International Journal of Finance, Economics and Business
Vol. 3, No. 3, September 2024, pp.151-162
e-ISSN: 2948-3883

DOI: 10.56225/ijfeb.v3i3.331

Original Article

Determining the Export Competitiveness of Indonesian Lobsters to Major Destination Countries

Teuku Muhammad Azmi [1], Taufiq C. Dawood [1] and Sartiyah Sartiyah [1,*]

[1] Department of Economics, Faculty of Economics and Business, Universitas Syiah Kuala, Darussalam, Banda Aceh, Indonesia; tmazmi@mhs.usk.ac.id (T.M.A.), taufiq.dawood@usk.ac.id (T.D.)
* Correspondence: sartysabang@usk.ac.id (S.S.)

Citations: Azmi, T.M., Dawood, T.C. and Sartiyah, S. (2024). Determining the Export Competitiveness of Indonesian Lobsters to Major Destination Countries. *International Journal of Finance, Economics and Business*, *3*(3), 151-162.

Received: 3 May 2024 Revised: 12 August 2024 Accepted: 7 September 2024 Published: 30 September 2024

Abstract: This study investigates the competitiveness of Indonesian lobster exports in five key destination markets—China, Taiwan, Hong Kong, Singapore, and Malaysia—and explores the influence of key export determinants, namely export prices, the GDP per capita of destination countries, and real exchange rates. The analysis employs the Revealed Comparative Advantage (RCA) and Export Product Dynamics (EPD) methods to evaluate competitiveness, while the determinants of export performance are examined using quarterly panel data from 2010 to 2022, analysed through the Panel Autoregressive Distributed Lag (ARDL) model. The results reveal that Indonesian lobsters exhibit a comparative advantage in Taiwan, Hong Kong, Malaysia, and Singapore, but not in China. Although Indonesia's export market share has expanded in China and Taiwan, it has declined in Hong Kong, Malaysia, and Singapore, despite an overall increase in export volume. Long-term analysis indicates that rising export prices do not significantly deter the volume of lobster exports to major markets. Conversely, higher GDP per capita in importing countries is associated with reduced export volumes, particularly in China, where the comparative advantage is weak. This suggests that lobsters are not consistently perceived as luxury goods, as rising incomes may lead consumers to shift toward other food options due to diminishing marginal utility. In the short run, real exchange rates exert a significant impact on export performance. An appreciation of the Indonesian rupiah tends to reduce export volumes, whereas depreciation stimulates them. To bolster its global competitiveness, Indonesia is advised to increase export volumes, foster international trade partnerships, and enhance the quality of its lobster products. These strategies are essential for expanding market presence in both established and emerging export destinations.

Keywords: Competitiveness; Export; Revealed comparative advantage, Export product dynamics, Panel ARDL.

1. Introduction

Fisheries is Indonesia's leading subsector in the agricultural sector that contributes to driving the country's economy. Indonesia as a maritime country is an archipelago where 70 percent of its territory is water. Based on geographical location, Indonesia is located between two oceans and has a tropical climate.

Indonesia has the second longest coastline in the world with a length of 108,000 km and an area of marine waters reaching 6.4 million km^2 (KKP, 2022). This makes Indonesia have abundant marine and fisheries resources. In addition to meeting domestic consumption, Indonesia exports its fishery products to foreign countries and the export value continues to increase every year (Boesono et al., 2011). Indonesia's fisheries trade balance is growing with an upward trend from US$4,090 million in 2017 to US$5,540 million in 2022. Indonesia's fisheries trade balance in the span of 2017 - 2022 averaged an increase of 1.66 percent per year. The trade balance trend has increased because the value of Indonesian fisheries exports has increased significantly from US$4,524 million in 2017 to US$6,242 million in 2022 with an average percentage increase of 6.69 percent per year. In 2022, Indonesia's fisheries trade balance reached the highest surplus during 2017-2022 at US$5,540 million. On the other hand, the lowest trade balance surplus in 2017 amounted to US$ 4,090 million. (Ministry of Maritime Affairs and Fisheries, 2023).. The trade balance surplus shows that the fisheries sector is one of the prospective sectors in contributing to Indonesia's state income.

Lobster is one of the Crustacean animals that is one of Indonesia's fisheries export commodities In general, the grouping of lobsters are traded into two groups, namely Homarid lobster, lobster derived from the Homarus genus, consisting of two species namely Homarus *Americanus* (American lobster) and *Homarus Gammarus* (European lobster). Then there are spiny lobsters, which are lobsters from the *Palinuridae* family, consisting of *Jasus spp*. (rock lobsters) and *Panulirus spp.* and *Palinurus spp.* (tropical or spiny lobsters). (Western Rock Lobster, 2022). On the basis of data from the Ministry of Marine Affairs and Fisheries (2022), Indonesia exports rock lobsters or spiny lobsters (Palinurus spp., Panulirus spp., and Jasus spp.), as these species make up the largest portion of Indonesian lobster exports.

Table 1. Volume and Value of Indonesian Lobster Exports 2017 - 2022

Lobster	2017	2018	2019	2020	2021	2022
Volume (Kg)	1.976.557	1.958.082	1.633.220	2.150.420	1.959.913	1.469.558
Value (USD)	20.884.423	29.903.687	33.189.390	76.106.250	28.616.955	25.700.739

Source: KKP (2023)

Table 1 shows data on the volume and value of Indonesian lobster exports from 2017 to 2022. The volume of Indonesian lobster exports from 2017 to 2022 fluctuated, the export volume increased rapidly by 2,150,420 Kg in 2020 but fell again in 2021 and 2022. The overall value of lobster exports increased from 2017 to 2022, with a rapid increase in 2020 amounting to US$76,106,250. This drastic increase in 2020 occurred because the Indonesian Ministry of Maritime Affairs and Fisheries authorized the export of lobster seeds. Indonesia massively exported lobster seeds to Vietnam, amounting to 14,639 Kg with an export value of US$ 39,303 thousand in 2020 (Trade Map, 2024). This export quantity is very large considering that in the previous year Indonesia had never exported lobster seeds to Vietnam. The policy of allowing the export of lobster seeds then caused various problems so that the export of Indonesian lobster seeds was banned again in 2021. This makes the volume and value of lobster exports decrease in 2021 and 2022 because Indonesia only exports large lobsters.

Lobster is known as a fishery commodity that has a high economic value for both domestic consumption and export. (Pereira & Josupeit, 2017). Besides being marketed domestically, lobsters are also exported to various countries with market demand that tends to increase every year (Boesono et al., 2011). (Boesono et al., 2011). The price of Indonesian lobster is getting more expensive from 2017 to 2022, from US$ 10,566.06 / ton to US$ 17,488.73 / ton. Not all fishery commodities have their export prices increased every year, such as shrimp commodities, from US $ 9,680.02 / ton in 2017 decreased to US $ 8,943.31 / ton in 2022. This downward trend in prices was also followed by the skipjack commodity in 2017 at US $ 1,635.875 / ton to US $ 1,561.533 / ton in 2022. The most expensive lobster export price among other fishery commodities shows that lobster is a fishery commodity that has high economic value.

Table 2. Export Prices of Indonesian Fishery Commodities 2017 - 2022 (US$ / Ton)

Commodities	2017	2018	2019	2020	2021	2022
Lobster	10.566,06	15.271,92	20.321,32	35.391,34	14.601.13	17.488,73
Shrimp	9.680,02	8.823,84	8.277,11	8.526,27	8.890,36	8.943,31
Crab	4.864,222	4.854,657	5.406,584	4.874,862	5.606,993	6.029,546
Tuna	4.579,355	4.632,177	4.440,746	4.392,750	4.375,024	4.619,996

Commodities	2017	2018	2019	2020	2021	2022
Squid	2.979,056	3.189,011	3.604,988	3.575,787	3.366,220	4.389,522
Skipjack	1.635,875	1.521,390	1.320,450	1.283,344	1.383,761	1.561,553
Seaweed	1.067,85	1.478,15	1.552,51	1.429,55	1.529,67	2.366,58

Source: KKP (2023) (processed)

On the international market Indonesia is not the only lobster exporting country, there are several major lobster exporting countries in the world including Australia, New Zealand, Vietnam, South Africa, Indonesia and Portugal. (Trade Map, 2024). Figure 2 shows the lobster exporting countries that have the largest amount of trade value in the international market from 2017 - 2022. Australia is the largest exporting country with an export value in 2017 of US$ 570,364 thousand. The value of Australian lobster exports from 2017 to 2018 increased to US$ 570,364 thousand and then decreased to US$ 224,195 in 2022. This decrease in trade value is due to the Covid-19 outbreak which took place from 2020 - 2022 and reduced exports to China making Australian lobster exports decline. The export trade value of New Zealand is US$ 206,151 thousand, and South Africa is US$ 40,617 thousand. Indonesia occupies the fourth position with an export value of US$ 26,382 thousand. The export value is still very large compared to the export value of Australian lobster. Even in 2022, Indonesia's lobster export value is smaller than Vietnam, which has experienced a rapid increase. Vietnam has exported lobster with a value of US$ 164,957 thousand, while Indonesia is only able to export US$ 20,352 thousand. Indonesia competes with Australia, New Zealand, Vietnam, South Africa and Portugal in the lobster export market. Indonesian lobster products must have strong competitiveness to gain market share in the international market. Appropriate export policies implemented by the Indonesian government can increase the volume and value of lobster exports. The increase in the value of lobster exports makes Indonesia gain from trade from international trade.

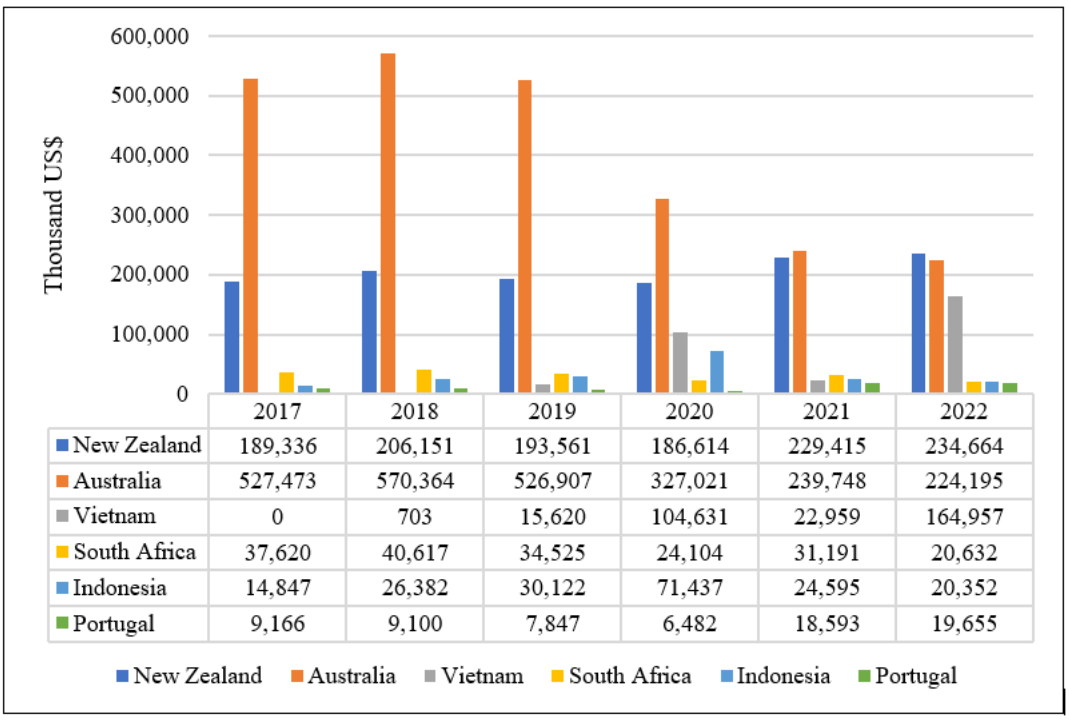

Figure 1. Trade Value of Lobster Exporters in International Markets 2017-2022 (Thousand US$)

The implementation of appropriate strategies and policies is needed to improve the competitiveness of Indonesian lobster in the international market. International market competition is increasingly competitive both in terms of quantity and quality of products, making the international market will be led by countries that have strong competitiveness. Therefore, it is necessary to conduct research to analyze the competitiveness of Indonesian lobster exports to major destination countries as well as the determinants of Indonesian lobster exports to major destination countries and recommendations that can be applied to this research.

2. Materials and Methods

2.1. Materials

The data used in this study is panel data, which is a combination of *cross-section data from the* 5 main destination countries for Indonesian lobster exports and time series data in quarterly form from 2010 - 2022. Secondary data is obtained from UN Comtrade, Trademap, UNComtrade, Worldbank and WITS. The lobsters that are the object of research are crayfish (*Palinurus spp., Panulirus spp., Jasus spp.)* with HS code 030621 revised in 2012 and HS 030631 revised in 2017. This study uses the *Revealed Comparative Advantage* (RCA) and Export Product Dynamic (EPD) analysis approaches to analyze the competitiveness of Indonesian lobster exports. RCA analysis to analyze the comparative advantage of Indonesian lobster in the main destination countries. EPD analysis is one indicator of competitiveness by measuring the market position of Indonesian lobster for certain market destinations. This method can measure whether or not Indonesian lobster is dynamic in the destination country market.

The inferential statistical analysis used is the ARDL (*Autoregressive Distributed Lag)* panel method, which analyzes the determinants of Indonesian lobster exports to the main destination countries in the short and long term. Export volume is the dependent variable in the ARDL Panel model. The export price of Indonesian lobster, GDP per capita of the main destination countries, and the real exchange rate of the rupiah against the destination countries' currencies (IDR/LCU) are the independent variables in the ARDL Panel model. Indonesian lobster export volume is the quantity of Indonesian lobster exports to export destination countries expressed in Kilograms. The export price of Indonesian lobster is the quotient between the export value and the export volume of Indonesian lobster to destination countries in the same time period (quarter) and is expressed in units of US$/Kg. *Gross Domestic Product* (GDP) per capita of the main destination country is the income of the community divided by the population of the destination country of Indonesian lobster exports in the quarter period in a given year and expressed in units of US$. The real exchange rate is obtained from the calculation of the quotient of the rupiah against the currency of the destination country and then multiplied by the division of the Indonesian CPI by the CPI of the destination country. The hypothesis in this study is that in the short and long term the export price of Indonesian lobsters and the real exchange rate have a negative effect on the volume of Indonesian lobster exports. GDP per capita of the destination country has a positive effect on the volume of Indonesian lobster exports.

2.2. Methods

Revealed Comparative Advantage (RCA) is a method used to measure the comparative advantage of a product in a country in the destination country. (Hasibuan et al., 2012). RCA was introduced by (Balassa, 1965) by assuming that a country's exports can reflect the comparative advantage of the country. This study calculates the RCA of Indonesian lobsters to 5 main destination countries so that their comparative advantage can be compared between destination countries. Mathematically, RCA is formulated as follows:

$$RCA_{ij} = \frac{X_{ij}/X_j}{X_{iw}/X_w} \quad (1)$$

Where RCA_{ij} is the competitiveness of country j for product i; X_{ij} is the export value of country j for product i to destination countries; X_j is the total export value of country j to destination countries; X_{iw} is the total export value of product i to destination countries, and X_w is the total world export value to destination countries. If the RCA value > 1 means that a country has a comparative advantage above the world average so that the product has strong competitiveness. If the RCA value is <1 then a country does not have a comparative advantage above the world average so that the product has weak competitiveness.

Export Product Dynamics (EPD) analyzes competitiveness by measuring a country's market position for a particular destination market. The method used is to calculate the growth of the product's export market share in international trade and the growth of the country's market share in world trade. (Pradipta & Firdaus, 2014). The combination of export market share (X) and country market share (Y) results in the competitiveness position of the analyzed product into four categories: *rising star*, *falling star*, *lost opportunity,* and retreat (Esterhuizen, 2006). (Esterhuizen, 2006). Mathematically, the EPD calculation is as follows.

X-axis: Export market share growth

$$Axis - X = \frac{\sum_{t=1}^{T}\left(\frac{X_{ij}}{W_{ij}}\right)_t x\ 100\% - \sum_{t=1}^{T}\left(\frac{X_{ij}}{W_{ij}}\right)_{t-1} x\ 100\%}{T} \quad (2)$$

Y-axis: Country market share growth

$$Axis - Y = \frac{\sum_{t=1}^{T}\left(\frac{X_t}{W_t}\right)_t x\ 100\% - \sum_{t=1}^{T}\left(\frac{X_t}{W_t}\right)_{t-1} x\ 100\%}{T} \quad (3)$$

Where X_{ij} is the value of Indonesian lobster exports to destination countries; W_{ij} is the value of world lobster exports to destination countries; X_t is the total value of Indonesian exports to destination countries; W_t is the total value of world exports to destination countries. $\sum T$ is the number of years of analysis; t is year t; and t-1 is the previous year.

Autoregressive Distributed Lag (ARDL) is the model used in analyzing the determinants of Indonesian lobster exports to the main destination countries in this study. The research data uses panel data which is a combination of cross-section and time series data. To analyze the influence in the short and long term, time series analysis uses Autoregressive Distributed Lag (ARDL). Pesaran et al. (1997) introduced ARDL for the first time. The use of ARDL panels to obtain the estimation results of each variable separately, assuming there is lag cointegration in each variable. The ARDL panel data regression equation in the model for this research variable is as follows:

$$\Delta EXP_t = \beta_0 + \sum_{i=1}^{k}\beta_1\Delta EXP_{it-k} + \sum_{i=1}^{k}\beta_2\Delta P_{it-k} + \sum_{i=1}^{k}\beta_3\Delta GDP_{it-k} + \sum_{i=1}^{k}\beta_4\Delta ER_{it-k} + \theta_1 EXP_{it-k} + \theta_2 P_{it-k} + \theta_3 GDP_{it-k} + \theta_4 ER_{it-k} + \varepsilon_t \quad (4)$$

Where EXP is the volume of Indonesian lobster exports to major destination countries; P is the price of Indonesian lobster exports to major destination countries; GDP is the GDP per capita of major destination countries; ER is the real exchange rate of the rupiah against the currencies of major destination countries; i is the five major destination countries; t is the year 2010 - 2022 (quarterly); ε_t is the error component; β_0 is the intercept; β is the short-term coefficient; and θ is the long-term coefficient. The testing stages carried out in this modeling include data stationarity test, cointegration test, optimum lag selection test, and ARDL Panel regression.

3. Results and Discussion

3.1. Descriptive Statistics

Descriptive statistics provide a concise overview of the overall data used in the study. The overview is known from information related to the mean, median, maximum data, minimum data, standard deviation, and number of observations of each variable in this study. Table 3 presents descriptive statistics of Indonesian lobster export volume, Indonesian lobster export price, destination country GDP per capita and real exchange rate. The data was collected in quarterly form from 2010 - 2022. Overall the number of data observations of the five variables used in this study has the same amount, each variable has 240 data observations. Descriptive statistics for the Indonesian lobster export volume variable (EXP) averaged 54,035.804 Kg with the highest export volume of 293,250 Kg in the 4th quarter of 2021 in China and the lowest of 63 Kg in the 3rd quarter of 2022 in Malaysia. Indonesia exports the most lobsters to China and the least to Malaysia. China is the largest importer of lobster from Indonesia and Malaysia is the smallest of the 5 main destination countries.

Table 3. Result of Descriptive Statistics

	EXP (Kg)	**P (US$/Kg)**	**GDP (US$)**	**ER (Rp/LCU)**
Mean	54.035,804	10,992	29.777,4	4.271,814
Median	41.094	8,206	23.319,59	2.537,679
Maximum	293.250	26,066	82.807,63	14.264,912

	EXP (Kg)	P (US$/Kg)	GDP (US$)	ER (Rp/LCU)
Minimum	63	1,1848	4.816,452	1.127.269
Std. Dev.	51.637,594	7,5438	20.748,89	3.812,836
Obs.	240	240	240	240

Note: EXP: Export Volume; P: Export Price; GDP per capita of Destination Country: Gross Domestic Product; ER: Real Exchange Rate.

Source: Trademap and World Bank (2024)

The average export price of Indonesian lobsters to destination countries (P) was US$ 10.992/Kg. The highest export price was in the 4th quarter of 2014 at US$ 26.066/Kg in Taiwan while the lowest was in the 1st quarter of 2011 at US$ 1.1848/Kg also in Taiwan. The export price of Indonesian lobster varies between destination countries, this is due to differences in export value and export quantity that occur in trade within a certain period of time. *Gross Domestic Product* (GDP) per capita of the main destination countries for Indonesian lobster exports shows an average value of US$ 29,777.4. The highest GDP value was US$ 82,807.63 in the 4th quarter of 2022 in Malaysia and the lowest was US$ 4,816.452 in the 1st quarter of 2011 in China. The real exchange rate between the rupiah and the currency of the destination country (ER) produces a variety of data variances. Each country has its own currency so that this real exchange rate will produce diverse data. The average real exchange rate is IDR 4,271.814 / LCU. The highest real exchange rate was IDR 14,264,912 / LCU in the 4th quarter of 2021 in Singapore, the lowest real exchange rate was IDR 1,127,269 / LCU in the 4th quarter in Hong Kong.

3.2. Stationarity Testing

This study begins by testing the stationarity of all data from the variables used in this study, including the variable volume of Indonesian lobster exports to major destination countries (EXP), Indonesian lobster export prices (P), GDP per capita of major destination countries (GDP), and the real exchange rate of the rupiah against the currency of the destination country (ER). To test the stationarity of the data, we will use the Augmented Dickey-Fuller (ADF) test.

Table 4. Unit Root Test Results with ADF Test

Variable(s)	Level I(0)		First difference I(1)	
	Prob.	Conclusion	Prob.	Conclusion
Export Volume (EXP)	0.2317	Non-stationary	0.0000***	Stationary
Export Price (P)	0.0782*	Stationary	0.0433**	Stationary
GDP Per Capita (GDP)	0.9000	Non-stationary	0.0017***	Stationary
Real exchange rate (ER)	0.1855	Non-stationary	0.0265**	Stationary

Note : ***, **, and * indicate significant at 1%, 5% and 10% confidence intervals respectively.

Table 4 shows the variation in the level of stationarity of the variables in this study. The unit root test results show that the export price variable (P) is stationary at the I(0) level. The variables of export volume (EXP), *Gross Domestic Product (*GDP) per capita of the destination country, and real exchange rate (ER) are stationary at the first difference level I(1).

3.3. Cointegration Testing

This study uses a cointegration test to test whether there is a cointegration relationship between variables. Cointegration is a long-term interaction of variables in a model that moves together over time. (Suriani et al., 2024). Cointegration testing uses the Kao Residual Cointegration Test analysis. The cointegration test results in Table 5 explain the importance of the Prob value. 0.0032 is smaller than the significance of 0.05 indicating the existence of cointegration or short-term balance to the long term in the ARDL Panel model formed. The cointegration test results show that Indonesian lobster export prices (P), GDP per capita of destination countries (GDP) and real exchange rates (ER) show a consistent pattern of movement in the long term or have an equilibrium from the short term to the long term. Suriani et al. (2024) stated that changes or deviations in one variable are offset by corresponding changes in other variables, thus maintaining an equilibrium relationship. In other words, the independent variables are cointegrated, which

indicates a long-term trend or balance in the independent variables. The result is that further estimation can be done.

Table 5. Estimated Kao Residual Cointegration Test

ADF	t-Statistic	Prob.
Panel ADF-Statistic	-2,721518	0,0032**

Note: ** Significant at 5% level. ADF: Augmented Dickey-Fuller

3.4. Optimum Lag Length Selection

A good estimate is generated by conducting a test to determine the optimum lag length. The results of the optimum lag test based on the lowest Akaike Information Criterion (AIC) value are in PMG/ARDL (2, 2, 2, 2). The lag obtained will be used to estimate this study to get the best estimation results. The results of the optimum lag length test in this study can be seen in Figure 3.

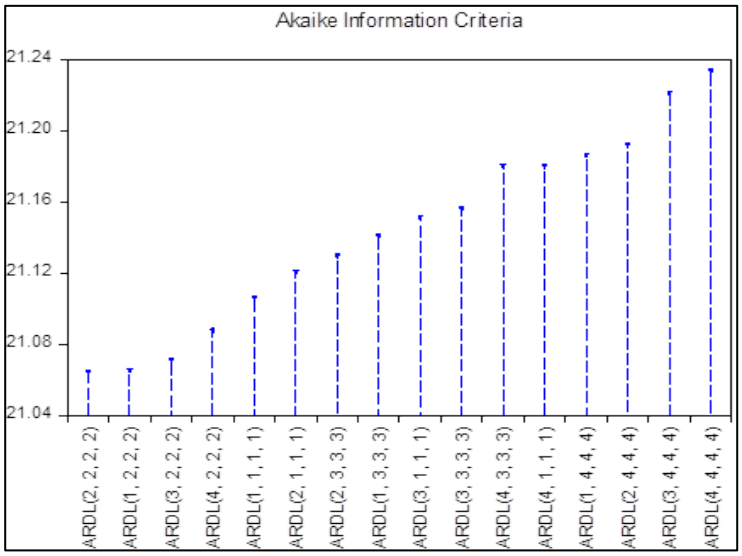

Figure 2. Result of Optimum Lag Length

3.5. Panel ARDL Estimation

The Panel ARDL estimation results are used to analyze the short-term and long-term effects of the Indonesian lobster export price variable (P), GDP per capita of destination countries (GDP) and real exchange rate (ER) on the Indonesian lobster export volume variable (EXP). Based on the Panel ARDL estimation results in Table 6, the independent variable of Indonesian lobster export price has no effect on export volume in the short term, as seen from the Prob. value of 0.1888 which is greater than the significance of 0.05. The variables of GDP per capita of the destination country (GDP) and GDP per capita of the previous quarter lag (GDP(-1)) also do not affect the export volume with the value of Prob. Each is greater than the significance of 0.05, namely 0.5632 and 0.7283. The variable that has a positive effect on the volume of Indonesian lobster exports (EXP) in the short term is the previous quarter lag export volume variable (EXP(-1)) with a Prob. value smaller than 0.01 significance, namely 0.0001.

The real exchange rate (ER) variable negatively affects the export volume because the Prob. value of 0.0468 is smaller than the significance of 0.05. The long-term estimation results show that the Indonesian lobster export price variable (P) has a positive effect on the volume of Indonesian lobster exports. This is characterized by a probability value of 0.0145 <0.10 which indicates a significant effect at a significance level of 10 percent. This is also followed by the variable GDP per capita of the destination country has a negative effect on the export volume with a prob. value of 0.0602 smaller than the significance level of 0.1, meaning that it has an effect at a 10 percent confidence level. The real exchange rate (ER) does not affect the volume of Indonesian lobster exports (EXP), this can be seen from the Prob. value in the long run is greater than the significance level of 0.1, namely 0.5841 greater than 0.10. In the Panel ARDL estimation test, the CointEq01 value is significant at the 5 percent test level because the Prob. value is 0.0160. These results indicate short-term to long-term cointegration in the Panel ARDL model. The CointEq coefficient is

-0.088555 meaning that the model has a cointegration relationship with a speed of 8.85 percent per quarter to reach equilibrium.

Table 6. Panel Autoregressive Distributed Lag (ARDL) Test Estimation Results

Long Term				
Variable(s)	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
P	3.412,589	1383,632	2,466400	0,0145**
GDP	-3,404362	1,800993	-1,890270	0,0602*
ER	-3,057588	5,575930	-0,548355	0,5841
Short Term				
Variable(s)	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
COINTEQ01	-0,088555	0,036422	-2,431337	0,0160**
D(EXP (-1))	0,184239	0,046766	3,939627	0,0001***
D(P)	-2.998,778	2.273,765	-1,318860	0,1888
D(P(-1))	1.254,791	1.006,682	1,246461	0,2141
D(GDP)	19,69188	34,00792	0,579038	0,5632
D(GDP(-1))	-6,565319	18,87479	-0,347835	0,7283
D(ER)	-176,2804	88,07756	-2,001422	0,0468**
D(ER(-1))	126,3820	82,81002	1,526168	0,1286
C	11.161,38	5.296,150	2,107452	0,0364

Revealed Comparative Advantage (RCA) is a method that can be used to analyze the comparative advantage of a product in a country. The comparative advantage of Indonesian lobster is measured by comparing the share of Indonesian lobster export value in major destination countries to the total value of Indonesian exports to major destination countries and the share of global lobster export value in major destination countries, in the total value of world exports to major destination countries.

Table 7. RCA Value of Indonesian Lobster to Major Destination Countries in 2010 - 2022

Year	**RCA Value**				
	China	**Taiwan**	**Hong Kong**	**Singapore**	**Malaysia**
2010	0,355	0,176	0,823	0,302	12,91
2011	0,690	1,331	0,444	0,464	1,81
2012	0,635	18,307	0,511	0,759	6,90
2013	0,415	41,121	1,594	0,147	1,76
2014	0,598	37,319	0,241	0,220	3,28
2015	0,500	13,770	0,273	1,249	2,92
2016	0,348	41,028	7,751	4,725	5,07
2017	1,007	28,587	18,866	2,632	2,01
2018	0,788	48,571	22,574	9,280	8,77
2019	0,948	61,988	48,597	6,783	25,76
2020	0,930	52,730	183,099	10,474	31,26
2021	1,388	8,715	18,553	3,572	87,62
2022	0,561	5,017	10,837	0,794	2,29
Average	0,705	27,589	24,166	3,185	14.797

The calculation results of the RCA analysis show that the average RCA value for the 2010-2022 period has a value that varies between the main destination countries. There are four countries with average RCA values greater than 1 between 2010 and 2022, and one country with an average RCA value of less than 1 from 2010 to 2022. The average RCA value of Indonesian lobster to China is less than 1 (RCA<1), so it is

concluded that Indonesian lobster commodities do not have a comparative advantage above the world average so that Indonesian lobster is weakly competitive in the Chinese market. Indonesian lobster has a comparative advantage above the world average in the Taiwan, Hong Kong, Singapore and Malaysia markets so that Indonesian lobster has strong competitiveness in the Taiwan Hong Kong, Malaysia and Singapore markets. Indonesia has the strongest competitiveness in lobster commodities to Taiwan because its average RCA value during 2010-2022 was the highest at 27.589. This comparative advantage can be an opportunity for Indonesia to increase Indonesian lobster exports to destination countries in order to increase the competitiveness of Indonesian lobster exports.

Export Product Dynamics (EPD) measures the market competitiveness position of a product in a country for a specific country market destination. The EPD matrix consists of the growth of the product's export market share in world trade on the X-axis and the growth of the country's market share in world trade on the Y-axis. Indonesia's lobster market position in China and Taiwan is a rising star. The demand for Indonesian lobster exports from China and Taiwan continues to increase considering that these countries have a very large population, therefore the consumption of lobster is high. Indonesia's lobster export market share has increased along with an increase in Indonesia's trade market share to China and Taiwan. Therefore, the growth of Indonesia's lobster export market share is competitive and the growth of Indonesia's trade market share is dynamic to China and Taiwan. The rising star market position quadrant is an ideal market condition because export opportunities continue to increase so it is expected to maintain existing export markets and increase export market access through promotional programs and cooperation between destination countries.

While the falling star market position in Indonesian lobster exports to the markets of Hong Kong, Singapore and Malaysia. Indonesia's lobster export market share has increased but there has been a decrease in Indonesia's trade market share to Hong Kong, Malaysia and Singapore. The growth of export market share in the 3 countries is positive or has increased while the growth of Indonesia's trade market share is negative. This can be interpreted that the total export value of Indonesia to Hong Kong, Singapore and Malaysia is decreasing compared to the total world export value to Hong Kong, Singapore and Malaysia every year. Although Indonesia's trade market share has decreased, the opportunity to increase Indonesian lobster exports remains because the export demand from the 3 countries has increased.

Table 8. Results of Export Product Dynamics (EPD) analysis of Indonesian Lobster to Major Destination Countries

Country	EPD Value		Market Position
	Export Market Share Growth (%)	Country Market Share Growth (%)	
China	29,7075	7,6322	Rising Star
Taiwan	179,569	0,582	Rising Star
Hong Kong	306,947	-5,086	Falling Star
Singapore	81,139	-3,558	Falling Star
Malaysia	86,152	-0,878	Falling Star

The analysis of the determinants of Indonesian lobster exports to major destination countries examines the effect of Indonesian lobster export prices (P), GDP per capita of destination countries (GDP), and real exchange rates (ER) on the volume of Indonesian lobster exports to destination countries (EXP) in the short and long term. The price of a commodity in a trade transaction is one of the factors that must be considered because the price determines how much the commodity will be traded (Riyani et al., 2018). (Riyani et al., 2018). The results showed that the Indonesian lobster export price variable (P) in the long term has a probability value of 0.0145 which is smaller than the significance of 0.05 and a coefficient value of 3,412.589. This indicates that the export price (P) has a positive effect on Indonesian lobster exports (EXP) in the long run. If the export price of Indonesian lobsters to the main destination countries (P) increases by US$ 1 per kilogram, then Indonesian lobster exports (EXP) will increase by 3,412.589 Kg, *ceteris paribus*. The export price (P) and the export price lag of the previous quarter ((P(-1)) have no effect on Indonesian lobster exports in the short term, this is indicated by their respective probability values of 0.1888 and 0.2141 greater than 0.1 significance.

The results showed that the export price of Indonesian lobster (P) has a positive effect on Indonesian lobster exports to the main destination countries (EXP) in the long run. The results of this study differ from the hypothesis that an increase in the export price of Indonesian lobster will cause a decrease in the number of lobster exports. An increase in the export price of Indonesian lobster causes the number of Indonesian

lobster exports to increase. This can be due to the fact that Indonesian lobsters exported to the main destination countries have strong competitiveness so that despite the price increase, the demand for lobsters does not decrease. The increase in the export price of Indonesian lobster which is lower than the export price of lobster from other exporting countries can also cause Indonesian lobster exports to increase because the main destination countries prefer to import from Indonesia than from other exporting countries. The long run is the accumulation of all short-term relationships between export prices and Indonesian lobster exports. So that the effect of Indonesian lobster export prices on Indonesian lobster exports no longer follows the theory because there are changes in each short-term relationship between Indonesian lobster export prices and Indonesian lobster exports.

Export prices have no effect on Indonesian lobster exports in the short term because demand tends to be inelastic in the short term so that price changes only slightly affect export volumes. Market participants consider price changes as a temporary phenomenon in the short term so that price changes have no effect on Indonesian lobster exports. Research Layna & Dewanta, (2022) found that export prices have a negative effect in the short term and a positive effect in the long term on the volume of Indonesian shrimp exports to the United States. GDP per capita of destination countries (GDP) in the long run negatively affects the volume of Indonesian lobster exports (EXP). The results showed that the variable GDP per capita of destination countries in the long run has a probability value of 0.0602 which is smaller than the real level of 10 percent (0.05) and a coefficient value of -3.404362. This indicates that GDP per capita of destination countries negatively affects Indonesian lobster exports (EXP) in the long run. If the GDP per capita of the destination country increases by US$ 1, Indonesian lobster exports (EXP) will decrease by 3.404362 Kg. GDP and GDP lag of the previous quarter (GDP(-1)) have no effect on Indonesian lobster exports in the short term. This is based on their respective probability values of 0.5632 and 0.7283 greater than the real level of 0.10 (10 percent).

The increase in GDP per capita of the destination country causes a decrease in the number of Indonesian lobster exports due to the low comparative advantage of Indonesian lobsters to China even though China is the country that consumes the largest lobster in the world. the increase in GDP per capita of the destination country does not necessarily increase the demand for lobster exports. In the long run, demand for lobster exports may not increase because people spend their income on other products. Lobster is not necessarily considered a luxury item because the higher one's income, the less one will spend on eating lobster. A person will choose other foods instead of just eating lobster. The reason being, if you continue to consume lobster, its utility will definitely decrease. Therefore, one will shift their consumption to other foodstuffs. The results of this study are in line with the research of Abidin et al. (2013) that GDP per capita of OIC member countries negatively affects Malaysia's exports to OIC member countries.

Different results were obtained from research Ashari et al. (2016) that the GDP of the destination country, namely the United States, has a positive effect on the competitiveness of Indonesian frozen shrimp exports in the short and long term. Research Silva et al. (2023) showed the result that the GDP of the destination country has no effect on Indonesia's frozen tuna exports to the main destination countries. Based on the Panel ARDL estimation results in Table 6, the real exchange rate (ER) has no effect on Indonesian lobster exports (EXP) in the long run. The coefficient value of the real exchange rate variable is negative, namely -3.057588 with a probability value greater than 5 percent significance, namely 0.5841 <0.05. The real exchange rate (ER) has no effect on Indonesian lobster exports (EXP) in the long term because Indonesian lobster exports to the main destination country (EXP) will still be carried out to meet the demand for Indonesian lobster exports to the main destination country despite the depreciation or appreciation of the real exchange rate of the rupiah against the currency of the destination country which usually occurs in the short term.

The real exchange rate (ER) has a negative effect on Indonesian lobster exports (EXP) in the short term. The coefficient value of the exchange rate variable is -176.2804 with a probability value of 0.0468 smaller than the real level of 0.05. The effect can be interpreted if the real exchange rate of the rupiah against the currency of the destination country increases or the rupiah weakens (depreciates) by 1 Rupiah / LCU, causing a decrease in Indonesian lobster exports by 176.2804 kilograms. The real exchange rate lag of the previous quarter has no effect on Indonesian lobster exports, this is indicated by the probability value of 0.7283 greater than the confidence level of 0.05.

The real exchange rate is a consideration for destination countries to decide to buy lobsters from Indonesia. When the real exchange rate of the rupiah against the currency of the destination country appreciates, the currency of the destination country becomes cheaper, Indonesian lobster becomes relatively more expensive for the destination country, thus reducing Indonesian lobster exports to the destination country. If the real exchange rate of the rupiah against the currency of the destination country depreciates,

the currency of the destination country becomes more expensive, Indonesian lobsters are relatively cheaper for the destination country, thereby increasing exports of Indonesian lobsters to the destination country. This is in accordance with the hypothesis which states that the real exchange rate of the rupiah against the currency of the destination country has a negative effect on Indonesian lobster exports. The real exchange rate can affect Indonesian lobster exports in the short term, because all trade transactions between Indonesia and the destination country are based on the exchange rate prevailing at the time of the trade transaction. The real exchange rate in the previous quarter lag does not affect Indonesian lobster exports, this indicates that only the real exchange rate in the current quarter, not the exchange rate of the previous quarter, can affect Indonesian lobster exports.

4. Conclusions

This study aimed to examine the export competitiveness and key determinants of Indonesian lobster exports to five major destination countries: the People's Republic of China, Taiwan, Hong Kong, Singapore, and Malaysia. These countries were selected due to their status as the largest importers of Indonesian lobsters. The competitiveness analysis was conducted using the Revealed Comparative Advantage (RCA) and Export Product Dynamics (EPD) methods. To identify the determinants of export performance, the study evaluated the effects of Indonesian lobster export prices, the GDP per capita of destination countries, and real exchange rates on export volumes. The analysis employed panel data consisting of quarterly observations from 2010 to 2022 across the five selected countries, and it utilized the Panel Autoregressive Distributed Lag (ARDL) model to capture both short-term and long-term relationships between the variables.

The findings reveal that Indonesian lobsters possess a comparative advantage in Taiwan, Hong Kong, Malaysia, and Singapore, indicating strong competitiveness in those markets. However, in China, the competitiveness is relatively weak as Indonesian lobsters do not have a comparative advantage above the world average. In terms of market dynamics, Indonesian lobster exports are classified as a "rising star" in China and Taiwan, while in Hong Kong, Malaysia, and Singapore, they fall under the "falling star" category. In the long run, export prices have a positive effect on the volume of Indonesian lobster exports, suggesting that higher prices are associated with sustained demand, likely due to the perceived quality of the product. Conversely, GDP per capita in destination countries negatively affects exports, possibly reflecting changes in consumer preferences as income rises. The real exchange rate does not exhibit a significant long-term impact. In the short term, neither the export price nor GDP per capita—nor their lagged values—significantly influence export volumes. However, lagged export volume shows a positive effect, indicating a persistence or momentum in export flows. Meanwhile, the real exchange rate negatively affects exports in the short term.

Based on these results, several recommendations are proposed. First, Indonesia should continue to strengthen its export presence in China and Taiwan, while also working to expand its market share in Hong Kong, Malaysia, and Singapore. Additionally, diversifying into new export markets is essential to reduce overreliance on a few key destinations. Second, improving the efficiency and productivity of lobster production is crucial. This can be achieved through targeted training and support for lobster fishers and business actors. Given the positive relationship between export prices and volumes, it is vital to maintain high product quality to justify premium pricing and remain competitive. Third, the Indonesian government should uphold the policy banning the export of lobster seeds to protect marine biodiversity and support the sustainable management of lobster resources. Lastly, Indonesia is encouraged to strengthen international trade cooperation through bilateral and regional agreements to enhance the global competitiveness of its lobster exports.

Author Contributions: Conceptualization, T.M.A., T.D. and S.S.; methodology, T.M.A. and S.S.; software, T.M.A. and S.S.; validation, T.M.A., T.D. and S.S.; formal analysis, S.S.; investigation, T.M.A; resources, T.M.A., T.D., and S.S.; data curation, T.D. and S.S.; writing-original draft preparation, T.M.A.; writing-review and editing, T.M.A., T.D., and S.S.; visualization, S.S.; supervision, S.S.; project administration, S.S.; funding acquisition, S.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank Universitas Syiah Kuala, Aceh, Indonesia, for supporting this research and publication. We would also like to thank the reviewers for their constructive comments and suggestions.

Conflicts of Interest: The authors declare no conflict of interest.

References

Abidin, I. S. Z., Bakar, N. A., & Sahlan, R. (2013). The Determinants of Exports between Malaysia and the OIC Member Countries: A Gravity Model Approach. *Procedia Economics and Finance*, 5, 12-19. https://doi.org/10.1016/s2212-5671(13)00004-x

Balassa, B. (1965). Trade Liberalization and Revealed Comparative Advantages. *The Manchester School of Economics and Social Studies*, 33(2), 99-123.

Boesono, H., Anggoro, S., & Bambang, N. A. (2011). Catch rate analysis of lobster (Panulirus sp) fishing effort with monofilament gillnet in Kebumen Regency waters. *Journal of Fisheries Science* and Technology, 7(1), 77-87.

Esterhuizen, D. (2006). *Measuring and Analyzing Competitiveness in the Agribusiness Sector: Methodological and Analytical Framework*. University of Pretoria. 99-`146

Hasibuan, A. M., Nurmalina, R., & Wahyudi, A. (2012). Analysis of the performance and competitiveness of Indonesia's cocoa bean trade and processed cocoa products in the international market. *RISTRI Bulletin*, 3(1), 57-70.

Ministry of Marine Affairs and Fisheries. (2022). Fishery Products Export Statistics 2017-2021.

Ministry of Marine Affairs and Fisheries. (2022). *Marine and Fisheries in Figures 2022*.

Layna, I. A., & Dewanta, A. S. (2022). Analysis of factors affecting Indonesian shrimp exports to the United States market in 1989 - 2018. *Journal of Economic and Financial Policy*, 58-70. https://doi.org/10.20885/jkek.vol1.iss1.art6

Pradipta, A., & Firdaus, D. M. (2014). Competitiveness position and factors affecting Indonesia's fruit exports. *Journal of Management & Agribusiness*, 11(2), 129 - 143

Pereira, G., & Josupeit, H. (2017). *The World Lobster Market* (Vol. 123). FAO Globefish Research Program.

Riyani, Darsono, Ferichani, M. (2018). Analysis of export demand for Indonesian agricultural commodities by the Chinese market. *AGRARIS: Journal of Agribusiness and Rural Development Research,* 4(2): 120-128

Silva, V. do C. da, Krisnamurthi, B., & Harmini. (2023). Analysis of factors affecting Indonesia's frozen tuna exports. *Agribusiness Forum*, 13(2), 164-178. https://doi.org/10.29244/fagb.13.2.164-178

Suriani, Masbar, R., Agustina, M., Khairul A.D. (2024). Do global green sukuk affect on climate change? Evidence in issuing countries. *International Journal of Energy Economics and Policy.* 14(1), 98 - 107

Trade Map. (2024). *Product: 030631 Rock lobster and other sea crawfish "Palinurus spp., Panulirus spp. and Jasus spp.", whether in shell or not, live, fresh or chilled*. https://www.trademap.org

Trade Map. (2024). Product: 0306311000 Crustaceans; live, fresh or chilled, rock lobsters and other sea crawfish (Palinurus spp., Panulirus spp., Jasus spp.), in shell or not - Breeding. https://www.trademap.org

Western Rock Lobster. (2022). *An overview of global lobster production and international trade: 2022 edition*