Journal of Business and Economics Research (JBE)
Vol 5, No 1, Februari 2024, pp. 1−10
ISSN 2716-4128 (media online)
DOI 10.47065/jbe.v5i1.4693
https://ejurnal.seminar-id.com/index.php/jbe

Analysis of Competitiveness and Factors Affecting Indonesian Clove Exports in Five Main Destination Countries

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Submitted: **18/12/2023**; Accepted: **21/02/2023**; Published: **22/02/2024**

Abstract−This study aims to analyze the competitiveness and factors affecting Indonesian clove exports in five main destination countries. Competitiveness analysis using the Revealed Comparative Advantage (RCA) method. Analysis of factors affecting Indonesian clove exports using gravity models and panel data regression methods processed using E-Views 12 software. This study uses secondary data with five research objects, namely Malaysia, UAE, Singapore, Saudi Arabia, and Vietnam, from 2012-2021, sourced from BPS, Ministry of Trade, UN Comtrade, International Trade Center (ITC), World Bank, and FAO. The results of RCA analysis show that Indonesian cloves are worth an average of above one, which means they have a strong comparative advantage and competitiveness in the five main destination countries. The results of factors affecting Indonesia's clove exports found that the real GDP of destination countries had a positive effect with a regression coefficient value of 12.27291 and was significant at the level of 5% with a probability of 0.0036 on the volume of clove exports. Export prices have a positive effect with a regression coefficient value of 0.871995 and are significant at the level of 5% with a probability of 0.0138 on the export volume of cloves. Meanwhile, economic distance has a negative effect with a regression coefficient value of -13.26768 and is significant at the level of 5% with a probability of 0.0144 on the export volume of cloves. The implications of this study show that Indonesian cloves have a comparative advantage and strong competitiveness, so clove farmers must be able to take advantage of the market conditions of destination countries and map countries with a large demand for cloves. Farmers can pay attention and take advantage of clove export prices in the international market, as well as consider the distance to the destination country which can affect transportation costs. In addition, the Indonesian government must be able to take into account the economies of clove importing countries to determine the implementation of clove export strategies.

Keywords: Export; Clove; Competitiveness; Gravity Model; RCA

1. INTRODUCTION

As an agricultural country, Indonesia has great opportunities in the agricultural sector. One of the subsectors that contributes to Gross Domestic Product (GDP) is plantations. During 2017-2021, GDP from plantations had an average growth of 3.31% or was able to contribute 38.33%, higher than other agricultural subsectors (Central Statistics Agency, 2022). Spices are one of the most important parts and have great potential in the plantation subsector to be developed. In 2021, spices accounted for 0.88% of total non-oil and gas exports (Ministry of Trade, 2021). There are several types of spices that are favored by the international market, namely cardamom, cinnamon, cloves, nutmeg, and lawing (Nurhayati et al., 2019). One of the spices that became Indonesia's leading export commodity with large production was cloves. Clove commodities are used for various needs such as the cigarette industry, food seasonings, cosmetics, and medicines (Pinto et al., 2022).

Table. 1 Production and Land Areal of Indonesian Clove in 2012-2021

Year	Production (ton)	Land Areal (ha)	Productivity (kg/ha)
2012	99.890	493.888	325
2013	109.694	501.378	350
2014	122.134	510.174	391
2015	139.641	535.694	441
2016	139.611	545.027	426
2017	113.178	559.566	345
2018	131.014	569.052	400
2019	140.797	573.873	420
2020	145.984	575.813	416
2021	137.642	573.836	417

Table 1 shows that Indonesia's clove production has increased positively every year with a total production of 1,277,696 tons (Directorate General of Plantations, 2023). In the same period, the Indonesian average contribution to world clove production was 73.92% (Food and Agriculture Organization, 2023). This makes Indonesia the largest clove producer in the world.

Along with increased production, cloves have become a big capital for Indonesia to develop exports in the international market. During 2012-2021, the total export volume of Indonesian cloves in the world market averaged 16,906,645 kg/year, with an average export value of US$68,687,808/year (UN Comtrade, 2023). According to the data

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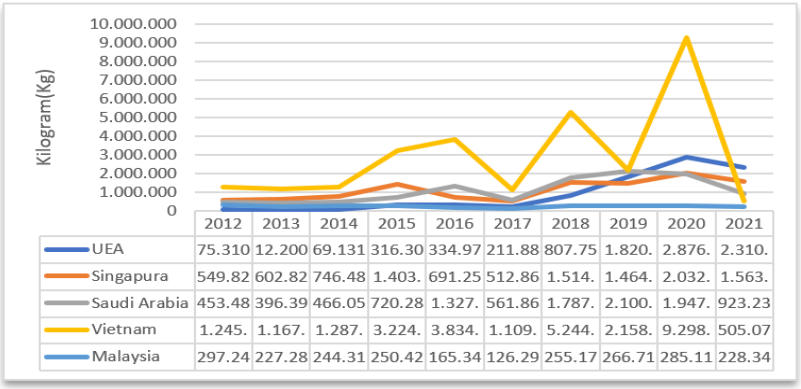
(International Trade Center, 2023), there are several competing countries for Indonesian clove exports, including Madagascar, Tanzania, Sri Lanka, and Singapore. If mapped geographically, the segmentation of the world clove export market is generally in the Asia-Pacific region (Mordor Intelligence, 2023).



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
UEA	75.310	12.200	69.131	316.30	334.97	211.88	807.75	1.820.	2.876.	2.310.
Singapura	549.82	602.82	746.48	1.403.	691.25	512.86	1.514.	1.464.	2.032.	1.563.
Saudi Arabia	453.48	396.39	466.05	720.28	1.327.	561.86	1.787.	2.100.	1.947.	923.23
Vietnam	1.245.	1.167.	1.287.	3.224.	3.834.	1.109.	5.244.	2.158.	9.298.	505.07
Malaysia	297.24	227.28	244.31	250.42	165.34	126.29	255.17	266.71	285.11	228.34

Figure 1. Development of Indonesian Clove Export Volume to Five Main Destination Countries

Figure 1 shows that in the last ten years, the export volume of Indonesian cloves to five main destination countries, namely the UAE, Singapore, Saudi Arabia, Vietnam, and Malaysia fluctuated. In terms of competitiveness, Indonesian cloves are also relatively low compared to competing countries. This is evidenced by the fact that in 2021, Indonesia ranked second with an export volume contribution value of 27.76%, while Madagascar became the main competitor country and was in first place at 21,317,990 kg, or 29.38% of the world market (International Trade Center, 2023). This condition is reinforced by research (Alisia & Maria, 2023) on the comparison of the competitiveness of Indonesian and Madagascar cloves in the research period 2008-2018, stating that Madagascar is the main clove exporter country in the world.

There are a number of problems that cause Indonesian cloves to still fluctuate and have low competitiveness. During 2012-2021, Indonesian clove export volume experienced fluctuating developments, and there was an even decline in clove exports in five destination countries in 2015 and 2021 (Figure 1). This is due to the slow global economic recovery after the global financial crisis in 2015, with only 3.1% compared to 3.5% growth in 2014. This resulted in a contraction in the Indonesian Export Commodity Price Index (IHKEI) by 15%, which resulted in a decrease in Indonesia's export commodities, including cloves (Bank Indonesia, 2015). In 2020, the world economy contracted by 3.1%, with a world trade volume of -5.3% (Bank Indonesia, 2020). The COVID-19 pandemic in 2020 resulted in various kinds of plantation commodities such as cloves, experiencing price reductions, as well as disruption of domestic and international distribution systems in 2021 (Wahdiana et al., 2023).

In addition, there is another problem, namely that Indonesian cloves still have low export competitiveness. This is because, at the same time Indonesia is still importing cloves. During 2012-2021, the highest import volume in 2017 was 13,572,105 kg, valued at US$113,468,361, while the export volume in 2017 was only 9,078,755 kg, valued at US$28,919,279 (UN Comtrade, 2023). Around 90% of Indonesia's clove production is used for local consumption, and the rest is exported to various countries (Mordor Intelligence, 2023). This data is in line with research (Putra Pratama et al., 2020) that the high import of cloves indicates that national clove production has not been able to meet the needs of the domestic industry. The cigarette industry absorbs a large part (more than 90%) of national cloves as the main raw material (Directorate General of Plantations, 2011). The large demand for domestic cloves is one of the factors that result in Indonesian clove exports not being maximized.

There are several theories of international trade, including the theory of comparative advantage (Ricardian Model), which emphasizes that a country can apply specialization in the production of goods that have high comparative value, and the theory of Heckscher and Ohlin (H-O Model), which emphasizes endowment factors (Ekananda, 2014). In the theory of international trade, there are factors that can affect exports seen from the demand and supply sides (Parkin, 2018). The study also included factors affecting exports such as Gross Domestic Product (GDP), export prices, and economic distance.

Previous research conducted by (Hasibuan & Novianti, 2022) found that the Gross Domestic Product (GDP) of export destination countries and export prices had a positive and significant effect on the export volume of Indonesian cloves. Meanwhile, economic distance has a negative and significant influence on the export volume of Indonesian cloves.

Research (Rhezamayye et al., 2019) shows that variables of production, domestic consumption, and exchange rates had a positive and significant effect on Indonesian clove exports in 2001-2015. Meanwhile, domestic price variables and export prices have no real effect.

Another study by (Putra Pratama et al., 2020) on the competitiveness of Indonesian cloves and competing countries in the international market found that based on RCA calculations, Indonesian cloves are still lowly competitive compared to their competitors, namely Comoros. Meanwhile, export determinants show that the Gross Domestic Product (GDP) of destination countries and export prices have an insignificant negative effect on the competitiveness of producer countries in the international market.

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From the previous relevant problems and research above, it is still necessary to expand studies on the utilization of Indonesia's clove export potential. Export development needs to be carried out to increase export value and avoid a trade balance deficit (Nurhayati et al., 2019). In line with that, this study was conducted to determine the influence of competitiveness and factors that affect Indonesian clove exports, especially in the five main destination countries. This research is also an update and development of previous research using the latest data for 2012-2021, as well as specifying export destination countries to determine the level of competition and absorption of destination countries. In addition, this study uses gravity model methods and competitiveness variability, which has not been done before.

Based on the description above, this study aims at further analysis of Indonesia's performance as a clove exporting country in the international market in relation to the competitiveness of these products as well as its determining factors to identify fluctuations in the volume of Indonesian clove exports.

2. RESEARCH METHODS

2.1 Conceptual Framework of Research

Indonesian cloves are included in the leading export commodities, this cannot be separated from the great potential of domestic cloves. Therefore, this study was conducted to examine the competition of Indonesian cloves in the markets of five destination countries. In order to be competitive in the export market, a spice commodity must have advantages that distinguish it from other exporting countries (Anggrasari et al., 2021). The relationship between research variables can be described using the following conceptual framework:

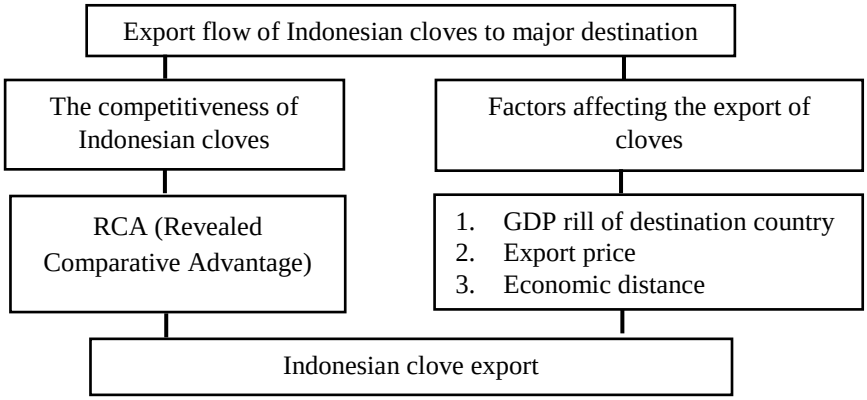

Figure 2. Conceptual Framework

This study was conducted to measure the performance of clove competitiveness against export destination countries to see the comparative advantage of Indonesian cloves with its competitor countries using the Revealed Comparative Advantage (RCA) method. The hypothesis built is that the RCA value of Indonesian cloves is more than one, meaning that Indonesian cloves have a comparative advantage and strong competitiveness in the destination country.

According to the explanation (Mankiw, 2018) real Gross Domestic Product (GDP) is a calculation of the production of goods and services in the economy and is not affected by price changes. The theory of gravity model proposed by (Krugman et al., 2018) emphasizes that the value of trade between two countries has a proportional relationship between GDP and distance. So that GDP becomes an important factor in measuring international trade flows. The results of research conducted by (Nainggolan et al., 2019) show that the real GDP of importing countries has a positive and significant relationship with the export of a commodity. Another study by (Adelina et al., 2020) on export determination a gravity model approach shows that increasing real GDP will have an effect on increasing exports.

H1: The real GDP of the destination country has a positive influence on export volume.

Supply illustrates a positive relationship between quantity and price. This is in accordance with the law of supply, which states that if the price of a good or service is high, it will increase the quantity of the goods or services offered, otherwise if the price of a good or service is low, the goods or services offered will decrease (Parkin, 2018). In export activities, prices represent the amount of profit obtained. Explanation (McConnell et al., 2021) that a nation will export if international prices exceed domestic prices and import if international prices are lower than domestic prices. Using the concept of the law of supply, it can be interpreted that domestic producers will take advantage of high international market prices to sell goods to consumers. The results of research conducted by (Putri et al., 2020) show that there is a positive influence between prices on the export volume of cinnamon commodities. If prices increase, producers will increase the supply of exports abroad because of the potential for greater profits. Another study by (Tika et al., 2022) shows that price has a positive effect on export volume where price is an important factor that encourages producers to offer goods of certain quality.

H2: Export prices have a positive influence on export volume

The gravity model explains that international trade between two countries is determined positively by each country's GDP and negatively by distance (Tinbergen 1962; Shahriar et al., 2019). Further (Krugman et al., 2018)

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explained that in international trade, an increase of one percent in the distance between two countries is associated with a one percent decrease in trade between countries. The decline reflects that distance is becoming a geographically important determinant as it relates to transportation costs in trade patterns between countries. In addition, the concept of economic distance is also clarified by S.B. Linder (1961) in (Le, 2017) that long economic distances between trading countries can hinder bilateral trade because long economic distances create differences in demand structures. Therefore, as economic distance increases, the volume of bilateral trade decreases. The results of research conducted by (Herawati et al., 2022) found that economic distance has a negative and significant effect, showing projections of transportation costs as a result of trade between countries with increasingly long geographical distances having an impact on decreasing export volumes.
H3: Economic distance has a negative influence on export volume

2.2 Data and Sources

This study analyzes the competitiveness and factors affecting Indonesian clove exports using the Harmonizes System (HS) 0907 code. The method used to analyze competitiveness is Revealed Comparative Advantage (RCA). The data needed are the export value of Indonesia and competing countries, the total export value of Indonesia and competing countries, the world export value for clove commodities, and the overall export value.

Meanwhile, the analysis of factors affecting the export volume of Indonesian cloves uses independent variables of real GDP destination country (GDP), export price (EP), and economic distance (ED). This study used secondary data with a quantitative approach. The type of econometric data used is panel data. Panel data is a combination of period data (time series) and individual data (cross-section) (Ekananda, 2019:13). This study uses ten-year time series data from 2012-2021 and cross-section data from five main destination countries for Indonesian clove exports, namely the United Arab Emirates (UAE), Singapore, Saudi Arabia, Vietnam, and Malaysia.

The data used in this study were obtained from the United Nations Commodity Trade (UN Comtrade), World Bank Indicators, Food and Agriculture Organization (FAO), International Trade Center (Trademap), Central Statistics Agency (BPS), and Directorate General of Plantations, Ministry of Agriculture.

2.3 Variable Operational Definition

This study used four variables, namely one dependent variable and three independent variables. The export volume of Indonesian cloves is a dependent variable. Real Gross Domestic Product (GDP) reflects the ability of a country's economy to meet people's needs and wants. Export prices as a benchmark when exporting Indonesian cloves to destination countries. Economic distance is a modification of geographical distance and an indication of the transportation costs faced by a country when exporting.

2.4 Data Analysis dan Processing Methods

1. Clove Competitiveness Analysis
   This study uses the Revaled Comparative Advantage (RCA) method to measure the comparative competitive advantage of Indonesian cloves. RCA is a method of competitiveness analysis with a mechanism for calculating the market share of the export value of Indonesian cloves against the total number of exports to importing countries compared to the share of world export value to Indonesian clove importing countries. The data processing tool uses Microsoft Excel 365. The RCA formula can be written as follows:

$$\text{RCA} = \frac{Xij/Xt}{Wij/Xt} \quad (1)$$

   Information:
   RCA: The level of competitiveness of Indonesian cloves
   Xij: The export value of Indonesian clove commodities to Indonesian clove importing countries
   Xt: The total value of Indonesia's exports to Indonesian clove importing countries
   Wij: The value of world clove exports to Indonesian clove importing countries
   Wt: The total value of world exports to Indonesian clove importing countries
   The criteria for determining the competitiveness index is that if the RCA value is > 1, it means that Indonesian clove commodities have a comparative advantage and strong competitiveness. Conversely, if the RCA value is < 1, it means that Indonesia's clove commodity is lowly competitive.
2. Factors Affecting Clove Export
   The analysis of factors affecting clove export in this study was carried out using the gravity model method. The gravity model is a method adapted from Newton's Law to analyze economic problems affecting trade between two countries (Krugman et al., 2018). The data analysis used in this study is statistical, with multiple linear regression techniques for panel data. Data processing tools using E-Views 12 software. Multiple linear regression analysis is a regression built on the relationship between two or more variables in estimating the dependent variable based on the value of the independent variable (Panjawa & Sugiharti, 2021:21). In this study, multiple linear regression analysis techniques were carried out to determine the models to be used, including the Common Effect Model (CEM), Fixed Effect Model (FEM), or Random Effect Model (REM). The three estimation techniques used to determine the best model of multiple linear regression panel data include the Chow, Hausman, and Lagrange Multiplier tests. After determining the model,

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a classical assumption test was carried out, with Ordinary Least Square (OLS) to check the results in this study whether the results were free from deviations. The classic assumptions used are tests of normality, multicollinearity, and heteroscedasticity. After that, from the selected model, hypothesis tests were carried out including the partial significance test (t-test), simultaneous significance test F-test, and coefficient of determination test (R2).

3. RESULTS AND DISCUSSION

3.1 Revealed Comparative Advantage (RCA)

3.1.1 Testing Revealed Comparative Advantage (RCA)

Revealed Comparative Advantage (RCA) is a method used to measure the competitiveness index of Indonesian clove commodities comparatively. The following is the average index of RCA Indonesia and competing countries in the markets of the five main destination countries.

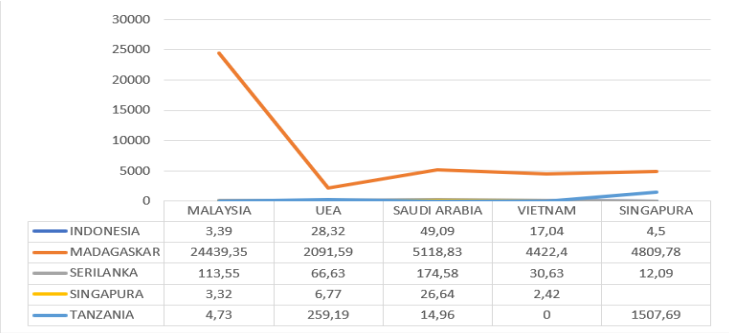

Figure 3. Development of RCA Index Indonesia and Competitor Countries

Based on figure 3, the RCA estimation results during the 2012-2021 period show that the highest average RCA index is controlled by competing countries, namely Madagascar, Sri Lanka, and Tanzania. Indonesian clove commodities have comparative advantages and strong competitiveness in five destination countries, especially in the Saudi Arabia market, with an average RCA value of 49.09. The country with the highest RCA during that time period was Madagascar, with an average RCA of 24439.53 in the Malaysian market. The following are the results of the estimated value of RCA Cloves Indonesia during the 2012-2021 period in destination countries, namely Malaysia, United Arab Emirates (UAE), Singapore, Saudi Arabia, and Vietnam.

Table 2. RCA Value of Indonesian Clove to Five Export Destination Countries Year 2012-2021

Year	RCA Value Indonesian to Export Destination Countries				
	Malaysia	UEA	Singapura	Saudi Arabia	Vietnam
2012	1,92	0,40	1,25	11,43	8,59
2013	1,73	0,07	1,77	20,32	12,57
2014	0,58	0,88	3,13	18,40	3,86
2015	5,81	6,37	6,42	24,10	8,78
2016	2,32	15,29	1,12	48,16	13,49
2017	1,57	12,06	0,74	35,49	2,14
2018	1,91	41,97	3,95	80,16	30,86
2019	8,42	59,08	10,42	74,84	24,28
2020	2,13	85,20	12,79	78,22	50,11
2021	7,47	61,88	3,42	39,75	15,73
Rata-rata	3,39	28,32	4,50	43,09	17,04

3.1.2 Discussion of Results Revealed Comparative Advantage (RCA)

Based on table 2, the Revealed Comparative Advantage (RCA) index of Indonesian clove exports shows a strong comparative and competitive advantage in all destination markets, namely Malaysia, UAE, Singapore, Vietnam, and Saudi Arabia, with a value of more than one (RCA>1). However, Indonesian cloves have not been able to compete with other clove exporting countries. This condition is due to major exporting countries such as Madagascar, Tanzania, and Sri Lanka consistently supplying cloves in large quantities to the same destination countries as Indonesia. In the period from 2012 to 2021, Indonesia became the largest clove producer in the world, with a total production of 1,277,696 tons. Meanwhile, in the same year period, Indonesia only exported cloves to the world, amounting to 169,116 tons (Directorate General of Plantations, 2023). It can be interpreted that the export of Indonesian cloves abroad is 13%, or a small part of national clove production. This condition is reinforced by data from (Mordor Intelligence, 2023) which states that Indonesia produces more than 70% of the world's cloves, but the amount of cloves exported is only around 10-15% of

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total production, and more than 90% is used for local consumption needs. This shows that although Indonesia is the largest clove producer in the world, Indonesia has not been able to become a major exporting country in the international market due to the high demand for domestic cloves, especially in the clove cigarette industry (Directorate General of Plantations, 2011). This condition is in line with Hechsher & Olin's (H-O) theory of comparative advantage, explaining that endowment factors such as land, people, and capital owned by a country will cause productivity (Ekananda, 2019). Furthermore, Indonesia has not been able to become a major exporting country in the international market because it is still importing cloves quite large (Putra Pratama et al., 2020).

3.2 Factors Affecting Indonesian Clove Export

3.2.1 Regression Model Selection Testing

Table 3. Model Selection Testing

Model Estimation Test	Probability Value
Chow Test	0.0000
Hausman Test	0,0100

Based on the Table 3 model selection test, it is known that the results of the chow test value of Prob. F Statistic is 0.0000 < 0.05. From these results, it can be concluded that H0 is rejected and the Fixed Effect Model (FEM) is the best estimation model compared to the Common Effect Model (CEM). Meanwhile, the Hausman test results show the value of Prob. F Statistic is 0.0100 < 0.05. From these results, it can be concluded that H0 is rejected and the Fixed Effect Model (FEM) is the best estimation model compared to the Random Effect Model (REM). So that the conclusion of this study can be drawn using the Fixed Effect Model (FEM) technique in estimating regression panel data

3.2.2 Classical Assumption Test

1. **Normality Test**
   The normality test is used to test whether, in a regression model, data is normally distributed or not. The decision-making criteria in the normality test is that if the probability in Jarque-Bera ≥ 0.05 (greater than 5%), then the data is normally distributed (Widarjono, 2018). The following are the results of the normality test of this study.

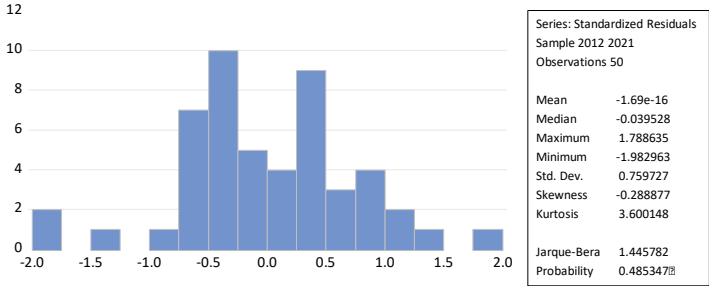

Figure 4. Normality Test

   Based on the normality test above, it can be seen that the probability value in Jarque-Bera is greater than the significance level α = 5%, or 0.485347 > 0.05. So it can be concluded that the data in this study is normally distributed.

2. **Multicollinearity Test**
   The multicollinearity test is used to determine whether or not there is a deviation from the classical assumption of multicollinearity, namely the existence of a linear relationship between independent variables in the regression model. The decision-making criteria in the multicollinearity test is that if the correlation coefficient between independent variables is less than 0.8, it means that multicollinearity does not occur. If the correlation coefficient between independent variables is more than 0.8, it means that multicollinearity occurs (Gujarati & Porter, 2009). The following are the results of the multicollinearity test of this study.

Table 4. Multicollinearity Test

	LN_PDB	LN_ Export Price (EP)	LN_ Economic Distance (ED)
LN_GDP	1.000000	0.527694	0.611189
LN_Export Price (EP)	0.527694	1.000000	-0.105992
LN_Economic Distance (ED)	0.611189	-0.105992	1.000000

   Based on the test results in Table 4, the correlation coefficient of the matrix between independent variables < 0.8. So it shows that there is no correlation between independent variables and is free from multicollinearity.

3. **Heteroscedasticity Test**
   The heteroscedasticity test is used to test whether, in regression models there is an inequality of variance from the residual of one observation of each independent variable. This study used the heteroscedasticity test of the Glejser method. The test criteria are that if the probability value of each independent variable > 0.05, it means that

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heteroscedasticity does not occur (Widarjono, 2018). The following are the results of the heteroscedasticity test of this study.

Tabel 5. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	-2.266369	42.27857	-0.053606	0.9575
LN_GDP	-0.172871	2.145531	-0.080573	0.9362
LN_Export Price (EP)	-0.164611	0.183172	-0.898671	0.3740
LN_Economic Distance (ED)	1.374005	2.805369	0.489777	0.6268

Based on the results of the heteroscedasticity test of the glejser method above, it shows that the value of prob. t-statistic on each variable > 0.05 (α = 5%). So that it can be concluded that the panel data regression model meets the assumptions and is free from heteroscedasticity problems.

3.2.3 Hypothesis Test

The hypothesis test uses the results of panel data regression estimation tests with the Fixed Effect Model (FEM) approach to identify regression models that have been formed and determine the influence of variable GDP rill, export prices, and economic distance on the export volume of Indonesian cloves. The following are the results of the panel data regression estimation test.

Table 6. Hypothesis Test

Variabel	Coefficient	Std. Error	t-Statistics	Prob.
C	-240.2978	78.32248	-3.068056	0.0038
LN_GDP	12.27291	3.974669	3.087783	0.0036
LN_Export Price (EP)	0.871995	0.339332	2.569739	0.0138
LN_Economic Distance (ED)	-13.26768	5.197041	-2.552929	0.0144
		Effect Specification		
R-Squared	0.613813	Mean dependent var		13.41406
Adjusted R-Squared	0.549449	S.D. dependent var		1.222528
S.E. of Regression	0.820599	Akalike info criterion		2.588082
Sum squared resid	28.28207	Schwarz criterion		2.894006
Log likelihood	-56.70205	Hannan-Quinn criter		2.704580
F-statistic	9.536522	Durbin-Watson stat		1.248990
Prob(F-statistic)	0.000000			

Based on the results of the data processing, the panel data regression model equation can be written as follows:

EVC= -240,2978 + 12,27291 + 0,871995 – 13,26768 + e

a. The real GDP of the destination country has a regression coefficient of 12.27291. This means that if the real GDP of the destination country increases by 1 percent, it will increase the export volume of Indonesian cloves by 12.27 percent, cateris paribus.
b. Export price (EP) has a regression coefficient of 0.871995. This means if the export price of cloves increases by 1 percent, it will increase the export volume of Indonesian cloves to destination countries by 0.87 percent, cateris paribus.
c. Economic distance (ED) has a regression coefficient of -13.26768. This means that an increase in economic distance of 1 percent will reduce the export volume of Indonesian cloves to the main destination countries by 13.26 percent, cateris paribus.

1. Partial Significance Test (t-Test)

The t test is used to determine the effect of the independent variable on the dependent variable individually or partially. The test criteria carried out are that if the t-statistic value > the t-table value or the probability of t-statistic < α (0.05), then H0 is rejected, meaning that the independent variable has a significant effect on the dependent variable partially. Conversely, if the t-statistic value < t-table value or t-statistic probability > α (0.05), then H0 is accepted, meaning that the independent variable does not have a significant effect on the dependent variable partially (Widarjono, 2018). The following is an explanation of the partial t test in this study.

a. The results of the t test prove that the t-statistic real GDP of export destination countries is 3.087783 > t-table is 1.67866, meaning that the real GDP of export destination countries has a positive influence on the export volume of Indonesian cloves. In addition, the probability of the t-statistic variable real GDP of the destination country is 0.0036 < a significance level of 5% (0.05), meaning that the variable real GDP of the destination country has a significant influence on the export volume of Indonesian cloves

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ISSN 2716-4128 (media online)
DOI 10.47065/jbe.v5i1.4693
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b. The results of the t test prove that t-statistic of the export price variable is 2.569739< t-table is 1.67866, meaning that the export price has a positive influence on the export volume of Indonesian cloves. In addition, the probability of t-statistic the export price variable is 0.0138 < a significance level of 5% (0.05). So it can be concluded that export prices have a significant positive influence on the export volume of Indonesian cloves.
c. The results of the t test prove that the t-statistic variable of economic distance is -2.552929 > t-table is 1.67866, meaning that economic distance has a negative influence on the export volume of Indonesian cloves. In addition, the probability of t-statistic for the economic distance variable is 0.0144 < a significance level of 5% (0.05). So it can be concluded that economic distance has a significant influence on the export volume of Indonesian cloves

2. **Simultaneous Significance Test (F-Test)**
The F test is used to identify regression models that are estimated to be feasible or not for explaining the effect of independent variables on the dependent variable. The test criteria carried out are that if the F- Statistic value> F-table value or F- statistic probability < α (0.05), then H0 is rejected, means that the independent variable has a significant effect on the dependent variable simultaneously. Conversely, if the F- statistic value < F-tabel value or F- statistic probability > α (0.05), then H0 is accepted meaning that the independent variable does not have a significant effect on the dependent variable simultaneously (Widarjono, 2018). Based on table 5, it is known that the value of prob. F-statistic of 0.000000 < a significant level of 5% (0.05). In addition, the F-Statistic value is 9.536522 > F-table 2.81. So it can be concluded that the estimated regression model is feasible to use to explain the influence of the independent variables of real GDP destination countries (GDP), export prices (EP) and economic distance (ED) simultaneously affect variables bound to the export volume of Indonesian cloves.
3. **Coefficient Determination Test (R^2)**
The coefficient of determination R^2 is a measurement of the percentage or proportion of how far the independent variable can explain its effect on the dependent variable in the model used. Based on table 5, the R-squared value is 0.613813. So it's concluded that the variables of the destination country's real GDP, export prices, and economic distance can explain the variable export volume of Indonesian cloves by 61.38%, while 38.62% is explained by other variables outside this research model.

3.2.4 Discussion of Variables Hypothesis Test Results

1. **The Effect of Real GDP on Indonesian Clove Export Volume**
Based on the test results in Table 5 using the Fixed Effect Model (FEM), it shows a variable coefficient value of Gross Domestic Product (GDP) of 12.27291 and a probability of 0.0038. So it can be concluded that the real GDP of the destination country has a positive and significant effect on the export volume of Indonesian cloves.
The findings of this study are in accordance with the theory of gravity model put forward by (Krugman et al., 2018) explaining that Newton gravity, like gravitational pull between two objects, is proportional to the product of its mass and decreases with distance. So that in trade between two countries, it has a proportional nature to GDP and decreases as the distance between countries increases.
The results of this study are supported by findings (Wahdiana et al., 2023) which show that the real GDP of destination countries has a positive and significant effect on the volume of Indonesian clove exports. In addition, several other studies by (Nainggolan et al., 2019), (Sugiharti et al., 2020), (Wiranthi & Mubarok, 2017), (Tri Utami, 2019) found that real GDP shows the purchasing power of the people of a country, so an increase in the GDP of the destination country will affect the increase in the volume of commodity exports in the country.
2. **The Effect of Export Price on Indonesian Clove Export Volume**
Based on the test results in Table 5 using the Fixed Effect Model (FEM), it shows the value of the export price variable coefficient of 0.871995 and the probability of 0.0138. So it can be concluded that the export price of the destination country has a positive and significant effect on the export volume of Indonesian cloves. This result is in accordance with the law of supply, namely that when the price of an item increases, the quantity offered will also increase, and when the price falls, the amount offered also decreases.
This finding is in accordance with the results of the research (Hasibuan & Novianti, 2022) on the analysis of factors affecting Indonesian clove exports to destination countries, stating that there is a positive and significant influence between export prices and the export volume of Indonesian cloves. In addition, this is in line with research by (Tika et al., 2022) on factors affecting Indonesian seaweed exports to Europe, stating that there is a positive influence between prices and export volumes. So that when the price of seaweed decreases, seaweed exports will decrease, and vice versa.
3. **The Effect of Economic Distance on Indonesian Clove Export Volume**
Based on the test results in Table 5 using the Fixed Effect Model (FEM), it shows the value of the economic distance variable coefficient of -13.26768 and the probability of 0.0144. It can be concluded that the economic distance of the destination country has a negative and significant effect on the export volume of Indonesian cloves.
The findings in this study are reinforced by the theory of gravity model through an explanation (Krugman et al., 2018) that distance negatively affects the flow of international trade between countries. In addition, there are studies that support the results of this finding, including research (Hasibuan & Novianti, 2022) and (Nurhayati et al., 2018) on Indonesian clove exports, which concludes that economic distance reflects transportation costs. So that, with the increase in costs incurred due to geographical distance, it will reduce the volume of Indonesian clove exports to destination countries. Another study by (Ridwannulloh & Sunaryati, 2018) on the determination of Indonesian CPO

Journal of Business and Economics Research (JBE)
Vol 5, No 1, Februari 2024, pp. 1−10
ISSN 2716-4128 (media online)
DOI 10.47065/jbe.v5i1.4693
https://ejurnal.seminar-id.com/index.php/jbe

exports states that distance variables have a negative and significant effect on the value of Indonesian CPO exports. The longer the distance of the importing country, CPO exports will decrease because it affects higher transportation costs.

4. CONCLUSION

Based on the results of competitiveness analysis using the Revealed Comparative Advantage (RCA) method, it shows that during the 2012-2021 period, Indonesian cloves in export destination markets, namely the United Arab Emirates, Singapore, Saudi Arabia, Vietnam, and Malaysia, had an average RCA value above one, which means that Indonesian cloves have a comparative advantage and strong competitiveness. However, Indonesia has not been able to compete with competing countries of clove exporters. This condition is due to major exporting countries such as Madagascar, Tanzania, Singapore, and Sri Lanka consistently supplying cloves in large quantities to the same destination countries as Indonesia. In addition, Indonesian clove commodities are mostly used to meet domestic consumption, especially in the cigarette industry. The results of panel data regression estimation using the gravity model method through the Fixed Effect Model (FEM) approach to factors affecting Indonesian clove exports in five main destination countries show 1) Gross Domestic Product (GDP) of real export destination countries and export prices have a positive and significant effect on Indonesian clove export volume, 2) Economic Distance has a positive and significant effect on Indonesian clove export volume. There are several limitations in this study, including that the competitiveness analysis method used in this study is limited to Revealed Comparative Advantage (RCA) and this study only uses three independent variables, namely the real Gross Domestic Product (GDP) of the destination country, Export Price, and Economic Distance. Therefore, there are still many broader export problems to be developed and investigated further. Researchers provide recommendations for future research in order to increase the number of time series, cross-section, and independent variables in order to expand the scope of research so as to obtain a more accurate and varied explanation related to the development of Indonesian clove export volumes. In addition, redeveloping competitiveness analysis methods to determine a stronger competitive position for Indonesian clove commodities.

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