

## Analysis of Market Structure and Competitiveness of Indonesian Pepper Exports Against Vietnam, China, The United States and Germany

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**Keywords :** *Pepper Export, Hirschman-Herfindahl Index, Concentration Ratio, Revealed Symmetric Comparative Advantage, Export Product Dynamic.*

*Abstract: Indonesia is one of the largest pepper producers in the world. Indonesia's pepper exports are mostly destined for Viet Nam for re-export purposes. Therefore, the government supports direct exports to major countries such as the United States, Germany, and China. The competition in the world pepper trade is very tight, judging from the intensity of the countries that are included in the world pepper trade. This study aims to determine the market competition structure and competitiveness of Indonesia's pepper exports for the 2003-2022 period. The method used is descriptive statistics. The analyses used in this study were the Hirschman-Herfindahl Index (HHI), Concentration Ratio (CRn), Revealed Symmetric Comparative Advantage (RSCA), and Export Product Dynamic (EPD). The results of the analysis show that the pepper market structure in Vietnam, China, the US, and Germany is in the form of an oligopoly with high market concentration. The RSCA value of Indonesia's pepper is greater than that of Brazil. This means that Indonesia has a comparative advantage and is highly competitive. Meanwhile, China's EPD value shows the position of the Rising Star. Viet Nam and the US show the position of Lost Opportunity. Meanwhile, Germany showed the position of Retreat.*

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### Introduction

Indonesian spices are one of the most exported commodities with the best quality in the world. Among the many spice commodities produced, pepper is a spice commodity that can be utilized to develop exports. Pepper is called the king in the spice group (King of Spices) and it has a very distinctive use and cannot be replaced with other spices (Wahyudi et al., 2017). Indonesia's pepper trade has been carried out since the colonial period. The Lampung area has been the center of the pepper trade at that time. Since the last five years, pepper

has not been able to occupy a position of top three as the leading commodity in the plantation sector. Data from 2021 shows that pepper only occupies the eighth position in the plantation group (Kementrian Pertanian, 2022). The following is the development of Indonesia's pepper exports to four central countries:

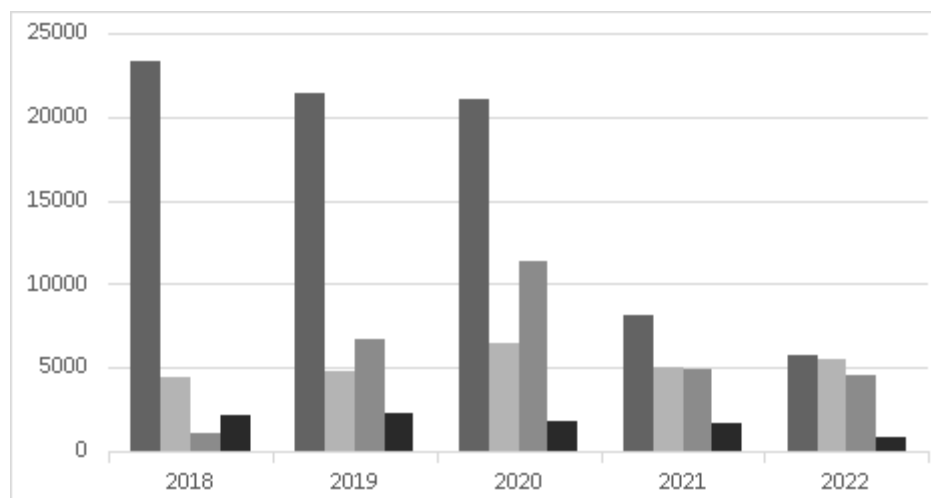


Figure 1. Development of Indonesian Pepper Exports

Sumber : (UN Comtrade, 2022), data processed

In the graph above, it can be seen that the volume of pepper exports in the four central destination countries continues to fluctuate. Vietnam is the country with the largest volume of pepper imports from Indonesia, but its development tends to decline. The biggest decline occurred in 2021, which reached 61.32%. In contrast to the United States, which shows an upward trend. Although the value of Indonesia's pepper exports to the US had decreased in 2021 by 22.81%, it increased again in 2022. Indonesia's pepper exports to China have also fluctuated. In 2018 to 2020 it showed an upward trend, but inversely in 2021 and 2022 which continued to decline. Meanwhile, pepper exports to Germany have decreased every year. Although the four countries are the leading market shares, the development of Indonesian pepper exports fluctuates every year and tends to decline.

Of the four countries that import Indonesian pepper, it is not yet known which countries provide greater benefits for Indonesian exports. Most of Indonesia's pepper is imported by Vietnam, but the country offers a relatively small selling price compared to other countries. Therefore, the profit earned from these exports is also relatively small. Plus Vietnam is also one of the largest pepper producing countries in the world. This means that Vietnam re-exports by mixing pepper products from Indonesia and domestic pepper. In 2019, the Indonesian government limited pepper exports to Vietnam with the aim that Indonesian pepper could export directly to major countries such as Europe and America (Fathya et al., 2021). Despite the restrictions, the value of pepper exports to Vietnam since the last five years has remained in the first position as the largest importer of pepper from Indonesia

The Indonesian government continues to promote pepper exports to major countries such as the United States, China, and Europe. In 2022 the demand for pepper from the United States of America reached 58.33 tons or comparable to 299,984 US Dollars. While the demand for pepper from China reached 7.94 tons or the comparable of 38,232 US Dollars (UN

Comtrade, 2022). The United States and China import pepper from Indonesia for domestic consumption purposes. In addition, pepper from Indonesia is also considered to have a distinctive taste and adds to the flavor of their dishes (Anggraeni & Budiarti, n.d.). Meanwhile, Germany is one of the countries with the highest demand in the European region. Pepper is considered a staple spice that has specific characteristics, making it difficult to find a substitute. The European market offers a price advantage over the Asian market for high-quality black pepper. Germany is therefore a potential market for Indonesian pepper (CBI, 2023).

Indonesia is popular for its distinctive pepper production. *Lampung Black Pepper* and *Muntok White Pepper* are iconic Indonesian pepper products. The development of Indonesian pepper products is also supported by the use of technology and the times. There are internal organizations that oversee the domestic pepper industry groups such as the Agricultural Technology Assessment Center (BTP) and the Regional Agriculture Office. Both organizations are able to change domestic pepper products to be more competitive with products from other countries. The advantages possessed by domestic pepper do not necessarily make Indonesian pepper able to dominate the market. Competition in the world pepper trade is quite crucial. There are many countries involved in the world pepper trade. In 2022, around 110 countries managed to make transactions to various foreign countries.

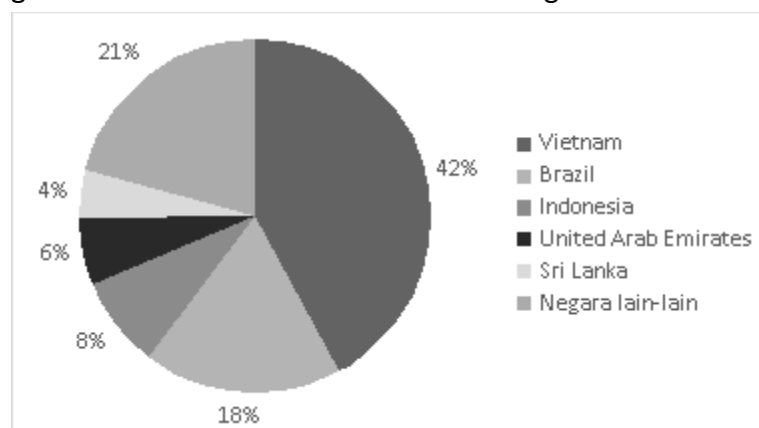


Figure 2. Pepper Exporters

Sumber : (UN Comtrade, 2022), data processed

Based on the image above, it is known that Vietnam, Brazil, and Indonesia are the three central countries dominating the global pepper market. In 2022, Vietnam controlled a market share of 42%, comparable to 710.83 billion USD, while Brazil held 18%, comparable to 308.74 billion USD. Meanwhile, Indonesia successfully exported pepper with a value of 141.34 billion USD, or 8% of the total global pepper market share. Other exporting countries include the United Arab Emirates and Sri Lanka, with respective market shares of 6% and 5%. Despite this achievement, Indonesia's market share is vulnerable due to its narrow margin compared to other countries. Therefore, the ability to enhance competitive positioning in the international pepper market is necessary.

The intensity of countries' participation in efforts to compete for a share of the world pepper market reflects intense competition. Market structure analysis is needed to

determine the behavior of market players who tend to adapt to existing market conditions to maintain their competitive position. The existence of ever-changing behavior in the market causes market performance to also change. Good market performance can be reflected by the opportunity for market participants to obtain appropriate profits without any special actions for a company or country. Market structure can identify the advantages and disadvantages of a product, making it helpful in determining the right strategy in controlling market share.

Marlinda's research suggests that the market structure of world pepper competition is oligopoly. This form of market has characteristics that are only controlled by a few producers, so competition in the market is very tight (Wahyudi et al., 2017). This market structure has characteristics similar to the actual pepper market conditions. Influential producers in the world pepper trade are only controlled by a few countries. More than 50 percent of the pepper market share is controlled by Vietnam, Brazil, and Indonesia, while other countries are only able to control the market by less than half of the share of these countries. So the world pepper market can be assumed to be oligopolistic. In contrast to research (Rumallang et al., 2019) which explains the characteristics of a perfectly competitive market structure. This type of market has a large number and variety of producers. Producers are free to enter and exit the market because producers who lose the competition will quickly be eliminated from the market. For this reason, the right strategy is needed to compete with many competitors. This characteristic is reflected in the world pepper trade. All pepper producing countries are free to enter the market. There are no specific barriers in entering the world pepper market. In the practice of world pepper trade, no conspiracy or collusion by several producers has been found. Therefore, the world pepper market can also be assumed as a perfectly competitive market.

Different market structure assumptions affect the behavior of companies or countries that will enter the world pepper market. Market players will adjust to the conditions and characteristics of the market. Therefore, each market has a different shape and behavior. Market structure analysis is also related to competition. Neoclassical thinking states that all companies want to dominate the market for the same purpose, namely profit. This goal is the beginning of the formation of competition, besides the control of market share can also reflect economies of scale. This means that the more production carried out can reduce production costs. So that profits will increase. This situation causes competition in controlling market share to be tighter.

Competitiveness is the ability of a country's commodities to enter the market and survive in the market, including in the international market (Trilarasati et al., 2023). So that increasing competitiveness in pepper commodities is important to do because many competitors have the ability to produce pepper with higher quality. Research (Nurhayati et al., 2018) explains the competitiveness of Indonesian pepper exports in the United States, Vietnam, and several European countries is very potential because it has a high level of competitiveness. The position of the Indonesian pepper commodity has the potential to increase every year. While Research (Balqis & Yanuar, 2021) explains that the potential

market for pepper trade is only in European countries, such as Germany, while the United States region does not have strong competitiveness for Indonesian pepper.

The results of the above analysis can be seen that research related to the structure and competitiveness of pepper exports needs to be done. These two components are the key to success in controlling the world pepper market share. The structure of a market indicates the market components that influence the nature and process of competition. In addition, the analysis of pepper export competitiveness allows researchers to evaluate the comparative advantage of a country in the production and export of pepper in the international market. The information obtained from this kind of research can serve as a basis for government decision-makers, producers, and exporters to formulate more effective strategies to optimize their market position, improve economic welfare, and maintain the sustainability of the pepper industry at the global level.

The purpose of this study was to determine the market structure and competitiveness of Indonesian pepper exports. The methods used to achieve the researcher's objectives are the Hirschman-Herfindahl Index (HHI) and Concentration Ratio (CRn) to analyze the market structure, and the Revealed Symmetric Comparative Advantage (RSCA) and Export Product Dynamic (EPD) methods to analyze the competitiveness position of pepper exports. Thus the researcher took the title "ANALYSIS OF MARKET STRUCTURE AND COMPETITIVENESS OF INDONESIAN PEPPER EXPORTS AGAINST VIETNAM, CHINA, THE UNITED STATES AND GERMANY".

### **Research Method**

This type of research is Quantitative research with descriptive statistical research methods. Descriptive research is intended to describe the market structure and competitiveness of Indonesian pepper exports. The type of data used is annual data (time series) for the period 2003-2022 and cross section data in the form of data from the central destination countries including Vietnam, the United States, China and Germany. Secondary data used include the area of pepper plantations, pepper production, volume and value of pepper exports in Indonesia and the world obtained from the Ministry of Agriculture, Directorate General of Plantations (Ditjenbun), Badan Pusat Statistik (BPS), Food and Agriculture Organization (FAO), Ministry of Trade, United Comtrade (UN Comtrade), and International trade Center (ITC). All data used is data related to Indonesian Pepper Exports, with HS code 090411.

This study uses the Herfindahl-Hirschman Index (HHI) and Concentration Ratio (CR4) methods to determine the market structure of pepper in destination countries. While measuring competitiveness using the Revealed Symmetric Comparative Advantage (RSCA) and Export Product Dynamic (EPD) methods.

### Herfindahl-Hirschman Index (HHI) dan Concentration Ratio (CR4)

The market structure of Vietnam, China, the United States, and Germany pepper is analyzed using the HHI and CR4 methods. The HHI value is obtained from the calculation of the following formula (Jaya, 2021):

$$H = \sum_{i=1}^n p_i^2$$

Description :

n : number of companies

$p_i$  : Market share of the  $i$ th company ( $i = 1, 2, 3, \dots, n$ ) in percent (%)

The use of the Herfindahl index is because this index focuses on the market share distribution by all companies. The criteria for calculating HHI are  $0 \leq H \leq 10,000$ , with the following conditions:

Table 1. HHI Assessment Criteria

HHI Value	Market Concentration
HHI < 1.000	Low market concentration
1.000 < HHI < 1.800	Moderate market concentration
1.800 < HHI < 10.000	High market concentration

Source : (Jaya, 2021)

The table above indicates that the smaller the HHI index value, the lower the level of market concentration. This means that higher market concentration reflects tight control by a few market leaders.

Measurement of concentration ratios is necessary to determine the market power held by dominant companies. The use of the concentration ratio (CR) method is valuable, as it provides information about the degree of concentration within an industry or market. The calculation formula for CR4 is as follows (Jaya, 2021):

$$CR4 = \sum_{i=1}^4 p_i$$

Description :

n : number of companies

$p_i$  : market share of the  $i$ th company ( $i = 1, 2, 3, \dots, n$ ) in percent (%)

4 : largest number of companies

The oligopoly market structure based on concentration ratio can be seen from the following table :

Table 2. CR4 Assessment Criteria

Konsentrasi Rasio (%)	Struktur Pasar
>85	Oligopoli konsentrasi tinggi
84-70	Oligopoli konsentrasi sedang
69-45	Oligopoli konsentrasi rendah
44-30	Oligopoli rendah
<30	Poli-poli

Source : (Jaya, 2021)

**Revealed Symmetric Comparative Advantage (RSCA) dan Export Product Dynamic (EPD)**

Competitiveness is the ability of a country to survive in a market. In this study, competitiveness is measured using RSCA and EPD. (Dalum et al., 1998) found an asymmetrical problem in the calculation of Revealed Comparative Advantage (RCA). Therefore, they developed the Revealed Symmetric Comparative Advantage (RSCA) method in 1998 to adjust the RCA values into a symmetric form around its neutral value. The formula for calculating RSCA is as follows:

$$RSCA = \frac{RCA_{ij} - 1}{RCA_{ij} + 1}$$

$$RCA = \frac{X_{ij}/X_i}{W_j/W}$$

Description :

X<sub>ij</sub> : Export values of commodity-j in the country-i

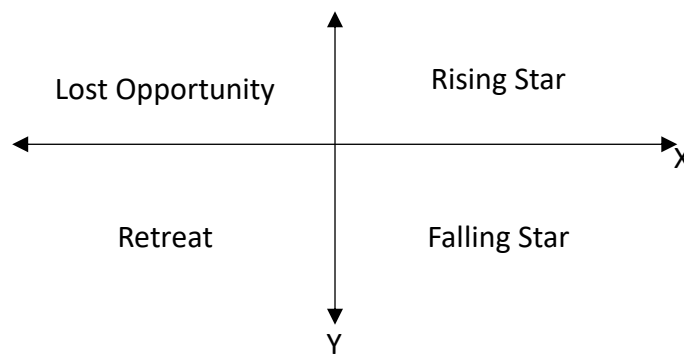
X<sub>i</sub> : Total export value of country-j

W<sub>j</sub> : World export value in commodity j

W : Total world exports to destination countries.

The measurement of RSCA allows for two possibilities. The RSCA value ranges from -1 to +1, with two possibilities. RSCA > 0 indicates that the exporting country's pepper commodity has a comparative advantage. Meanwhile, RSCA < 0 indicates that the exporting country's pepper commodity has less comparative advantage in the destination country (Dalum et al., 1998).

EPD is used to identify Indonesian pepper as well as competitive and highly competitive competitor countries, and has rapid product growth in the export pepper trade flow in the global market. In this case, the markets analyzed are Vietnam, China, the United States, and Germany.



Source : (Esterhuizen, 2006)

The matrix above illustrates the competitive position based on the export market share of a country i in the target market (reflected on the horizontal axis) and the product share of product j in the target market (reflected on the vertical axis).

Table 3. EPD Assessment Criteria

EPD Value (X dan Y)	Position	Description
Positive x-axis and y-axis	Rising Star	Ideal Position
Negative x-axis and positive y-axis	Lost Opportunity	The existence of a decline in market competitiveness indicates an undesirable competitive position, as the produced products have not succeeded in reaching the international market.
Positive x-axis and negative y-axis	Falling Star	The situation is not desirable (there is still an increase in market share except for dynamic goods).
Negative x-axis and y-axis.	Retreat	The condition of no longer desiring products or goods from a certain country.

Source : (Esterhuizen, 2006)

The EPD value is formulated as follows :

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

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

Keterangan :

$X_{ij}$  = Export value of commodity i to country j

$X_t$  = Total export value of Indonesia to country j

$W_{ij}$  = World export value of commodity i to country j

$W_t$  = Total world export value to country j

t = Number of years

## Result and Discussion

### Market Structure

The Hirschman-Herfindahl Index (HHI) is used to see whether the market concentration formed is classified as a perfectly competitive market or an imperfectly competitive market. Meanwhile, CR4 aims to determine the level of tightness of market concentration and determine whether there is an oligopoly phenomenon in a market or not. The average results of the HHI calculation in the 2003-2004 period in Vietnam, China, the US, and Germany were 4181.98; 4.154,25; 3.342,31; and 2.563,89, respectively (table 4). These HHI values amounted to 1.800-10.000, which indicates that the structure of pepper markets in Vietnam, China, the US, and Germany tends to lead to highly concentrated markets.



(Hasibuan, 1993) states that market forms that have high concentration are oligopolies and monopolies.

The average CR4 calculations for the 2003-2022 period in Vietnam, China, the US, and Germany were 93,3%; 94,5%; 94,3%; 88,3%, respectively. These values are greater than 85%, indicating that the market structure in the four major countries is a highly concentrated oligopoly market. This means that the four market-ruling countries have a large contribution to the total market share control in Vietnam, China, the US, and Germany. There are several countries that control the pepper market, such as Brazil, Indonesia, Malaysia, and India. The market rulers will depend on each other and create the same behavior.

Table 4. Calculation of HHI and CR4 Values

YEAR	Vietnam		China		AS		German	
	HHI	CR4	HHI	CR4	HHI	CR4	HHI	CR4
2003	4688,71	98,2%	3921,44	89,7%	2269,64	86,3%	2239,39	84,1%
2004	4439,41	98,0%	3172,03	92,1%	2520,54	90,2%	2329,32	88,4%
2005	4926,55	99,8%	5827,54	97,5%	2410,10	90,0%	2126,38	83,4%
2006	2620,94	93,2%	2412,46	89,7%	2282,50	92,3%	2249,97	86,0%
2007	2049,43	76,8%	3336,38	93,9%	2506,15	94,6%	1947,06	83,5%
2008	2844,23	78,4%	4280,08	94,7%	2813,84	93,5%	2096,69	85,5%
2009	3996,85	89,6%	6177,67	95,7%	2832,09	97,0%	2435,33	87,3%
2010	6597,40	95,9%	4993,29	93,8%	3327,53	96,5%	2570,42	85,9%
2011	2538,03	90,3%	4014,75	95,0%	2699,24	97,5%	2679,44	87,3%
2012	7038,77	95,7%	4873,56	96,9%	3233,69	97,2%	2861,52	91,9%
2013	6184,10	89,8%	4006,71	97,4%	2871,05	97,3%	2967,01	93,8%
2014	3302,70	91,0%	4546,26	98,7%	3511,88	97,4%	2577,72	90,8%
2015	5304,23	95,2%	4424,95	97,8%	2859,12	96,1%	2540,70	92,1%
2016	5562,76	92,7%	4475,65	97,8%	3673,24	96,0%	2666,16	90,6%
2017	3476,77	93,6%	4203,12	89,7%	3501,77	94,8%	2758,73	90,8%
2018	3517,68	98,4%	3290,54	88,5%	4052,52	92,0%	2731,84	89,8%
2019	4432,06	99,0%	3178,29	93,4%	4773,71	92,4%	2616,64	87,7%
2020	3926,04	97,6%	3822,62	94,4%	4356,79	93,2%	2827,40	88,1%
2021	2854,23	94,6%	4010,77	97,3%	4667,88	95,3%	2981,72	90,3%
2022	3338,62	98,7%	4116,92	95,6%	5682,89	96,5%	3074,30	88,9%
AVERAGE	4181,98	93,3%	4154,25	94,5%	3342,31	94,3%	2563,89	88,3%

Source : Data Analysis 2024

The results of the HHI and CR4 calculations show that the pepper markets in Vietnam, China, the US, and Germany tend to lead to an oligopoly form. (Hasibuan, 1993) states that oligopoly markets have the characteristics of a few producers who control a market, and there are high barriers in the market. In line with this research, the pepper markets in Vietnam, China, the US, and Germany are dominated by four ruling countries, as seen from the  $CR4 > 85\%$  value. In addition, there are high barriers to entering the market. Barriers include intense competition, a tariff policy of up to 0.6% in Germany, and strict standards of pepper quality from the European Spice Association (ESA) and the American Spice Trade Association (ASTA) (Nurdjannah et al., 2018).

Research conducted by Marlinda (Wahyudi et al., 2017) also stated that the global pepper market structure is in the form of an oligopoly. Competition in the oligopoly market is very intense, marked by the increasing number of global pepper producers each year, but

only a few countries are able to survive in that market. Therefore, it is necessary to have the ability to determine one's position (Strategic Positioning) among competitors.

### Competitiveness

Competitiveness is the ability of a commodity to enter a market and survive in that market, including in the international market (Trilarasati et al., 2023). The measurement of competitiveness using the RSCA is used to assess the export share of Indonesia and Brazil compared to the global export share of pepper in the same target markets.

Table 5. RSCA Calculation

Year	Indonesia RSCA Value				Brazil RSCA Value			
	Vietnam	China	AS	Jerman	Vietnam	China	AS	Jerman
2003	0,94	0,89	0,96	0,94	-1,00	-1,00	0,87	0,96
2004	0,93	0,38	0,94	0,94	-1,00	0,67	0,88	0,94
2005	0,95	0,36	0,94	0,94	-1,00	-0,70	0,86	0,95
2006	0,93	0,75	0,95	0,96	-1,00	-0,18	0,88	0,89
2007	0,92	0,51	0,96	0,96	0,81	-0,83	0,88	0,92
2008	0,93	0,50	0,97	0,96	0,79	-0,99	0,78	0,89
2009	0,93	-0,90	0,96	0,95	0,91	-0,99	0,87	0,90
2010	0,94	0,88	0,97	0,96	0,81	-0,97	0,86	0,86
2011	0,92	0,89	0,94	0,93	0,89	-0,93	0,87	0,89
2012	0,96	0,97	0,97	0,95	0,44	-0,82	0,84	0,92
2013	0,96	0,94	0,95	0,94	0,42	-0,72	0,89	0,93
2014	0,95	0,93	0,89	0,96	0,89	0,08	0,88	0,95
2015	0,96	0,97	0,92	0,96	0,74	-0,28	0,89	0,95
2016	0,97	0,94	0,91	0,94	0,82	-0,56	0,87	0,95
2017	0,97	0,82	0,89	0,94	0,91	0,47	0,85	0,96
2018	0,97	0,86	0,84	0,95	0,95	0,40	0,86	0,96
2019	0,94	0,95	0,85	0,96	0,96	0,24	0,80	0,96
2020	0,94	0,94	0,87	0,95	0,94	0,12	0,88	0,97
2021	0,91	0,90	0,82	0,95	0,90	0,20	0,84	0,97
2022	0,78	0,92	0,81	0,92	0,95	0,36	0,73	0,96
RATA-RATA	<b>0,94</b>	<b>0,72</b>	<b>0,92</b>	<b>0,95</b>	<b>0,46</b>	<b>-0,32</b>	<b>0,85</b>	<b>0,93</b>

Source : Data Analysis 2024

From 2003-2022, Indonesia's RSCA values were all positive, meaning that Indonesia has a strong comparative advantage and is highly competitive. Indonesia is superior to Brazil in the pepper markets of Vietnam, China, the US, and Germany. This condition is seen from the acquisition of Indonesia's RSCA value, which is greater than that of Brazil. In addition, the export value of Indonesian pepper is also greater than that of Brazil. The average export value of Indonesian pepper in Vietnam, China, and the US, is 46.446,5; 8.549,373; and 55.863,65;. While Brazil amounted to 12.666,65; 908,7; and 47.870,95. In Germany, the average value of

Indonesian pepper exports is lower than in Brazil, namely 11.608,79 and 47.870,95 USD per year. However, Indonesia has a stronger competitive position than Brazil.

The comparative advantage possessed by Indonesian pepper makes its competitiveness stronger than that of Brazil. Indonesia's pepper production continues to increase every year until in 2022 its production reaches 128.331 tons per year, while Brazil's is 81.962 tons per year (FAOSTAT, 2024). Indonesian pepper has a better taste quality than pepper from other countries, especially at a higher spiciness level of 4%. So, the price of Indonesian pepper has a high selling value. The production of Indonesian pepper has also been widely recognized in foreign countries such as *Lampung Black Pepper* and *Muntok White Pepper* (Mahdi & Suprehatin, 2021)

The results of the above analysis are in line with research (Nurhayati et al., 2018), which states that Indonesian pepper has a comparative advantage in Vietnam, the US, and Germany because it has an average RCA value greater than zero (>0). Research (Lestari et al., 2023), obtained the results of the calculation of the average RCA of Indonesian pepper in China of 11.038 or > 1. This means that Indonesia has a comparative advantage over China. Thus, it can be concluded that Indonesia is highly competitive in Vietnam, China, the US, and Germany. So, Indonesia needs to improve the quality of pepper and the technology used in order to maintain its competitive position.

Export Product Dynamic (EPD) is an indicator that measures the market position of a country's products for a particular market destination. The EPD method is used to determine the competitive advantage of a particular commodity of a country. If the growth of the commodity is above average and this situation continues for a long period of time, this commodity may eventually become an important source of export earnings for the country.

In this study, the EPD method is used to determine the competitiveness position of Indonesian pepper in export destination countries, namely Vietnam, China, the United States, and Germany, during the 2003-2022 period, which will then be grouped into four indicators, namely Rising Star, Falling Star, Lost Opportunity, and Retreat. The following are the results of the EPD analysis of Indonesian pepper in five export destination countries:

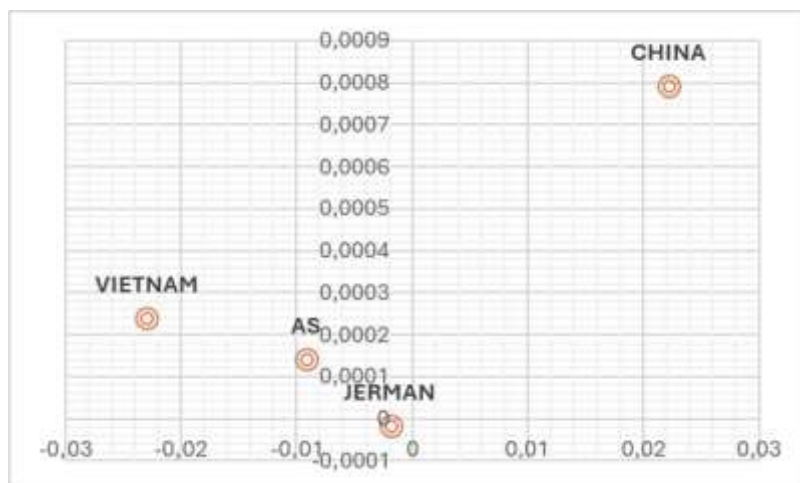


Figure 3. EPD Value Calculation  
Source : Data Analysis 2024

On the X and Y axes, China shows a positive value of 0,022; 0,0008. This value causes the Indonesian pepper commodity to be in a rising star position. This situation shows an ideal position, and there are indications of an increase in market share. The average increase in the share of Indonesian pepper exports in China over the past 20 years reached 1.114,2%. Since 2019 the share of pepper exports in China has continued to increase, until in 2022 Indonesia's achievement occupied 57% of the total export share in China. Thus, the Indonesian pepper industry is able to dominate China's market share, and pepper commodities from Indonesia are well-received in the country. Indonesian pepper must maintain its competitive position by improving quality and technology to support its production.

The Lost Opportunity position is obtained by Vietnam 0,02302; 0,00024 and the US 0,0092; 0.00014. Both countries show that the X and Y axes are positive and negative, meaning that there are conditions that are not expected. In the period 2003-2022, Indonesia's pepper export share in Vietnam did have an average increase of 2%. However, since 2017, the decline in the share of exports has continued until 2022, when the decline occurred drastically by 50%. Meanwhile, the share of pepper exports in the US has decreased by an average of 2% per year. This means that Indonesian pepper cannot increase its market share or compete effectively with pepper from other countries in these markets.

The last position is the Retreat position that occurred in Germany, which is -0.0018; -0.000017. The X and Y axes are negative, meaning there is growth in the dynamic product market share and a significant decline and stagnation in the pepper commodity market share. During the period 2003-2022, Indonesia's share of pepper exports to Germany continued to decline, with an average annual decrease of 4%. This condition means that Indonesian pepper in Germany does indeed have a comparative advantage, but the country is not inclined to import pepper commodities from Indonesia. Indonesian pepper commodities are missing the opportunity to increase their export market share as well as their product market share in the German market.

The analysis of the competitive position in this study is in line with the research (Balqis & Yanuar, 2021). The study states that the American market is in the Lost Opportunity position, which is a situation where there is a decrease in market share due to Indonesia's loss of opportunity to reach the market, but pepper is still a competitive product. Meanwhile, Germany occupies the Retreat position, namely a decrease in the share of pepper exports, while China is a potential market for Indonesian pepper exports. This condition is reinforced by its competitive position, which is a rising star. Research (Nurhayati et al., 2018), shows that the rising star position is an ideal position for the development of a country's exports. Indonesian pepper has the potential to continue to increase in the Chinese market. This situation will be accompanied by an increase in the share of Indonesian pepper exports in China. Thus, Indonesian pepper needs to maintain its position in the Chinese market by improving the quality of export products and updating more sophisticated technology.

## Conclusion

Based on the results of data analysis conducted by researchers, it can be concluded that the pepper market structure in Vietnam, China, the United States, and Germany is an oligopoly with high market concentration. The average value of HHI for the four countries is more than 2,500. At the same time, the average value of CR4 for the four countries is greater than 60%. Indonesian pepper commodities are highly competitive or have comparative advantages in Vietnam, China, the United States, and Germany. The average calculation value of RSCA Indonesia to the four countries is above zero ( $>0$ ). The competitiveness position of Indonesian pepper exports in Vietnam, China, the United States, and Germany shows different EPD values. China is in the ideal position category, namely Rising Star. The United States and Vietnam occupy the lost opportunity position, while Germany's lowest position is in the retreat position. Thus, the main export destination country with potential for the development of the country's economy is China. In this country, Indonesia has strong or superior competitiveness. At the same time, the competitiveness of Indonesian pepper exports in China is ideal. Indonesia is able to dominate the pepper market share in China. Indonesia is expected to be able to maintain its competitive position and continue to improve the quality of its products.

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