

Export Competitiveness Analysis of Pepper (*Piper Nigrum* L.) Commodity in the International Market

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ABSTRACT

Indonesia is popular as a country relying on the agricultural sector as livelihood and a backbone to support the national economy. One of the current challenges pepper producers encounters is increased competitiveness between producing countries. This increased competitiveness is reflected in the more considerable global pepper production growth than in export growth. This study aims to analyze (1) comparative competitiveness, (2) competitive competitiveness, and (3) trade specialization index. This study used time series secondary data from 2006 to 2020. The study employed an RCA to analyze comparative competitiveness, an EPD to analyze competitive advantage, and an ISP to analyze whether Indonesia tends to be an exporter or importer of pepper commodities. The research results showed that Indonesia, Vietnam, and Brazil are essential in the world pepper trade. The results of the calculation of the RCA index for the 2006-2020 period include that Indonesian, Vietnamese, and Brazilian peppers have a comparative advantage or strong competitiveness in the international market because the RCA value is > 1 . Indonesian and Brazilian peppers are in the Rising Star position, indicating that these two countries have a comparative advantage and a competitive advantage. Meanwhile, Vietnam is in a lost opportunity position. The ISP values for Indonesian, Vietnamese, and Brazilian pepper have an average of 0.72, 0.82, and 0.77, respectively. This showed that these three countries have competitive solid capabilities or tend to become pepper-exporting countries.

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1. Introduction

Indonesia is popular as a country that relies on the agricultural sector as a source of livelihood and one of the pillars that improve the national economy. Indonesia is an agricultural country with great potential in the agricultural sector (Asrol and Heriyanto 2017). The agricultural sector in Indonesia must be developed and improved following population growth, economic development, and technological advances to increase agricultural crop production. Some of the commodities with advantages in the international market, i.e., pepper, clove, and nutmeg.

One of the countries that produces the best spices in the world is Indonesia. Besides, Indonesia, Malaysia, and Singapore have the same advantages as agricultural conditions with long-term benefits at the ASEAN level (Jambor, 2018). The level of demand for pepper plays

a crucial role in shaping the competitiveness of pepper in both the local and global markets. Generally, the pepper industry in Indonesia tends to focus more on exporting than catering to domestic consumption (Pusdatin, 2015). Indonesia's pepper production must support competitiveness through pepper demand to continue to supply pepper in the export market. Based on the land area, it can be seen that the highest land area for pepper commodities from 2006-2020 was in 2013, namely 91,000 tons with a land area of 171,900 ha. Then, there were fluctuations in land area and production in early 2006 and 2014-2020, even though there was an increase in pepper production of 89,041 tons in 2020 with a total of 198,222 hectares.

The decrease in the area and pepper production was caused by land conversion by farmers. Even though there are fluctuations in land area, pepper production and productivity tend to increase yearly. Therefore, the average production of Indonesian pepper in 2006-2020 was 85,400.93 tons, with an annual land area of 182,533.86 tons and an annual productivity of 0.47 tons/ha.

The superior commodity with significant potential for Indonesian economic development is pepper. Pepper (*Piper Nigrum* L.) is Indonesia's main traditional export commodity and is recorded as the first spice traded to Europe via Saudi Arabia and Persia. Plantation crops such as spices show a high competitive value in international trade. International trade involves export and import transaction processes separated from individuals in the domestic market. It involves two or more countries. Export is a legal transaction of items or commodities from one country to another. Bulk export of items requires intervention from customs in both sending and receiving countries. The recovered export sector supports economic growth for most countries in Southeast Asia (Apridar, 2007). Therefore, export is a critical process in the economic continuity of a country. Besides export, import is also a vital part of the international trade.

Currently, the agricultural sector is on the path to high sustainable growth. The leading commodity from the Indonesian plantation sub-sector includes pepper (*Piper Nigrum* L) (Ariesha, Alamsyah, and Malik 2019). In Indonesia, there are two types of pepper, i.e., black pepper from Lampung and white pepper from Bangka (Kurnianto 2014).. The competitiveness of pepper in both the local and worldwide markets is significantly influenced by its demand. In Indonesia, the pepper industry primarily leans towards exports rather than satisfying domestic consumption (Pusdatin, 2015).

Following the open trade flow in the ASEAN region, the ASEAN free trade is enacted as the ASEAN Economic Community (AEC). It impacts the Indonesian trade performance. The advancement of unrestricted trade among ASEAN countries is expected to open a more extensive Indonesian export opportunity, including the Indonesian pepper commodity export commodity in the ASEAN market. Extensive pepper export opportunities can backfire if Indonesia fails to enforce excellent management. Highly competitive countries will get optimal benefits from international trade. In international trade, every country must possess specialization and the capability to contend for established markets effectively. Market control by a country can be a measure of a country's ability to compete for certain commodities (Patone, *et al.*, 2020)

Greater openness in trade within each nation fosters the acceleration of global interconnectedness. Considering this fact, Indonesia must proactively prepare for and harness this situation to maximize its advantages as a nation embracing an open economic system. Countries with open economies heavily depend on exports as a driver of economic growth in the global landscape. This is because export activities play a pivotal role in influencing the

trajectory of the domestic economy. With increased exports, Indonesia can enhance its trade balance and create new employment opportunities (Zuhdi, 2016)

In 2016, Indonesia became the fifth largest exporter of pepper in the market world. The contribution of Indonesian pepper exports in international trade is as much as 55.15 thousand tons, equivalent to 5% of total pepper exports worldwide. Indonesian pepper export competitor in the world market is India, which contributed 327.83 thousand tonnes (29.56%), Vietnam 182.50 thousand tons (16.45%), China 181.26 thousand tons (16.34%), and Spain, which reached 60.68 thousand tonnes (5.47%) of world exports. Pepper contributed to the country's foreign exchange because Indonesian pepper is superior to pepper from other countries. Pepper Indonesia is a spice that is unique and irreplaceable by other products.

In the ASEAN region, Indonesia has competitors in pepper production and export, i.e., Vietnam and Brazil. The three countries have comparative and competitive competitiveness. It was observed in 2021 that Vietnam dominated global pepper export with an export volume of 161,431.00 tonnes, followed by Indonesia with 84,491.18 tonnes at the second rank and Thailand with 5,181.42 tonnes at the tenth rank. One of the current challenges encountered by pepper-producing countries is increased competitiveness between producing countries.

This increased competitiveness is reflected in the more considerable global pepper production growth than in export growth. When two countries compete, both are in good condition; therefore, competitiveness is identified as a means of providing for developing those commodities (Prasetyo, *et al.* 2020). With a small size, Exported commodities could be more decisive and have a high income, so there is a need for benchmarks because of commodity competitiveness in contribution to foreign exchange. The competitiveness of a commodity can be analyzed through the level approach profits and efficiency in a commodity (Viana *et al.*, 2020). Hence, each Indonesian pepper producer must improve their competitiveness against other competing countries. Based on this explanation, pepper export from Indonesia and other competing countries has comparative and competitive advantages and the strongest competitiveness among countries in the international market. Therefore, the problems can be identified as follows:

1. How is the comparative competitiveness of Indonesian pepper in the international market from 2006 – 2020?
2. How is the competitive competitiveness of Indonesian pepper in the international market from 2006 – 2020?
3. How is the Indonesian trade specialization index for the pepper commodity in the international market?

In general, this study aims to analyze the export competitiveness of Indonesian pepper. Specifically, this study aimed to:

1. Analyze the comparative competitiveness in the international market from 2006 – 2020.
2. Analyze the competitive competitiveness in the international market from 2006 – 2020.
3. Analyze the Indonesian trade specialization index for the pepper commodity in the international market from 2006 – 2020.

2. Methodology

This study used time series secondary data from 2006 to 2020. Secondary data collected for this study were statistical: Indonesian pepper land area, Indonesian pepper

production, Indonesian export volume, Indonesian export value, Vietnamese pepper land area, Vietnamese pepper production, Vietnamese export volume, Vietnamese export value, Brazilian pepper land area, Brazilian pepper production, Brazilian export volume, and Brazilian export value. The data were acquired from the Food and Agriculture Organization (FAO), Trademap, and United Nations Commodity Trade (UN Comtrade).

3.1 Revealed Comparative Advantage (RCA)

The method utilized to analyze the comparative competitiveness of the pepper commodity in this study was the Revealed Comparative Advantage (RCA). RCA (Revealed Comparative Advantage) calculations compare the ability to export a commodity from a particular country with total world exports. The RCA (Revealed Comparative Advantage) method is based on the concept that inter-regional trade shows a comparative advantage for certain products owned by a region. If the proportion of a product's value share relative to the total product surpasses the proportion of that product's share relative to the total product in other regions. The measured variable assesses how well a product performs in exports concerning a country's total export volume in comparison to the product's value in the global trade market (Krisnamurthi, 2012). RCA can be formulated as follows:

$$RCA_i = \frac{XO_i / X_{ti}}{XWO_i / XW_t} \dots\dots\dots (1)$$

Note:

- XO_i = Indonesian pepper export value
- XWO_i = Total global pepper export value
- X_{ti} = Total Indonesian export value for all commodities
- XW_t = Total global export value for all commodities

If the RCA index value is higher or equal to one ($RCA \geq 1$), the country exhibits a comparative edge or heightened competitiveness exceeding the global norm. Meanwhile, if the RCA index value is smaller than one ($RCA < 1$), the country lacks a comparative edge or displays limited competitiveness, exceeding the global average.

3.2 Export Product Dynamics (EDP)

This approach assesses how a product performs within the market over time. The EPD technique gauges the competitive edge of specific goods from a particular nation. Should the product's growth surpass the norm and persist over an extended duration, it could contribute significantly to a country's export revenue (Hady, 2004). However, the study analyzed the competitiveness of Indonesian peppers from 2006 – 2020 for the export market. The EPD method consists of matrices placing analyzed products into four categories.

Table 1. Matrix of Competitiveness Position with The EPD Method

Share of Country's Export in World Trade	Share of Product in World Trade	
	Rising (Dynamic)	Falling (Stagnat)
Rising (Competitive)	Rising Star	Falling Star
Falling (Non-Competitive)	Lost Opportunity	Retreat

As illustrated in Table 2, the product's competitive standing can be translated from its placement within one of the quadrants in Figure 1. This in-quadrant position presents the

business strength (axis-X) and market appeal (axis-Y) of a product, formulated as follows (Abdullah, 2002).

$$sumbuX = \frac{\sum_{t=1}^n \left(\frac{X_{ij}}{W_{ij}}\right)_t \times 100 \% - \sum_{t=1}^n \left(\frac{X_{ij}}{W_{ij}}\right)_{t-1} \times 100 \%}{T}$$

Meanwhile, market appeal (axis-Y) is mathematically formulated as follows:

$$sumbuY = \frac{\sum_{t=1}^n \left(\frac{X_t}{W_t}\right)_t \times 100 \% - \sum_{t=1}^n \left(\frac{X_t}{W_t}\right)_{t-1} \times 100 \%}{T}$$

Note:

- X_{ij} : Indonesian pepper export value
- X_t : Total Indonesian export value
- W_{ij} : Global pepper commodity export value
- W_t : Total global export value
- T : Number of years accounted for

3.3 Trade Specialization Indexs (ISP)

The Trade Specialization Index (ISP) is a standard measure of competitiveness. The Trade Specialization Index (ISP) evaluates the contrast between a country's net trade value and its total trade value. The Trade Specialization Index (ISP) is used to analyze a product's position or development stages (Simangunsong, *et al.* 2016). This index is valuable to observe whether Indonesia tends to be an exporter or importer region. In this study, the export and import of Indonesian peppers were calculated annually from 2006 – 2020. ISP can be mathematically formulated as follows (Bustami & Hidayat, 2013)

3. Results and Discussion

Revealed Comparative Advantage (RCA) analysis is an index used to measure the competitiveness of certain commodities owned by a country by showing the competitiveness of the country's commodities against commodities of the same type made by several other countries in the world. A competitive commodity will be able to compete with other countries in the world market and survive for a limited period. The longer a commodity lasts, the greater its competitiveness in the world market. The size of a country's RCA value is strongly influenced by the development of that particular country's commodity exports. If the volume of exports increases, then exports also increase, so the RCA value of certain commodities from that country also increases. Table 3 shows the results of RCA analysis calculations for 3 exporting countries in 2006-2020 on the international market.

Table 2. RCA Values of Indonesian, Vietnamese, and Brazilian Peppers from 2006 -2020 in The International Market

Year	RCA			Criteria
	Indonesia	Vietnam	Brazil	
2006	6.962	4.639	6.256	
2007	8.412	40.142	6.119	
2008	10.131	37.025	4.865	
2009	7.743	38.838	4.930	
2010	10.478	38.369	3.734	
2011	6.044	41.696	4.317	
2012	11.546	35.030	4.189	
2013	9.942	34.621	4.493	RCA > 1
2014	7.885	33.778	5.672	
2015	12.039	25.230	6.063	
2016	9.871	26.383	4.476	
2017	5.734	20.866	5.144	
2018	4.511	16.003	4.443	
2019	4.512	12.963	4.186	
2020	4.508	10.070	3.916	
Rata-rata	8.021	30.244	4.854	RCA > 1

Source: UN Comtrade, 2021 (Processed).

Table 3 reveals that the RCA index calculation results from 2006 – 2020 indicate that Indonesian, Vietnamese, and Brazilian peppers have comparative advantages and strong competitiveness in the international market, as seen by the RCA value >1. The highest RCA values of the three countries belonged to Vietnam, with 42.639 in 2006, followed by Indonesia, 12.039 in 2015, and Brazil, 6.256 in 2006. Meanwhile, the lowest RCA values were acquired by Indonesia in 2018 with 4.511, Vietnam with 10.070 in 2020, and Brazil with 3.734 in 2010. The average Indonesian RCA value was 8.021, exceeded by Vietnam with 30.244 and Brazil with 4.854. It shows that Indonesia, Vietnam, and Brazil have a higher market share than the average global export market share of the pepper commodity. Hence, the three countries have comparative advantages for the pepper commodity. It concludes that Indonesia, Vietnam, and Brazil have comparative advantages and strong competitiveness for pepper export in the global market.

This aligns with research conducted by (Aprilia *et al.*, 2015).. The objective of this research is to assess Indonesia's competitive standing and specialization in the global pepper market during the period from 2009 to 2013. The findings of this investigation reveal that Indonesian pepper holds a comparative edge in international trade. Proven by calculations RCA in 2013, RCA Indonesia (17.26) is above Brazil (7.70), India (3.60), and Malaysia (3.13) but below Vietnam (44.77).

Export Dynamic Product (EPD) analysis is an indicator that can be used to measure the market position of a country's products in the international market. The EPD method measures whether Indonesia's pepper commodity and its competitor countries are sustainable (dynamic) in the international market based on a country's competitive advantage. EPD uses market attractiveness as measured by demand growth and business strength as measured by market share growth. The position of pepper exporters in the international market is divided into four quadrants, namely Quadrant I (Rising star), Quadrant II (Falling star), Quadrant III (Lost opportunity), and Quadrant IV (Retreat). Table 4 shows the market position based on EPD

calculations for Indonesian pepper commodities and their competing countries in the international market from 2006 to 2020.

Based on Table 4 of the EPD analysis from 2006 – 2020, Indonesia and Brazil were in the rising star position concerning pepper export trade in the international market. The rising star market position shows that pepper commodities of both countries are ideal since the commodities are dynamic, where the growth is rapid and marked by increasing international demands. Indonesian and Brazilian peppers’ rising star market position demonstrates that both countries have comparative and competitive advantages in conducting pepper export in the international market. Competitive advantages of a country can only be built through continuous innovation via technology utilization, entrepreneurship, productivity improvement, and provision of skilled labor. It aims to fulfill the increasing demands of the international market.

Meanwhile, the EPD position of the pepper commodity in Vietnam was at the lost opportunity position, i.e., a condition of declining market shares of pepper commodities in the international market. In contrast, the Vietnamese export market’s appeal increased. This condition causes Vietnam to lose market share or export coverage for the pepper commodity in the international market. The export market share loss of the pepper commodity is caused by increasing pepper consumption for domestic industrial needs; thus, the export volume of the Vietnamese pepper in the international market declines.

Table 3. Market Position Based on EPD Calculation of Pepper Commodities In Indonesia and Competing Countries in The International Market Of 2006 – 2020.

Year	Position		
	Vietnam	Indonesia	Brazil
2006	-	-	-
2007	Rising Star	Rising Star	Rising Star
2008	Retreat	Falling Star	Retreat
2009	Rising Star	Lost Opportunity	Rising Star
2010	Retreat	Falling Star	Retreat
2011	Rising Star	Lost Opportunity	Rising Star
2012	Lost Opportunity	Rising Star	Rising Star
2013	Retreat	Retreat	Falling Star
2014	Rising Star	Lost Opportunity	Rising Star
2015	Lost Opportunity	Rising Star	Rising Star
2016	Rising Star	Lost Opportunity	Lost Opportunity
2017	Retreat	Retreat	Retreat
2018	Retreat	Retreat	Retreat
2019	Lost Opportunity	Rising Star	Lost Opportunity
2020	Lost Opportunity	Rising Star	Rising Star
Rata-rata	Lost Opportunity	Rising Star	Rising Star

Source: UN Comtrade, 2021 (Processed).

A decrease in the pepper export volume in Vietnam is affected by the increasing domestic pepper consumption, which decreases the export value, leading Vietnam to lose the opportunity. The increasing pepper consumption in Vietnam improves productivity within the available area, allowing pepper production growth rate to fulfill domestic and international

market demands. Hence, Indonesian, and Brazilian peppers at the rising star position have comparative and competitive advantages in conducting pepper export in the international market. Meanwhile, Vietnam was in the lost opportunity position, i.e., a condition of declining market shares of pepper commodities in the international market, while the Vietnamese export market's appeal increased. This condition causes Vietnam to lose market share or export coverage for the pepper commodity in the international market.

The Trade Specialization Index (ISP) serves as a metric employed to assess a product's status or stage of development, providing insights into a country's inclination towards being an exporter or importer. ISP is calculated by comparing the discrepancy between a country's net traded value and its total trade value. ISP values range from -1 to +1. When the value is positive (falling between 0 and 1), it signifies robust competitiveness for the given commodity, indicating that the country will likely be an exporter of that commodity and vice versa. Table 4 presents the analysis results of the trade specialization index of Vietnamese, Indonesian, and Brazilian peppers from 2006 – 2020.

Table 5. ISP Values of Indonesian, Vietnamese, and Brazilian Peppers from 2006 – 2020.

Year	ISP		
	Indonesia	Vietnam	Brazil
2006	0.81	0.95	0.96
2007	0.86	0.91	0.92
2008	0.87	0.83	0.91
2009	0.82	0.87	0.94
2010	0.87	0.72	0.92
2011	0.78	0.85	0.94
2012	0.87	0.76	0.95
2013	0.86	0.80	0.94
2014	0.62	0.89	0.96
2015	0.85	0.72	0.97
2016	0.75	0.85	0.37
2017	0.61	0.88	0.58
2018	0.43	0.81	0.43
2019	0.34	0.78	0.38
2020	0.42	0.75	0.35
Average	0.72	0.82	0.77

Source: Trademap, 2021 (Processed)

Based on Table 5, the three pepper exporting countries in the international market had positive ISP values ($ISP > 0$). The ISP values for Indonesian pepper from 2006 to 2020 were positive, with an average of 0.72. It indicates that Indonesia has strong competitiveness and tends to be an exporting country, although it still requires imports from other countries in an insignificant amount. Vietnam's Trade Specialization Index (ISP) values from 2006 – 2020 were positive, with an average of 0.82. It indicates that Vietnam has strong competitiveness and tends to be an exporting country, although it still requires imports from other countries.

As the third biggest pepper exporter worldwide, Brazil also had a positive average ISP value, i.e., 0.77. It indicates that Brazil is competitive and tends to be an exporting country. Based on the import data from The United Nations Trade, Brazil has fewer import amounts

than Vietnam and Indonesia. Therefore, it concludes that the ISP values of Indonesia, Vietnam, and Brazil were 0.72, 0.82, and 0.77, respectively. It shows that these three countries have strong competitiveness and tend to be pepper-exporting countries.

4. Conclusion

Based on study findings and discussion, the conclusions drawn are calculation results of the RCA index from 2006 – 2020 show that Indonesian, Vietnamese, and Brazilian peppers have comparative advantages or strong competitiveness in the international market since RCA values >1 . Indonesian and Brazilian peppers taking the rising star position show that both countries have competitive and comparative advantages. Meanwhile, Vietnam was at a lost opportunity position, i.e., a condition of declining market shares of pepper commodities in the international market, while the export market's appeal increased. This condition causes Vietnam to lose market share or export coverage for the pepper commodity in the international market. ISP values of Indonesian, Vietnamese, and Brazilian peppers have an average of 0.72, 0.82, and 0.77, respectively. It shows that the three countries have strong competitiveness or tend to be exporting countries.

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