{xit}{Wt}\right)_t x100\% - \sum_{t=1}^{t}\left(\frac{xit}{Wt}\right)_{t-1} x100\%}{T} \quad (3)$$

Where: X_{ij} (Export value of commodity j from Brazil/ Vietnam/Colombia/Indonesia to country i); X_{it}(Total export value of Brazil/Vietnam/Colombia/Indonesia to the world); W_j(World coffee export value); W_t(Total world export value); t(Year t); t_{-1}(Previous year); T (Number of years of analysis)

Analysis of Almost Ideal Demand System (Linear Approximate/AIDS)

This study also uses the AIDS model proposed by Deaton and Muellbauer (1980) to analyze the factors influencing market share among major exporting countries. The estimation method for estimating the coefficients in the AIDS model is carried out using the Seemingly Unrelated Regression (SUR) method, assuming that this approach can assist in understanding the position of coffee-exporting countries in the context of importing countries. The data used in this AIDS model is a time series from 2004–2021. These data will then be estimated using the Linear Approximate AIDS (LA/AIDS) model, with the basic model as shown in the following equation:

$$w_i = a_i + \sum_{j=1}^{n} Y_{ij} \ln p_i + \beta_i \ln\left(\frac{x}{p^*}\right) + \sum \theta \ln Z + e_i \quad (4)$$

Where: W_i (export share of the i-exporting country in the destination country); P_i (the original price of the coffee commodity in the exporting country); X (total import value of the destination country); P* (geometric Stone value = ∑wi.pi); Z (demographic variables (population, GDP, and inflation).

The estimation model for coffee export market share from the main exporting country to the main importer (destination) country is as follows:

$$W_1 = a_1 + y_{11} \ln p_1 + y_{12} \ln p_2 + y_{13} \ln p_3 + y_{14} \ln p_4 + \beta_1 \ln\left(\frac{x}{p}\right)$$

$$W_2 = a_2 + y_{21} \ln p_1 + y_{22} \ln p_2 + y_{23} \ln p_3 + y_{24} \ln p_4 + \beta_2 \ln\left(\frac{x}{p}\right)$$

$$W_3 = a_3 + y_{31} \ln p_1 + y_{32} \ln p_2 + y_{33} \ln p_3 + y_{34} \ln p_4 + \beta_3 \ln\left(\frac{x}{p}\right)$$

$$W_4 = a_4 + y_{41} \ln p_1 + y_{42} \ln p_2 + y_{43} \ln p_3 + y_{44} \ln p_4 + \beta_4 \ln\left(\frac{x}{p^*}\right)$$

Where: W_1(share of Indonesian coffee exports in destination countries); W_2 (share of Brazilian coffee exports in destination countries); W_3 (share of Colombian coffee exports in destination countries); W_4 (Vietnam's share of coffee exports in destination countries); P_1(price of Indonesian coffee in the destination country); P_2 (price of Brazilian coffee in the destination country; P_3 (price of Colombian coffee in the destination country); P_4 (price of Vietnamese coffee in the destination country); α, β, γ, θ (regression parameters).

The geometric stone price index can affect calculations in the AIDS model, and this is due to the non-invariant change in units of measurement Moschini (1995) in Rifin (Rifin, 2013). So Moschini suggested that in order for the stone price index to be corrected using the log-linear version of the Laspeyres index as follows:

$$\ln P^* = \sum_{i=1}^{n} Si \ln \frac{Pit}{P_t^0}$$

Where Pt0 is the price in the base year, the Seemingly Unrelated Regression (SUR) method processed in the Stata program is carried out to determine the regression coefficient in the model. Following the requirements of the AIDS model, the equations built in this study are restricted using the constraints of adding up, homogeneity, and symmetry. Based on the AIDS parameters obtained from the estimation results, the value of self-price elasticity is calculated, which can

describe the level of competition in the world's main exporting countries and coffee-importing countries. The value of price elasticity for AIDS is based on Özçelik and ŞAHİNLİ (2009); Turkmen and Ceylan (2019) is calculated as follows:

$$\varepsilon_{ii} = -1 + \frac{\gamma_{ij}}{w_{ij}} - \beta_i$$

Where $\hat{y}_{ij}$ is the coffee price parameter for exporting country i in market j; β_i is the total import parameter per price index; w_{ij} is the share of coffee of exporting country i in country j. The AIDS model is used to predict the factors that affect demand for coffee imports from the world's main exporting countries in the world's main importing countries. In addition, the coefficient value of each variable from the estimation results can provide information about how much influence this variable has on the demand for coffee imports. Based on the literature review conducted, the hypothesis of this research is as follows:

Price of coffee in the exporting country

Utami et al. (2018) and Maulani & Wahyuningsih (2021) found it positively affects coffee demand. This is because high coffee prices will increase the income of the exporting country, which can be used to improve the quality and quantity of coffee production and promote coffee exports. However, Densky et al. (2018) and Wijayanti et al. (2021) found that coffee price has no significant effect on coffee export demand. Hypothesis 1 (H1). The price of coffee from the exporting country has a positive effect on the competitiveness of coffee exports from Indonesia.

GDP of the importing country

Savira et al (2022)'s study shows that the GDP of the importing country has a positive effect on coffee exports. Ganbaatar et al. (2021)'s study shows that the GDP of the exporting country and the importing country have a positive relationship. This means that if the GDP of the exporting country increases, then coffee exports from that country will also increase. Conversely, if the GDP of the importing country increases, then coffee demand from that country will also increase. Hypothesis 2 (H2). The GDP of the importing country has a positive effect on the competitiveness of coffee exports from Indonesia.

Inflation of the importing country

Pradipta & Firdaus (2014)'s study shows a negative effect of inflation in the importing country (projected by the consumer price index) on the demand for commodities. An increase in international commodities that results in an increase in food prices will cause an increase in the price of fruits, including mangosteen, which will ultimately reduce the purchasing power of the destination country. Hypothesis 3 (H3). The inflation of the importing country has a negative effect on the competitiveness of coffee exports from Indonesia.

Population of the importing country

Pradipta and Firdaus (2014) study shows a positive effect of the population of the importing country on the demand for commodities. The study of Wijayanti et al. (2021), which found that the population of the United States as the destination country for Indonesian coffee exports has a positive effect on the demand for Indonesian coffee. Hypothesis 4 (H4). The population of the importing country has a positive effect on the competitiveness of coffee exports from Indonesia.

RESULTS

Coffee Competitiveness of Brazil, Vietnam, Colombia, and Indonesia

A country's trade performance is determined by the comparative advantage of its products, which can be measured by Revealed Comparative Advantage (RCA) analysis. RCA reflects the proportion of a country's commodity exports compared to global exports in the same market. An RCA value of more than one indicates a competitive advantage, while a value below one indicates a lack of competitiveness.

The analysis results show that Indonesian coffee products with HS code 090111 have competitiveness in the main market based on an RCA value of more than one. However, Indonesia's RCA value for this product does not exceed Vietnam, Brazil, or Colombia. This result shows that even though it is exported, this type of Indonesian coffee is still less competitive than the products of the three main exporting countries.

Based on Table 1, Indonesia has an average RCA value of 3.7, the lowest compared to other coffee exporting countries, indicating the need to increase comparative advantage (Zuhdi and Suharno, 2015). Brazil and Vietnam, the largest coffee exporters, have a higher average RCA, while Colombia has the highest RCA (30.44), indicating their comparative advantage.

Vietnam is Indonesia's main competitor in Southeast Asia, with strong support from their government in infrastructure and research (Deaton and Anindita, 2018). Brazil, with a higher RCA than Vietnam, has advantages in production and quality (Pradipta dan Firdaus, 2014). Colombia, with the highest RCA value, dominates with high-value Arabica coffee compared to Robusta coffee (Purnamasari et al. 2014). As a country that produces more types of Robusta coffee, this condition causes a decrease in performance, although it remains a producer of specialty coffee.

The low competitiveness of Indonesian coffee is associated with low quality and productivity (Narulita et al. 2014; Jamil, 2019). The structure of the coffee business in Indonesia, which small-scale farmers dominate, contributes to this low quality (Fadah, 2016). Business analysis is needed to improve competitiveness and strategy (Destarianto et al. 2013; Kurniasanti et al. 2015).

The competitive strength of a product in the export market can be assessed not only by RCA (Revealed Comparative Advantage) analysis but also by the Export Product Dynamics (EPD) analysis method. This approach provides an overall picture of trade. It describes the level of export growth dynamics in a certain period, which will then be divided into four categories: rising star, falling star, lost opportunity, and retreat. Export data for coffee type HS 090111 were obtained from UN Comtrade and Trademap from 2004 to 2021, divided into three periods.

Table 2 shows the analysis results of Indonesia's EPD and three competitor countries in the main markets for Indonesian coffee exports, namely the United States, Japan, and Egypt. In the first period, Brazil and Vietnam were grouped as Rising Stars. This condition means that both countries are showing fast and dynamic export increases. Conversely, Colombia and Indonesia are placed in the Lost Opportunity category, indicating that they need help fully utilizing their export potential. In the second period, Brazil fell to the Falling Star category, which showed a decline in its export performance. Vietnam remains in the Rising Star category, consistently improving its export performance. Colombia moves into the Retreat category, signaling a further decline in its export performance. Indonesia also dropped into the Falling Star category, which shows a decline in its export performance.

In the third period, Brazil and Colombia continued in the Retreat category, showing a continued decline in their export performance. Vietnam moves into the Lost Opportunity category, indicating a decline in export performance. At the same time, Indonesia remains in the Lost Opportunity category, indicating that they are still not fully exploiting its export potential. Overall, Vietnam showed the most consistent and positive performance in increasing their exports, despite showing a decline in the last period. Indonesia and Colombia face challenges in taking advantage of their export opportunities, while Brazil shows a significant decline in export performance throughout the observed period.

Table 1. RCA index for Coffee HS090111 of Brazil, Vietnam, Colombia, and Indonesia

Years	RCA Index			
	Brazil	Vietnam	Colombia	Indonesia
2004	18.2	24.0	56.3	3.9
2005	17.7	18.8	57.8	4.8
2006	17.3	24.8	48.7	4.7
2007	16.5	30.7	44.6	4.3
2008	15.3	24.4	36.3	5.2
2009	15.4	18.7	29.2	4.4
2010	16.1	15.8	29.4	3.2
2011	15.9	14.2	23.1	2.6
2012	13.3	17.1	17.7	3.6
2013	13.0	12.6	21.1	4.2
2014	16.2	12.9	26.7	3.5
2015	16.1	7.8	38.3	4.3
2016	14.2	8.8	41.0	3.6
2017	11.6	7.6	36.0	3.8
2018	11.9	7.3	34.3	2.8
2019	13.1	5.1	36.5	3.3
2020	13.5	3.8	44.9	2.8
2021	12.6	3.7	45.5	2.2
Average	14.9	14.3	37.1	3.7

Table 2. The dynamics of the position of coffee-exporting countries in international competition

Period	EPD			
	Brazil	Vietnam	Colombia	Indonesia
I (2004-2009)	Rising Star	Rising Star	Lost Opportunity	Lost Opportunity
II (2010-2015)	Falling Star	Rising Star	Retreat	Falling Star
III (2016-2021)	Retreat	Lost Opportunity	Retreat	Lost Opportunity

Analysis of Factors Influencing Demand for Indonesian Coffee Exports and Competitor Countries in Indonesia's Main Export Destinations

Various external and internal factors from the importing country can influence the demand for coffee in the international market. External factors include global economic conditions, commodity price fluctuations, and climate change, which can affect coffee production in exporting countries. International trade regulations and tariffs can also affect the demand for coffee. For example, reducing tariffs could make coffee cheaper for consumers and increase demand. This study uses the Almost Ideal Demand System (AIDS) model to analyze the factors that affect demand for coffee exports from Indonesia and competing countries (Brazil, Colombia, and Vietnam) in the main export destination countries (United States, Japan, and Egypt). The influence of the independent variables is based on the efficiency and p-value of each independent variable. The dependent variable in this study is the market share of Indonesian, Brazilian, Colombian, and Vietnamese coffee in the United States, Japan, and Egypt. Furthermore, the independent variables in this study are coffee prices in Indonesia, Brazil, Colombia, and Vietnam, total imports, GDP, population, and inflation in the United States, Japan, and Egypt. The following is a summary of the AIDS model estimation results that have been carried out (Table 3).

Based on the estimated demand model for coffee from Indonesia, Brazil, Colombia, and Vietnam, generally, the independent variables significantly influencing the demand for Indonesian coffee are fewer than those from Brazil, Colombia, and Vietnam. The United States is Indonesia's main destination for coffee exports. The demand for Indonesian coffee is relatively unaffected by competitors' coffee prices and the internal conditions of the United States. This is also supported by the results of self-price elasticity estimates, which are relatively inelastic compared to the price elasticities of coffee in Brazil, Colombia, and Vietnam. In contrast, Brazilian coffee prices, Vietnamese coffee prices, population, and United States inflation negatively affect demand. Increases in prices, population, and inflation in the United States will reduce the demand for Brazilian coffee. This is also supported by the estimation results of the price elasticity of Brazilian coffee, which is the most elastic compared to Indonesia, Colombia, and Vietnam. The demand for Colombian coffee is negatively affected by the price of its coffee, meaning that an increase in the price of Colombian coffee will decrease the demand for coffee from Colombia. The population and inflation rate in the United States have a positive effect, meaning that an increase in population and inflation in the United States will also increase the demand for coffee from Colombia.

On the other hand, the demand for Vietnamese coffee is positively influenced by the price of Brazilian coffee and the population in the United States. An increase in the price of Brazilian coffee and the population of the United States will increase the demand for Vietnamese coffee. This result indicates a substitution relationship between Brazilian and Vietnamese coffees. Apart from producing arabica coffee, Brazil also produces robusta coffee to substitute for robusta coffee from Vietnam.

Furthermore, the demand for coffee in the Japanese market, the independent variable that significantly influences the demand for Indonesian coffee is the Japanese population. The population effect is positive, meaning that increasing the Japanese population can increase the demand for Indonesian coffee. The demand for Brazilian coffee in Japan tends to come from external factors, namely Colombian and Vietnamese coffee prices. Colombian and Vietnamese coffee prices affect it negatively, meaning an increase in Colombian and Vietnamese coffee prices will also reduce the demand for Brazilian coffee. These results also align with the estimated demand for Colombian coffee, which is also negatively affected by Brazilian coffee prices.

On the other hand, the estimated demand for Brazilian coffee results shows a complementary relationship between Brazilian robusta coffee and Vietnamese robusta coffee in the Japanese market. This complementary relationship between robusta and

arabica coffee was also found in Manalu's research (Manalu and Hartoyo, 2022). This research shows a complementary relationship between Robusta coffee (Vietnam) and Arabica coffee (Brazil) in the Japanese and German markets. Vietnam's coffee demand is only influenced by the Japanese population.

Finally, regarding the demand for coffee in the Egyptian market, it was found that the demand for Indonesian coffee was positively influenced by the price of Brazilian coffee and the population of Egypt. The positive influence of Brazilian coffee prices means that an increase in Brazilian coffee prices will also increase the demand for Indonesian coffee. This condition also indicates a substitution relationship between Brazilian coffee and Indonesian coffee. As previously discussed, Brazil also produces robusta coffee, such as Indonesia and Vietnam, so this type of robusta coffee can be substituted in the international market. Substitution relationships between the same types of coffee have also been found in a study by Rosiana et al. (2018), Meiri et al. (2013), Manalu and Hartoyo (2022), which show that there is a substitution relationship for Robusta coffee on the international market. That result is different from the demand for Brazilian coffee, which tends not to be significantly influenced by the independent variables in this study. The demand for Colombian coffee in the Egyptian market is only influenced by the internal conditions of the Egyptian state, such as population, GDP, and inflation. Population and GDP levels have a positive effect, meaning that increasing population and GDP can increase the demand for coffee from Colombia. However, inflation has a negative effect, meaning an increase in inflation in Egypt will reduce the demand for coffee from Colombia.

Furthermore, Vietnamese and Brazilian coffee prices negatively affect the estimated demand for Vietnamese coffee. This result means that an increase in Vietnamese and Brazilian coffee prices will reduce the demand for coffee from Vietnam. These results also show a complementary relationship between robusta coffee (Vietnam) and arabica coffee (Brazil), as happened in the Japanese market.

The AIDS model can estimate the factors affecting coffee demand and the self-price elasticity of Indonesian, Brazilian, Colombian, and Vietnamese coffee in the United States, Japan, and Egypt markets. The results of the elasticity estimation can be seen in Table 4.

Table 3. Factors influencing coffee demand are Indonesia, Brazil, Colombia and Vietnam

Importing Countries	Exporting Countries			
	Indonesia	Brazil	Colombia	Vietnam
United States of Amerika		Brazillian coffee prices (-) Vietnam coffee prices (-) USA's Populations (-) USA's Inflation (-)	Colombian coffee prices (-) USA's population (+) USA's Inflation (+)	Brazillian coffee prices (+) USA's population (+)
Japan	Japan's population (+)	Colombian coffee prices (-) Vietnam coffee prices (-)	Brazillian coffee prices (-) Japan's population (+) Japan's GDP (+)	Japan's Population (-)
Egypt	Brazillian coffee prices (+) Colombian coffee prices (-) Egypt's population (+)		Egypt's population (+) Egypt's GDP (+) Egypt's Inflation (-)	Brazillian coffee prices (-) Vietnam coffee prices (-)

Table 4. Own price elasticity of Indonesian, Brazilian, Colombian and Vietnamese coffee

Exporting Countries	Importing Countries		
	USA	Japan	Egypt
Indonesia	-0.5496301	-1.342614	-10.66741
Brazil	-2.166234	-1.056658	-1.537541
Colombia	-1.678185	-0.268712	-0.9541471
Vietnam	-1.123857	-1.234181	-6.372333

According to the findings presented in Table 4, the price elasticity of Indonesia in the United States market is determined to be -0.5496301. In contrast to other nations, Indonesia exhibits higher price inelasticity in terms of its coffee market. This implies that a rise in the price of Indonesian coffee does not significantly result in a proportional decline in the demand for Indonesian coffee. This information suggests that Indonesia enjoys a relatively favorable position in comparison to other countries engaged in exporting activities. In contrast, Brazil exhibits a self-price elasticity value of -2.166234, indicating a higher elasticity level than Indonesia, Colombia, and Vietnam. This implies that the rise in Brazilian coffee prices will elicit a more pronounced decrease in demand for Brazilian coffee relative to other nations. This position is deemed to be economically unviable for Brazil.

In contrast to the Japanese and Egyptian markets, the self-price elasticity of Indonesian coffee tends to deviate significantly from zero compared to other coffee-exporting nations. Specifically, the self-price elasticities for Indonesian coffee are calculated to be -1.342614 and -10.66741. This observation demonstrates that an escalation in the price of Indonesian coffee elicits a prompt reaction in the form of a decline in the demand for Indonesian coffee. Undoubtedly, this position has significant adverse implications for Indonesia. There is a requirement for a modification and enhancement of productivity and efficiency in the process of coffee production with the intention of exporting. In the context of the Egyptian market, it is noteworthy that the volume of coffee exports from Indonesia to Egypt ranked as the third largest. In the Japanese and Egyptian markets, Colombia holds the most advantageous position in terms of profitability when compared to Indonesia, Brazil, and Vietnam. Colombia exhibits a near-zero elasticity value, specifically -0.268712 and -0.9541, indicating a relatively inelastic demand for Colombian coffee. The current position held by Colombia offers a notable benefit due to the comparatively modest rise in the price of Colombian coffee in relation to the decline in demand for said coffee.

Managerial Implications

The elastic condition of Indonesian coffee above is an important concern for Indonesia. With the elastic condition of Indonesian coffee, its competitiveness tends to fluctuate. Previous research has shown that efforts to increase the competitiveness of Indonesian coffee for export can be made in several ways. First, efforts can be made to improve the quality of coffee beans. The quality of coffee beans greatly influences the taste and attractiveness of the product in the international market. Several studies suggest improved seed quality can be achieved through improved orchard management practices, such as selecting high-yielding varieties, proper fertilization and maintenance, and good post-harvest handling (Avelino et al. 2005).

Second, product diversification and increased added value. One of the advantages of Indonesian coffee is the diversity of coffee types and varieties found in various production areas. Developing processed coffee products with added value, such as specialist and single-origin coffee, can effectively increase competitiveness in international markets (Giovannucci et al. 1990). For example, the development of processed coffee products with added value, such as Gayo coffee and civet coffee. By exploiting Gayo coffee's unique taste and aroma, local producers have succeeded in building a strong image and brand in the international market.

Third, market access should be increased through certification and international quality standards. Nugroho (2014) provides an overview of how certification impacts Indonesian coffee exports. In his study, Nugroho (2014) found that Indonesian coffee with certifications such as Organic, Rainforest Alliance, or Fair Trade has greater appeal in the international market. In addition, coffee products that meet international quality standards such as ISO or HACCP also have a greater opportunity to penetrate the premium market. However, this research also emphasizes that obtaining and maintaining this certification requires significant efforts from producers and farmers, including improving the quality of plantation management, increasing farmer capacity, and consistently producing high-quality coffee beans.

Fourth, the capacity of farmers can be increased through education, training, and facilities. The competitiveness of Indonesian coffee is not only determined by the quality of the product but also by the capacity of the farmers to manage the coffee business. Education and training related to plantation management, post-harvest handling technology, to market knowledge can help farmers increase the productivity and competitiveness of their products. Ndayitwayeko et al. (2014) and Nguyen (2016) need assistance from the government regarding good cultivation training and the use of

technology in the business cycle and coffee farming for farmers. Farmer capacity will also affect the quality of the beans produced. Currently, the green-picking system is still widely practiced by coffee farmers. Small-scale coffee farmers are more concerned with quantity. Fadah (2016) confirmed that farmers in his study area harvest coffee before the coffee beans are fully ripe and red. They mainly do this because of their urgent financial needs, including meeting their daily needs and the sudden education costs for farm children.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Indonesian coffee's competitiveness is relatively lower than that of other major coffee exporting countries, such as Brazil, Colombia, and Vietnam. The results of the RCA analysis for the 2004–2021 period, the average RCA value for Indonesian coffee is 3.7. In contrast to the average RCA score of competing countries from ASEAN, Vietnam has an average score of 37.1. The most common type of coffee produced by the two countries is Robusta coffee. This condition is caused by the structure of the coffee business in Indonesia, which small-scale farmers dominate; the quality of the coffee still needs to improve because it tends to be harvested before it is ripe.

In contrast, Vietnamese coffee farmers receive strong support from the government regarding coffee-related infrastructure and research. Furthermore, the results of the EPD analysis provide an overview of the dynamics of the position of coffee-exporting countries in international competition. The results of the EPD analysis, in general, show that the four main exporting countries have dynamics of export competition performance that tend to decline. Indonesia's performance during the three sub-periods remained in the Lost Opportunity and Falling Star positions. These results indicate a decrease in the export share of coffee and the export share of Indonesia's total products in the international market.

This study also analyzes the factors that influence coffee exports from Indonesia and other exporting countries, such as Brazil, Colombia, and Vietnam in the destination countries. The destination countries in question are the destination countries for Indonesian coffee exports with the largest export value: the United States, Egypt, and Japan. The Almost Ideal Demand System (AIDS) analysis shows that demand for Indonesian coffee in the United States market tends not to be influenced by coffee prices from competing countries and internal conditions in the United States. The price elasticity estimation results also show that Indonesian coffee tends to be inelastic in the US market. In contrast to Brazil, Colombia, and Vietnam, the demand for their coffee is influenced by the price of their coffee and the internal conditions of the United States. In the Japanese market, the demand for Indonesian coffee is positively influenced by the Japanese population. The price elasticity level of Indonesian coffee in the Japanese market is more elastic than in the United States market. On the other hand, there is a complementary relationship between Brazilian Arabica coffee and Vietnamese robusta coffee in the Japanese market. Finally, the demand for Indonesian coffee in the Egyptian market is positively influenced by the population of Egypt and the price of Brazilian coffee. Besides producing arabica coffee, Brazil also produces robusta coffee. An increase in the price of Brazilian coffee will increase the demand for Indonesian coffee, indicating a substitution relationship between the two. The price elasticity level of Indonesian coffee in the Egyptian market is the most elastic compared to the US and Japanese markets. The estimation results are an important point regarding the competitiveness of Indonesian coffee in the international market.

Recommendations

The elastic condition of Indonesian coffee causes its competitiveness to fluctuate. Steps to increase competitiveness can be taken by improving the quality of coffee beans through proper garden management and post-harvest handling. Furthermore, product diversification and increased added value, such as specialist and single-origin coffees, can be an effective strategy, as shown by the success of Gayo coffee in the international market. Market access can be improved through certification and international quality standards that are attractive to the market. Lastly, capacity building of farmers through education and training is important to produce high-quality coffee beans and overcome the practice of harvesting green picking that is still rife.

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