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ANALYSIS OF INDONESIAN AGRICULTURAL TRADE PERFORMANCE TO BRICS

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ABSTRACT

The BRICS alliance has become a significant player in the global economy, making it imperative for member nations to engage in strategic trade. With abundant natural resources and a thriving agriculture industry, Indonesia is well-positioned to capitalize on the trade prospects within BRICS. This study utilizes quantitative methods from secondary data. It employs analytical tools, including Revealed Comparative Advantage (RCA), Export Product Dynamics (EPD), and Intra-Industry Trade (IIT), to offer insights and evidence-based recommendations for shaping Indonesia's future trade policies on agricultural commodities within the BRICS framework. The results show that Indonesia's trade in agricultural products with the BRICS countries is positive, as it offers a high level of competitiveness during the period studied. The RCA analysis results show that Indonesian agricultural products are competitive in BRICS. This analysis also shows that India and China have the most significant impact on Indonesian agricultural trade with BRICS. Based on the EPD calculation results, Indonesian agricultural exports to BRICS countries are in the Rising Star quadrant. Based on the analysis, Indonesia's trade in agricultural products with BRICS countries shows a high level of integration with a value of 70.12, indicating significant similarities in the products exchanged.

Keywords: *agriculture, BRICS, competitiveness, export, trade*

BACKGROUND

The BRICS coalition, comprising Brazil, Russia, India, China, and South Africa, has emerged as a formidable force in the global economic landscape. These nations, characterized by their large populations, vast geographical expanse, and abundant natural resources, have collectively transformed into pivotal players in international trade and geopolitics. The BRICS coalition's increasing economic significance has prompted participating nations to strategically engage in trade relations and recognize the immense potential for mutual growth and prosperity (Ciuriak, 2023; Petrone, 2020; Putri et al., 2023; United Nations, 2023). Basically, BRICS countries control 30% of the world's territory, 42% of the population, 23% of the economy, and 18% of global trade (Prasetyantoko, 2023). BRICS is a developing country that has the potential to influence the world

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economy even the financial crisis does not significantly affect the country (Aleksia & Bakhtiar, 2023; Iqbal, 2022). The GDP in BRICS countries is predicted to increase due to the demographic bonus (Liu & McKibbin, 2022). The population in BRICS countries can be more prosperous than developed countries due to increased economic productivity through increased labor productivity that can be still improved (Streltsov et al., 2021). Among the countries keenly observing the opportunities within the BRICS framework is Indonesia. Located in Southeast Asia, Indonesia boasts a rich tapestry of agricultural resources and diverse commodities (Asian Development Bank, 2019; Basri & Hill, 2020; Keswani, 2019; Ngarayana et al., 2021). Its strategic geographical location and agricultural abundance position Indonesia as a prime candidate to harness substantial trade prospects within the BRICS group.

China stands out as the primary importer of Indonesian agricultural commodities, with a consistently rising trend year after year. Closely is India, which exhibits a fluctuating yet overall upward trajectory. Meanwhile, other BRICS nations, namely Brazil, Russia, and South Africa, have tended to contribute lower export values to Indonesia. Still, they have been steadily building positive trends in their respective contributions. Over the past ten years, BRICS member countries have contributed to Indonesia's agricultural export values as follows: Brazil, importing agricultural commodities totaling 35.96 million US Dollars; Russia, accounting for 68.43 million US Dollars; India, with a value of 41.66 million US Dollars; China, at 48.89 million US Dollars; and South Africa, with 30.13 million US Dollars. The export growth has maintained a consistently positive average value over the past decade. The average growth rate of Indonesia's agricultural commodity exports to BRICS countries over the past decade exhibits a promising trend. The average export growth values hover around 10% or higher, except India, which maintains an average growth rate of 5.77%. This figure serves as a cautionary signal for Indonesia, suggesting that the Indian export market may be nearing saturation for Indonesian agricultural commodities despite the continued positive trend (International Trade Centre, 2023a).

The primary objective of this study is to generate evidence-based recommendations that can inform Indonesia's future trade policies concerning agricultural commodities within the BRICS framework. In an era where international trade plays a pivotal role in a nation's economic development, understanding the intricacies of trade relations with BRICS countries holds immense importance for Indonesia's future economic prospects (Hooijmaaijers, 2021; Liu & McKibbin, 2022; Rath & Ridhwan, 2020a). This research endeavor is motivated by the belief that Indonesia, armed with a deeper understanding of its trade dynamics within the BRICS coalition, can make informed decisions to optimize its agricultural exports, foster economic growth, and enhance its global economic influence. As we delve into the detailed analysis of Indonesia's agricultural trade with BRICS nations, we aim to uncover patterns, trends, and opportunities to guide policymakers and stakeholders towards a more prosperous future. Indonesia has the potential to be part of BRICS due to its achievements as the fourth most populous country in the world and has experienced high average annual economic growth, being one of the 20 largest economies in the world and the largest economy in Southeast Asia.

In addition, Indonesia's foreign policy, ambitious development, capital transfers, development of infrastructure and connectivity projects, and interaction with major economies are also important and seem to be in line with BRICS development goals (Bonesh, 2023). However, BRICS can also be an alternative market for Indonesia especially in agricultural commodity exports. BRICS is a large market with rapid economic growth and also has strengths in key sectors such as energy, industry,

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natural resources, and technology (Putri et al., 2023). This article discusses a 5-years retrospective analysis of Indonesia's agricultural commodity trade with BRICS nations, examining competitiveness, performance, and integration. Analyses related to BRICS are related to its impact on the macroeconomy and diplomatic relations that arise due to the development of BRICS (Larionova & Shelepov, 2022; Liu & McKibbin, 2022; Putri et al., 2023). This research focuses more on international trade conducted by Indonesia with BRICS countries, especially on agricultural commodities because Indonesia's largest foreign exchange contributor comes from agricultural commodity exports. In addition, the focus on BRICS is new to see how this trade relationship can benefit Indonesia so that Indonesia can adjust its trade policy. This research aims to investigate the potential trading opportunities between Indonesia and the BRICS member countries (Brazil, Russia, India, China, and South Africa) through the utilization of three distinct analytical tools: Revealed Comparative Advantage (RCA), Intra-Industry Trade (IIT), and Export Product Dynamics (EPD). Using these three methods can provide a comprehensive analysis not only related to competitiveness but also the condition of export-import integration between countries and the dynamic state of competitiveness (Fitrianti et al., 2024).

RESEARCH METHODS

The emergence of BRICS countries as global economic powerhouses has generated substantial interest among policymakers and researchers worldwide. This study focuses on Indonesia's trade relations with BRICS members. Indonesia is one of the developing countries that has the potential to become a developed country as it is ranked as the first most powerful country in ASEAN and even fifth in Asia in terms of its economic growth (Saputra & Ali, 2021). This research adopts a quantitative approach and relies on secondary data sources. Various analytical tools, including the Revealed Comparative Advantage (RCA), Intra-Industry Trade (IIT), and Export Product Dynamics (EPD), are employed to glean insights from the data. Through a rigorous analysis of these metrics, we aim to provide a comprehensive understanding of Indonesia's trade dynamics with BRICS countries in the agricultural sector. Trade data for Indonesia and BRICS countries were obtained from reputable international databases, such as the World Bank, the United Nations, and the International Trade Centre (ITC). The study covers the most recent available data from 2017 to 2021. The primary variables include exports and imports of goods, categorized by agriculture segment (Harmonized Commodity Description and Coding System by European Union as group of Agricultural Product).

Revealed Comparative Advantage (RCA) Analysis

The RCA index is based on traditional trade theory and is relatively simple to calculate due to the type of data it relies on. By assuming that trade patterns mirror disparities among countries in both “relative costs and non-price factors,” RCA is believed to uncover the comparative advantage of trading partners. The RCA index is calculated using the Balassa index formula (Bhat et al., 2022; Santoso et al., 2022; Zuhdi et al., 2021).

$$RCAij = \frac{(\frac{Xki}{Xti})}{(\frac{Wk}{Wt})}$$

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Information:
$RCAij$: Revealed Comparative Advantage of product i in country j
Xki : The exports of product k by country i
Xti : The total exports of country i
Wk : The world exports of product k
Wt : The world total exports.
A product is considered to have a comparative advantage if RCA > 1.

Intra–Industry Trade (IIT) Analysis

The IIT is measured using the Grubel-Lloyd index, which calculates the share of intra-industry trade within total trade (Wiranthi & Mubarok, 2017; Wood et al., 2021).

$$IIT_{i,jk} = 1 - \left[\frac{X_{i,jk} - M_{i,jk}}{X_{i,jk} + M_{i,jk}}\right] x\ 100$$

Information:
$IIT_{i,jk}$: The value of Intra Industry Trade
$X_{i,jk}$: The export value of product i in country j to country k
$M_{i,jk}$: The import value of product i in country j to country k

IIT value varies from 0-100, with a higher IIT value indicating a higher degree of intra-industry trade (Chemsripong, 2004).

Export Product Dynamics (EPD) Analysis

The EPD analysis process involves tracking the developmental path of export products over a specific timeframe and assessing changes in both diversification and specialization (Carolin et al., 2024). Building upon Estherhuizen's framework, the Export Product Dynamic (EPD) methodology is used to gauge the performance of Indonesia's agricultural products in target markets. This EPD approach comprises a matrix categorizing behaviors into four distinct quadrants, as illustrated in Figure 1. The quadrant's position signifies a commodity's business capacity (X-axis) and market demand (Y-axis). Business capacity is evaluated based on the importing country's market growth percentage, while the growth in demand within destination countries determines market demand. Consequently, the interplay between market demand and business capacity gives rise to the positioning of statuses within these four quadrants (Purba et al., 2022; Putri et al., 2023).

The "rising star" status represents an optimal scenario where a product attains the highest rank in the realm of export trade, rapidly expanding its market share. Conversely, a "lost opportunity" denotes an unforeseen circumstance arising from a reduction in the domestic market share at a time when the export market is still experiencing growth. The "falling star" signifies a more unfavorable lost opportunity scenario, indicating an increasing percentage of agricultural commodities in the importing country while holding a diminished share in the global market, with the agricultural commodity trade in importing countries no longer exhibiting dynamism. Ultimately, the "retreat" position indicates that the agricultural commodity has stagnated and lacks competitiveness in the export market (Hasanah & Marwanti, 2024; Wati & Aini, 2022).

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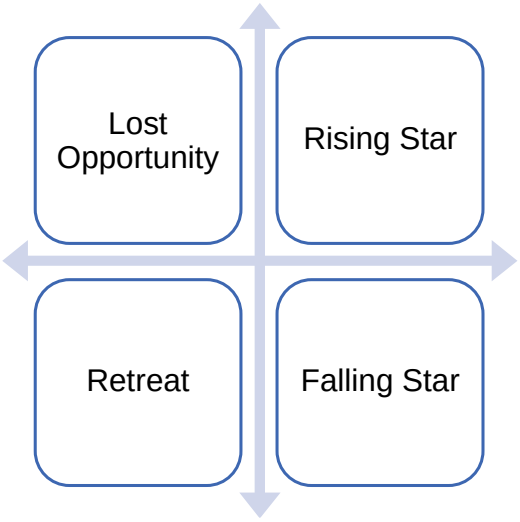

Figure 1. EPD Matrix
Source: Santoso et al. (2022)

Mathematically, business capacity (X-axis) was formulated as follows:

$$\frac{\sum_{t=1}^{n}\left(\frac{Xij}{Xiw}\right)t\ X\ 100\% - \sum_{t}^{t-1}\left(\frac{Xij}{Xiw}\right)t-1\ X\ 100\%}{T}$$

Meanwhile, market interest (Y-axis) was formulated:

$$\frac{\sum_{t=1}^{n}\left(\frac{Xj}{Xw}\right)t\ X\ 100\% - \sum_{t}^{t-1}\left(\frac{Xj}{Xw}\right)t-1\ X\ 100\%}{T}$$

Information:
Xij : The export value of Indonesia's agricultural products to a specific country i in US Dollars
Xiw : The export value of global agricultural products to the same country i, in US Dollars
Xj : The export value of all commodities from Indonesia to country i, in US dollars
Xw : The export value of all global things to that same country i, in US Dollars.

The variable T signifies the number of years under consideration, with T representing a specific year, denoted as t (Destiarni et al., 2021; Ulfah et al., 2023).

RESULT AND DISCUSSION

Indonesia's Trade With BRICS

Before BRICS was formed, Indonesia had been trading with BRICS countries for a long time, especially in bilateral trade. Several superior products have been exported by Indonesia to BRICS, with one of the largest products being agricultural products. One of the indicators used to measure Indonesia's export potential to BRICS is to look at the export value and product market share in each BRICS country (Rath & Ridhwan, 2020b). BRICS is a potential market for Indonesia, especially in reaching non-traditional export markets. Indonesia has a larger alternative market for its agricultural

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export commodities because BRICS has great potential in the development of energy, industry, natural resources, and technology. This also shows BRICS as a new force in the international economy. The agricultural commodities analysed are proxied through exports of edible oil and coffee, which are Indonesia's leading export commodities.

Since the last five years (2017-2021), it has been seen that exports of agricultural products to BRICS tend to fluctuate. China is an export destination country with the fastest export value increase compared to other countries. This condition is inseparable from the rise in China's economic scale since reform and opening occurred in the country (Yuan & Du, 2020). In 2017, the value of agricultural product exports to China was only 4.08 million US Dollars, and in 2022, the value of exports to China increased by 110% to reach 8.56 million US Dollars. However, if we look at the market share of Indonesian agricultural products in China, there is a decreasing trend of up to 10% from 17.71% to only 15.93%. If we look at it in terms of market share, Brazil is the country with the most significant increase in market share. It is because from 2017 to 2021, there was an increase in the market share of agricultural products by 37.31%, whereas, in 2017, the market share of agricultural products in Brazil was only 26.46% and increased to 36.33 in 2021. In line with the increase in market share, exports of agricultural products to Brazil have grown from only 325 thousand US Dollars in 2017 to 548 thousand US Dollars in 2021, or an increase of 68.60%. Brazil is experiencing the effects of climate change, which is making significant changes to its agricultural productivity (Pellegrina, 2022). Climate change has disrupted the agricultural activities in Brazil that provide most of the food consumed globally, requiring imports (Zilli et al., 2020). Furthermore, the export value of agricultural products to BRICS and their market share are outlined in Figure 2.

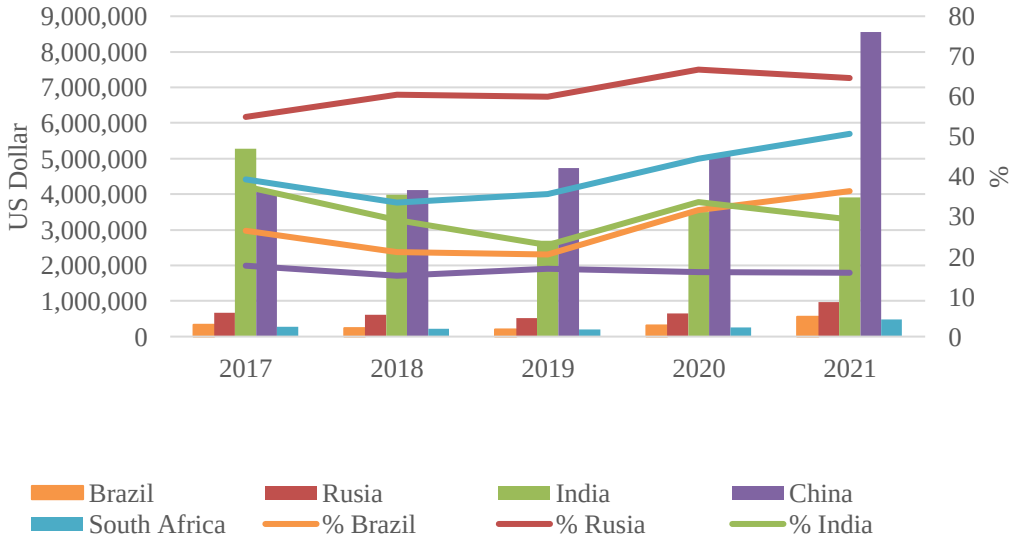

Figure 2. Export Value and Market Share of Indonesian Agricultural Products to BRICS
Source: International Trade Centre (2023b)

Competitiveness of Indonesian Agricultural Products in BRICS

Analysis of the competitiveness of Indonesian agricultural products in BRICS is determined using the Revealed Comparative Advantage (RCA) method. The competitiveness of agricultural commodities is based on a country's comparative advantage in a particular market. The market share of Indonesian agricultural products in BRICS is compared with the world market share of agricultural

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products in the same market, so the results of this comparison will produce an RCA value. The RCA value is then used as a basis for deciding whether Indonesian agricultural products are considered competitive in BRICS or not, provided that if the RCA value is > 1, it means that Indonesian agricultural products are competitive. If the RCA value is < 1, it can be interpreted otherwise (Wang et al., 2018).

The results of the RCA analysis show that Indonesian agricultural products have competitiveness in BRICS with an RCA value > 1 in the entire analysis period. However, from 2017 to 2021, there was a decrease in the RCA value from year to year, from the original RCA value reaching 3.84 to only 2.74 or a reduction of 28.79%. However, Indonesia's agricultural products are still competitive. The decline in RCA is influenced by the fact that there is a downward trend in the export value of Indonesian agricultural commodities to BRICS (Lestari et al., 2023; Shankar et al., 2023). The decline is not holistically happening in all BRICS countries. Further analysis was carried out for each BRICS country to determine the contribution to the decrease in RCA for each country. Based on the analysis results, it appears that India and China are the countries that contributed to the decline in the RCA value compared to other countries. It is reflected in the RCA values for both countries, which experienced a decrease from the beginning to the end of the year of analysis. On average, the RCA values for India and China decreased by 1.01% and 6.81%, respectively. Meanwhile, the RCA values for Brazil, Russia, and South Africa showed an increase of 28.71%, 7.47%, and 9.68%, respectively. Furthermore, the development of the RCA value of Indonesian agricultural products to BRICS is presented in Figure 3.

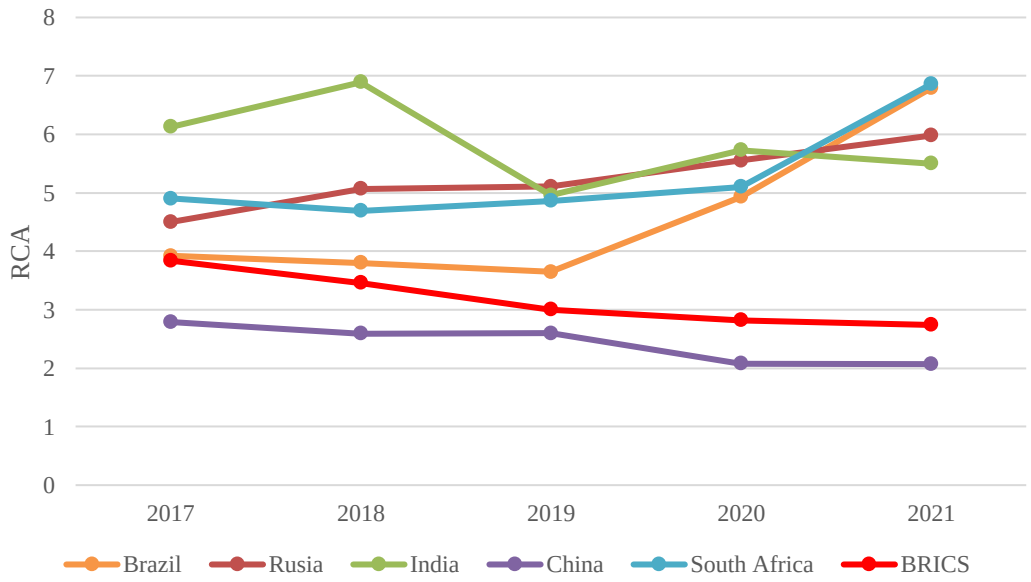

Figure 3. Development of the RCA Value of Indonesian Agricultural Products to BRICS
Source: International Trade Centre (2023b)

Based on this analysis, India and China are the countries that have the most significant impact on trade in Indonesian agricultural products to BRICS. The large population in these two countries (35.75% of the world's total population) has increased people's consumption so that to meet their needs, imports have become an option. On the other hand, India and China are potential countries for Indonesia to export agricultural products, so efforts need to be made to increase exports to these

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countries. Based on information from the International Trade Centre (International Trade Centre, 2023c), Crude Palm Oil (HS 151110) is the product with the most potential for export to India, with export potential reaching 15 billion US Dollars. Meanwhile, products that can be exported to China are Palm Oil (excluding crude) and Fractions (HS 1511190), with export potential reaching 992 million US Dollars.

The potential products that can be exported to Brazil are Palm Kernel and Babassu Oil (excluding crude) and Fractions (HS 151329) with a value of up to 32 million US Dollars. In comparison, the potential products that can be exported to Russia are Palm Oil (excluding crude) and Fractions (HS 1511190) with a value of up to 46 million US Dollars, and potential products that can be exported to South Africa are Palm Oil (excluding crude) and Fractions (HS 1511190) with a value of up to 15 million US Dollars.

Export Performance of Indonesian Agricultural Products to BRICS

It is interesting to note that palm oil products are products that are in great demand by BRICS compared to other agricultural products. This is reflected in the high value of Indonesian palm oil exports (HS 1511) to BRICS, which reached 8.8 billion US Dollars in 2021. It is undoubtedly an opportunity for Indonesia, considering that Indonesia is the largest palm oil-producing country in the world. In 2017, Indonesian palm oil production reached 243 million tonnes and increased to 256 million in 2021. If we look at the production of palm oil derivative products, it is known that Indonesian palm oil production is 38 million tonnes and will be 44 million tonnes in 2020. Meanwhile, Indonesian palm kernel production was 9 million tons in 2017 and increased to 10 million tons in 2020 (Food and Agriculture Organization, 2023a). The following is the production and export of Indonesian palm oil, which is presented in Figure 4.

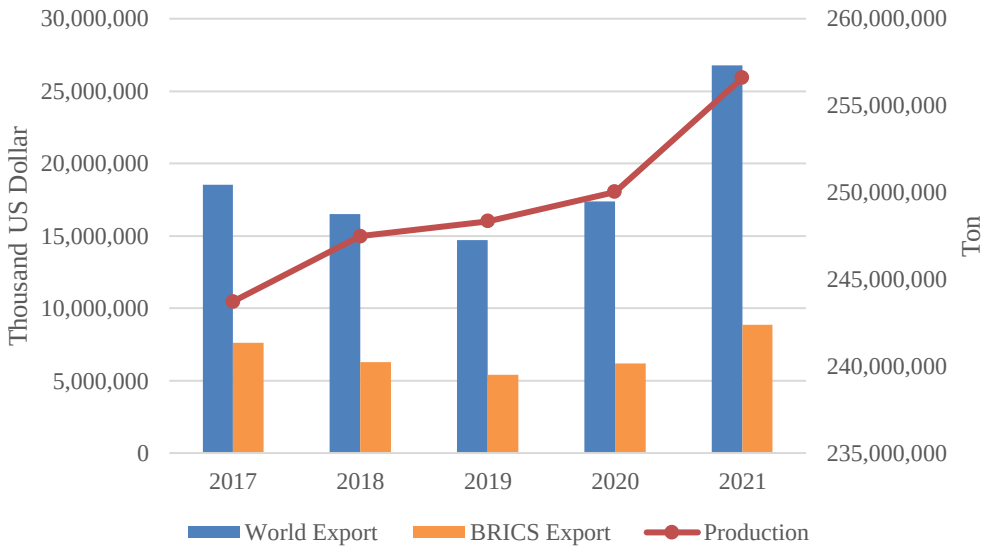

Figure 4. Production (ton) and Exports of Indonesian Palm Oil to the World and BRICS (Thousand US Dollars)
Source: Food and Agriculture Organization (2023b); International Trade Centre (2023b)

Besides that, coffee is also one of the best-selling commodities on the international market. In 2017, the value of Indonesian coffee exports (HS 090111) reached 1.75 billion US Dollars but fell

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to 850 million US Dollars in 2021. In the BRICS market, coffee exports contributed 12.46% of Indonesia's total coffee exports in 2017 and lost to 7.06% in 2021. The decline in export value is not in line with the increase in Indonesian coffee production, which reached 6.6% in the same period in 2017. Indonesian coffee production was only 718 thousand tons and will increase in 2021 to 765 thousand tons.

International Coffee Organization, (2023) reported that there was an increase in the level of domestic coffee consumption in the 2017-2021 period by 7.5%. Indonesian coffee consumption in 2016/2017 was 279 thousand tons and increased to 300 thousand tons in 2020/2021. This increase at least affects domestic coffee stocks, but if you look at trends in Indonesian coffee production and consumption, Indonesia should be able to maintain the value of its exports. Export is an important activity for Indonesia to earn foreign exchange (Wangke, 2020). One of the government's revenues is through foreign exchange, which is also a source of state imports (Sugiharti et al., 2020). Agricultural commodities are Indonesia's main export commodities, so they need to be maintained so that export activities are consistent. However, other factors, such as trade diversion by importing countries, are thought to be one of the factors causing the decline in Indonesian coffee exports to BRICS, the validity of which needs to be studied further. The following is the development of Indonesian coffee production, consumption, and exports to BRICS, as presented in Figure 5.

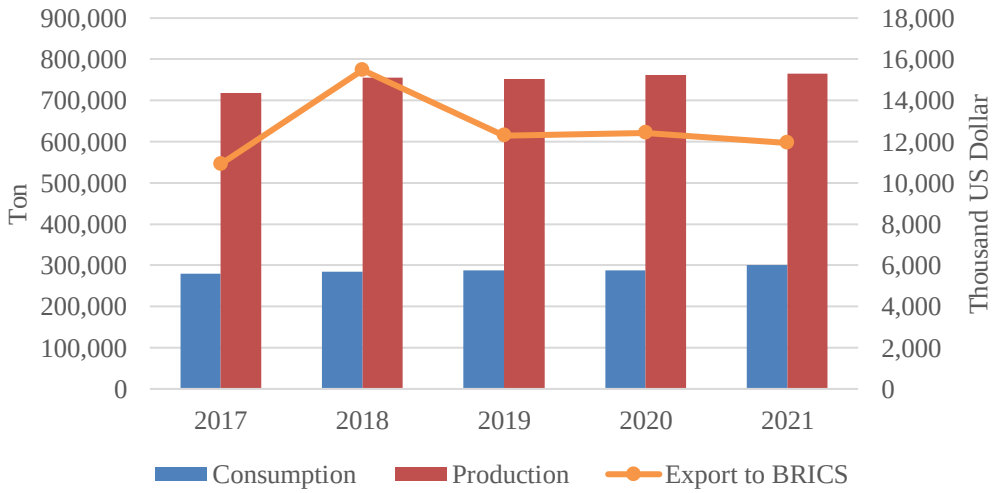

Figure 5. Development of Production (Ton), Consumption (Ton), and Exports (US Dollars) of Indonesian Coffee
Source: International Coffee Organization (2023b); International Trade Centre (2023b)

The aggregate performance of Indonesian agricultural product exports to BRICS is carried out using Export Product Dynamics (EPD). In general, EPD can map the export performance of Indonesian agricultural products into four quadrants: rising star, falling star, retreat, and lost opportunity (Riyanto et al., 2022). Based on the EPD calculation results, it is known that the export performance of Indonesian agricultural products to BRICS is in the rising star quadrant, which means that exports of Indonesian agricultural products can dynamically balance import demand in importing countries.

This export performance cannot be separated from the contribution of China and South Africa, whose export performance also occupies the rising star quadrant, while other countries such as Brazil

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and Russia are in the falling star quadrant, which indicates that Indonesia cannot meet the import demand of these two countries which is moving quickly and dynamically. Meanwhile, in India, the export performance of Indonesian agricultural products is in a retreat position, which means that Indonesian agricultural products are no longer in demand by the Indian market. This condition could result from trade creation because the Indian Government is so massive in forming Free Trade Agreements (FTA) with other countries (Ministry of Commerce and Industry of India, 2023). Furthermore, the export performance of Indonesian agricultural products to BRICS, as stated in the EPD matrix, is presented in Figure 6.

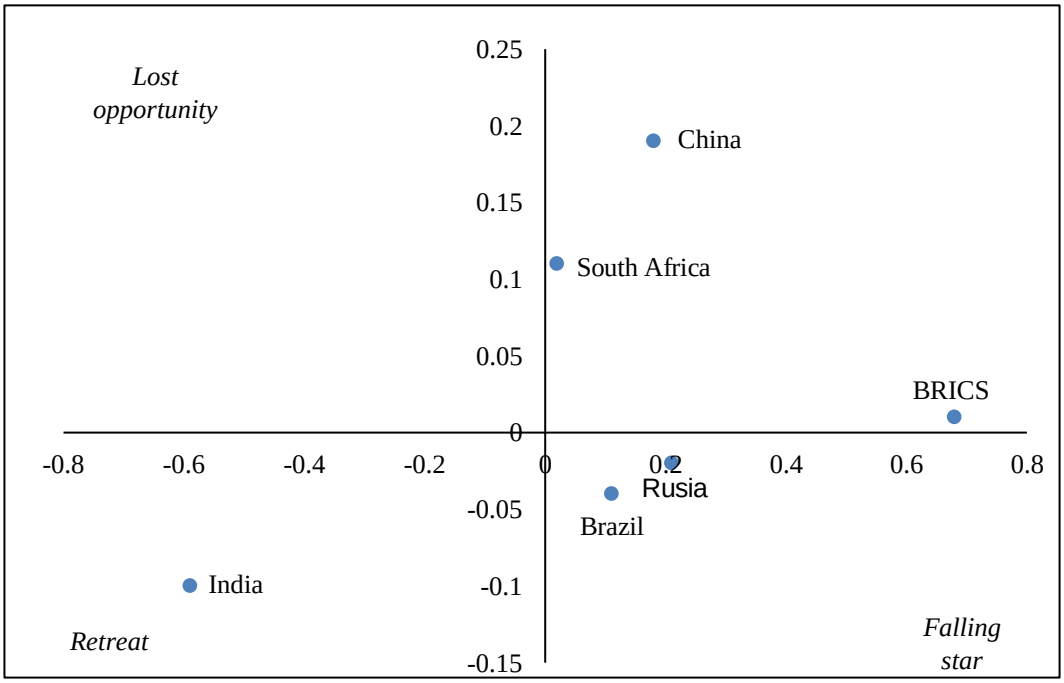

Figure 6. EPD Matrix of Export Performance of Indonesian Agricultural Products to BRICS
Source: International Trade Centre (2023b)

Integration of Indonesian Trade With BRICS

Intra-industry trade between countries with similar endowment factors is growing rapidly (Yergiin & Mercan, 2012). It has become something that cannot be avoided anymore because of the increasingly widespread open economic model implemented by each country. This open trade has encouraged trade integration between trading partner countries because each country struggles to achieve economies of scale. Indonesia's trade integration into BRICS can be measured using Intra Industry Trade (IIT) Index analysis. IIT describes trade between countries (export-import) involving similar commodities (Bojnec & Fertő, 2016). Based on the analysis results, trade-in Indonesian agricultural products with BRICS has strong integration with a value reaching 70.12.

This value indicates similarities in the products traded between the two parties. That can be understood considering that some BRICS member countries such as Brazil, China, and India have a similar comparative advantage to Indonesia, where the agricultural sector is a prominent industry in those nations. Their respective IIT values further confirm this. Brazil and China each have an average IIT score of 68.66 and 67.22, indicating strong trade integration with Indonesia. India and Russia, on the other hand, have IIT values of 47.15 and 34.25, respectively, signifying moderate trade integration

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with Indonesia. Meanwhile, South Africa is one of the countries with weak trade integration with Indonesia, with an IIT score of 24.23. Below are the results of the IIT analysis presented in Table 1.

Table 1. Intra-Industry Value of trade in Indonesian agricultural products to BRICS

Country	Year					Average
	2017	2018	2019	2020	2021	
Brazil	65.17	70.77	73.83	73.66	59.86	68.66
Rusia	54.30	65.70	40.67	7.13	3.47	34.25
India	25.48	41.47	47.44	47.84	73.55	47.16
China	71.28	76.92	71.78	66.68	49.44	67.22
S.Africa	19.43	25.07	32.28	30.86	13.52	24.23
BRICS	62.22	73.27	74.54	73.79	66.78	70.12

Source: Processed from International Trade Centre (2023a)

CONCLUSION AND SUGGESTION

Indonesia's trade in agricultural products with the BRICS countries is positive, as it offers a high level of competitiveness during the period studied. The RCA analysis results show that Indonesian agricultural products are competitive in BRICS, with an RCA value greater than one throughout the analysis period. This analysis shows that India and China have the most significant impact on Indonesian agricultural trade with BRICS. Based on the EPD calculation results, Indonesian agricultural exports to BRICS countries are in the Rising Star quadrant. It means They can efficiently meet the import demand in the importing countries. Based on the analysis, Indonesia's trade in agricultural products with BRICS countries shows a high level of integration with a value of 70.12, indicating significant similarities in the products exchanged. This can be attributed to several BRICS member countries, such as Brazil, China, and India, sharing comparative advantages with Indonesia, with agriculture playing a significant role in each country's economy. The Government of Indonesia must play a more active role in increasing the quantity of Indonesian agricultural product exports to BRICS. Improvements in the production side are the main pillars that need to be addressed, along with monitoring the quality of the products. Apart from that, regulations related to export trade aspects also need to be made easier by not providing additional costs that could burden producers. The Government can substitute by offering incentives, which, in the end, can encourage producers to produce their products better.

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