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MARKET STRUCTURE AND COMPETITION OF INDONESIAN EEL IN THE CHINESE MARKET

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Abstract

Background: Indonesia is a major exporter of frozen eels to China. China consistently absorbed more than 80% of Indonesia's eel exports. Indonesian exports have been declining in recent years, whereas global demand, including China, is expected to grow. This may lead to competition among the exporting countries in the Chinese market.
Purpose: This study aims to identify the structure of the frozen eel export market in China, the factors affecting the demand share, and to analyze the competition between Indonesia's frozen eel and other exporting countries in the Chinese market.
Design/methodology/approach: The Herfindahl–Hirschman Index and Concentration Ratio (CR4 and CR8), and an Almost Ideal Demand System model. The data used were Secondary data from Indonesia, Malaysia, Thailand, Pakistan, and India from to 2012-2023.
Findings/Results: The analysis shows that the export market structure of frozen eels in China is oligopolistic. Factors affecting the demand for Indonesia's frozen eel in China are its own price, the price of frozen eel in the rest of the world, the exchange rate, and China's GDP. Pakistan and Thailand have competed with Indonesia. Indonesian frozen eels are classified as normal goods, but are inelastic. Indonesia is the second-most benefited country in terms of China's increase in import expenditure.
Conclusion: Indonesia should leverage its competitive advantage in determining the pricing of frozen eels in the Chinese market and expand its market share in the global market. Furthermore, Indonesia can collaborate with Malaysia and India to capitalize on complementary market conditions.
Originality/value (state of the art): This is the first study of its kind to examine the Indonesian Eel market structure and competitiveness in the Chinese market. It is also the first to integrate market structure theory with the AIDS model.

Keywords: almost ideal demand system (AIDS) model, eels, export, Chinese market, international trade

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INTRODUCTION

Indonesia is one of the world's richest marine resource countries. Indonesia has the rights and authority over the Indonesian sea, which covers 6.4 million km^2 or equivalent to 62% of Indonesia's total territory (Kementerian Koordinator Bidang Kemaritiman dan Investasi, 2021). Fisheries are a marine resource owned by Indonesia. According to FAO (2018), Indonesia is the second country with the highest fish production worldwide. The catch of fish in Indonesia is equivalent to 8% of the world's total catch.

Eels (*Anguilla spp.*) are a fish species found in Indonesia. Among the approximately 19 eel species worldwide, there are 9 eel species found in Indonesia, including *Anguilla bicolor bicolor, Anguilla bicolor pacifica, Anguilla nebulosa nebulosa, Anguilla marmorata, Anguilla celebensis, Anguilla ancentralis, Anguilla interioris, Anguilla obscura,* and *Anguilla borneensis* (Muthmainnah et al., 2020). Eels in Indonesia are distributed along the southern coast of Java, western coast of Sumatra, eastern coast of Kalimantan, coast of Sulawesi, western coast of Iran, and Maluku Islands (Direktorat Jenderal Perikanan Tangkap, 2018).

Eel is a fish species with a high economic value and excellent export opportunities. At the consumer level, eels are sold at IDR 130.000 – 300.000/kg (Aulia et al., 2020). The high price of eels is due to their nutritional value and complex life cycle (Saleh et al., 2022). Although domestic demand for eels is not too high, global demand, especially from East Asian countries, is very high. Therefore, export opportunities for Indonesian eels in the international market are very high. This is supported by the export restriction policy for eels from Europe and Japan, which causes a shift in demand from European and East Asian countries to Southeast Asian countries, including Indonesia (Nijman, 2015).

Indonesia is one of the leading exporters of eels in the international market, mainly in frozen form. In 2022, Indonesia exported 6.540 tons of frozen eel worth US$11.8 million, accounting for 29% of the export market share of frozen eel in the international market. The main destinations for Indonesia's frozen eel exports are China, Hong Kong, and South Korea. Figure 1 shows that in the last three years (2020-2022), China has been the main destination market for frozen eel from Indonesia, absorbing >80% of Indonesia's frozen eel exports in the international market.

China is one of the main international markets for eel import. In addition to their popularity as a base for various types of food in China, eels are widely used in traditional medicines (Hakoyama et al., 2022). Chinese people believe that eel has various benefits as a base ingredient in traditional Chinese medicine, such as hemorrhoids, beriberi, kidney, tuberculosis, and lung diseases (Righton et al., 2014). This has led to increasing demand for eels in the Chinese market.

Indonesia controls most of the market share of frozen eel commodities in China. It can be seen in Figure 2, that by 2022, Indonesia controls 60% of the frozen eel market in China. Indonesia's competitors such as India, Malaysia, Thailand, Iran, Myanmar, and other countries tend to control only <20% of the market share in the Chinese market. This shows Indonesia's superior position and potential in the Chinese market compared with other exporting countries.

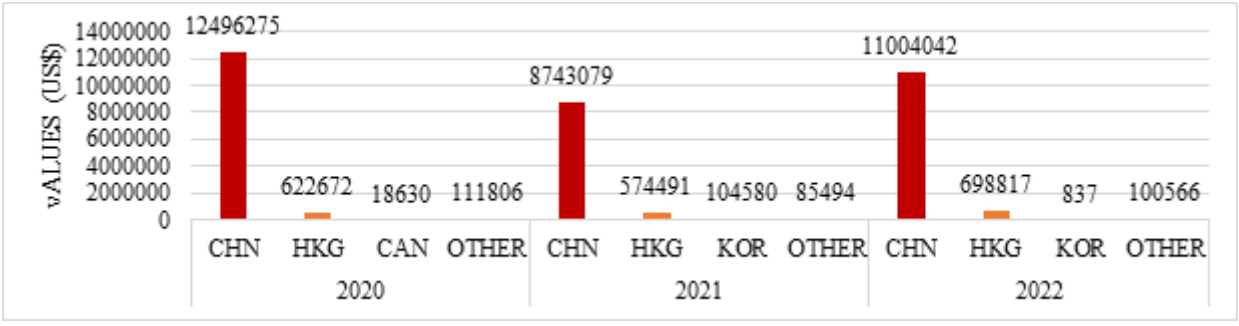

Figure 1. Main importing countries of frozen eel from Indonesia (International Trade Centre, 2024)

Although Indonesia controls most of the frozen eel market share in the Chinese market, it is not the only country with good market potential in the Chinese market. Figure 3 shows that although Indonesia shows an increasing trend, it tends to be less stable than other exporting countries, such as India, which has consistently shown a significant increase. Even when there was a significant decrease in Indonesia's frozen eel exports in 2021, other exporting countries such as Malaysia experienced a significant increase. If this continues, Indonesia's position as the world's top eel exporter could be replaced by that of other eel-exporting countries.

In terms of demand, the demand for frozen eels in the Chinese market has been positive over the last 10 years. Figure 4 shows that although the Chinese market demand fluctuated, the overall trend was positive. China's market demand is projected to increase until 2026 based on the demand trend over the last 10 years. This indicates that Indonesia has a great opportunity to export frozen eels to the Chinese market. However, at the same time, it is a challenge for Indonesia to meet the demands of the Chinese market.

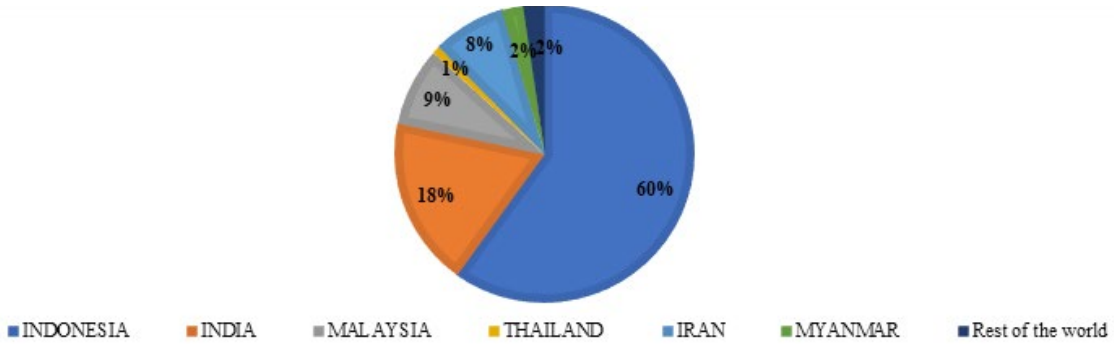

Figure 2. Countries exporting frozen eels to the Chinese Market (International Trade Centre, 2024)

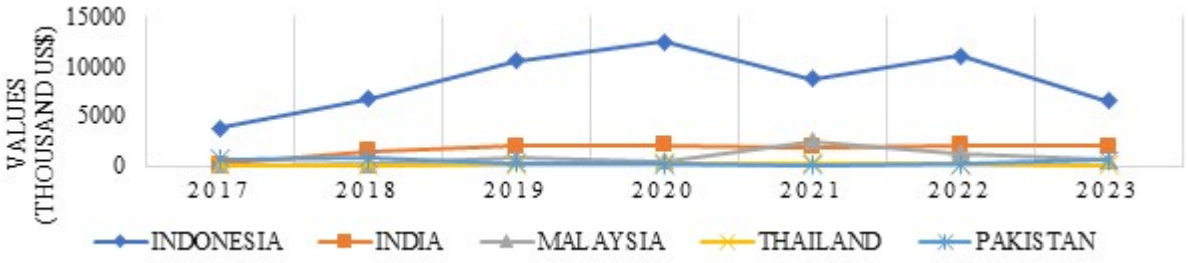

Figure 3. Countries exporting frozen eels to the Chinese Market (International Trade Centre, 2024)

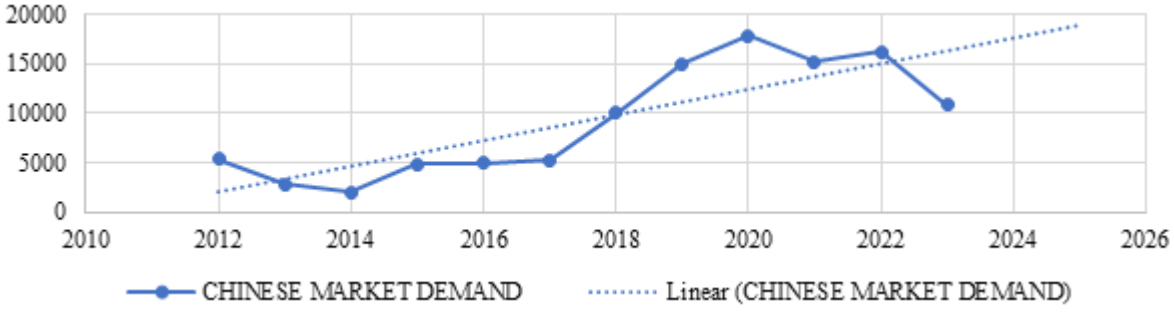

Figure 4. Chinese Frozen Eel's Market Demand (International Trade Centre, 2024)

To date, no study has focused specifically on analyzing the structure and competition of Indonesian frozen eels in the Chinese market. However, analysis related to structure, competition, and factors that influence it can be the first step in identifying the competition that occurs among eel-exporting countries in the destination market. In this way, policy implications can be drawn so that Indonesia can take steps earlier than its competitors can. Previous studies on other seafood commodities have also revealed the importance of understanding the market structure and competition. These include findings by Osmaleli et al. (2023) on oligopolistic behavior in canned tuna exports, and Kristiani (2024) on the position of Indonesian processed tuna between exporting countries and the factors that affect its demand. These studies suggest that an analysis of the market structure and competition can offer actionable insights into improving export strategies, an approach that can be applied to the Indonesian eel industry.

This study adopts a quantitative approach by analyzing the market structure and competition among frozen eel exporters in the Chinese market. By identifying the level of market concentration and competition, this study provides insights into the competitiveness of Indonesian eel exports compared to other exporters.

Based on the previous description, the objectives of this study were to identify the market structure of Indonesian frozen eels in the Chinese market, analyze the factors that influence the demand share of frozen eels in the Chinese market, and analyze the competition between Indonesian frozen eels and other exporting countries in the Chinese market.

METHODS

The data used in this study are secondary data from the International Trade Center (Trade Map) with HS code 030326 “Frozen Eels (Anguilla spp.)” for export value data (US$) and export quantity (kg). Exchange rate data were obtained from Exchange Rates in the UK, whereas GDP data were obtained from Trading Economics. Quarterly time-series data from 2012 to 2023 were used. This period was chosen because the HS code for eels has been registered only since 2012. The countries used for Indonesia’s comparison in this study are India, Malaysia, Thailand, and Pakistan, which can control >80% of China’s frozen eel imports if the market share is accumulated.

This study relied entirely on secondary data collection techniques from reputable international databases. All data points were systematically collected and processed for use in panel data econometric modeling.

The data analysis method used in this study was a quantitative analysis using several analysis models. Herfindahl–Hirschman index (HHI) and Concentration Ratio (CR4 and CR8) analyses were used to identify the market structure of Indonesian frozen eels in the Chinese market. The Herfindahl-Hirschman Index (HHI) and Concentration Ratio can calculate the market share of each eel exporting country involved in trade in the main destination market, namely China. The formula for the Herfindahl-Hirschman index (HHI) (Sleuwaegen et al., 1986) is as follows:

$$HHI = \sum_{i=1}^{n} Si^2$$

Note: Si (Exporting country’s market share of eel products to China); n (Number of countries exporting eel products to the Chinese market).

The concentration ratio equation used in this study is as follows:

$$CR_n = \sum_{i=1}^{n} Pi$$

Note: CR_n (Concentration level for n producers); n (Number of concentrations in the Industry); Pi (Market share of the i -th producer).

To analyze the factors affecting demand and market competition for frozen eels in the Chinese market, the Almost Ideal Demand System (AIDS) model first introduced by Deaton and Muellbauer (1980) was used to analyze consumer demand systems. Factors affecting demand were identified through the significance of the variables in the AIDS model. The AIDS model used in this study is as follows:

$$w_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \log P_j + \beta_i \log\left(\frac{x}{p^*}\right) + \theta i \ln ER + \sigma i \, GDP$$

Note: w (export share of the i-th exporting country in the world); P (price of origin of the exporting country); x (total world import value); p* (geometric price index stone = ∑wi.pi); ER (riil exchange rate (CNY/IDR)); GDP (Importing country GDP).

The AIDS model's estimation results were used to calculate the elasticity of the own price, cross price, and expenditure. The equations are:

Cross price elasticity (*compensated*)

$$e^*_{ij} = -\delta_{ij} + \frac{\hat{\gamma}_{ij}}{\overline{w}_i} + \overline{w}_j$$

Own price elasticity (*uncompensated*)

$$e_{ij} = -\delta_{ij} + \frac{\hat{\gamma}_{ij}}{\overline{w}_i} - \hat{\beta}_i\left(\frac{\overline{w}_j}{\overline{w}_i}\right)$$

Expenditure elasticity

$$\eta_i = 1 + \frac{\hat{\beta}_i}{\overline{w}_i}$$

Where: γ̂ij (frozen eel's price parameter in market-j); β̂i (total value of frozen eel exports in market j); wi (share of frozen eel from Indonesia); wj (share of frozen eel other countries). δ is the Kronecker delta, where δ = 1 for i=j and δ = 0 for i≠j.

The flow of this study is summarized in the operational framework shown in Figure 5. This framework shows how the study analyzes Indonesia's position in China's growing eel market by examining the market structure, demand factors, and competition using the HHI, CR, and AIDS models. These results support policy recommendations for boosting Indonesia's eel exports.

RESULTS

Market Structure of Indonesian Frozen Eels in the Chinese Market

The structure of frozen eel exports in the Chinese Market is formed by exporting countries that dominate the market. Table 1 shows that the values of CR4, CR8, and the HHI tended to increase. The value of the HHI increased significantly, indicating a higher market concentration, with few exporters dominating the market share, and competition between exporters tended to decrease.

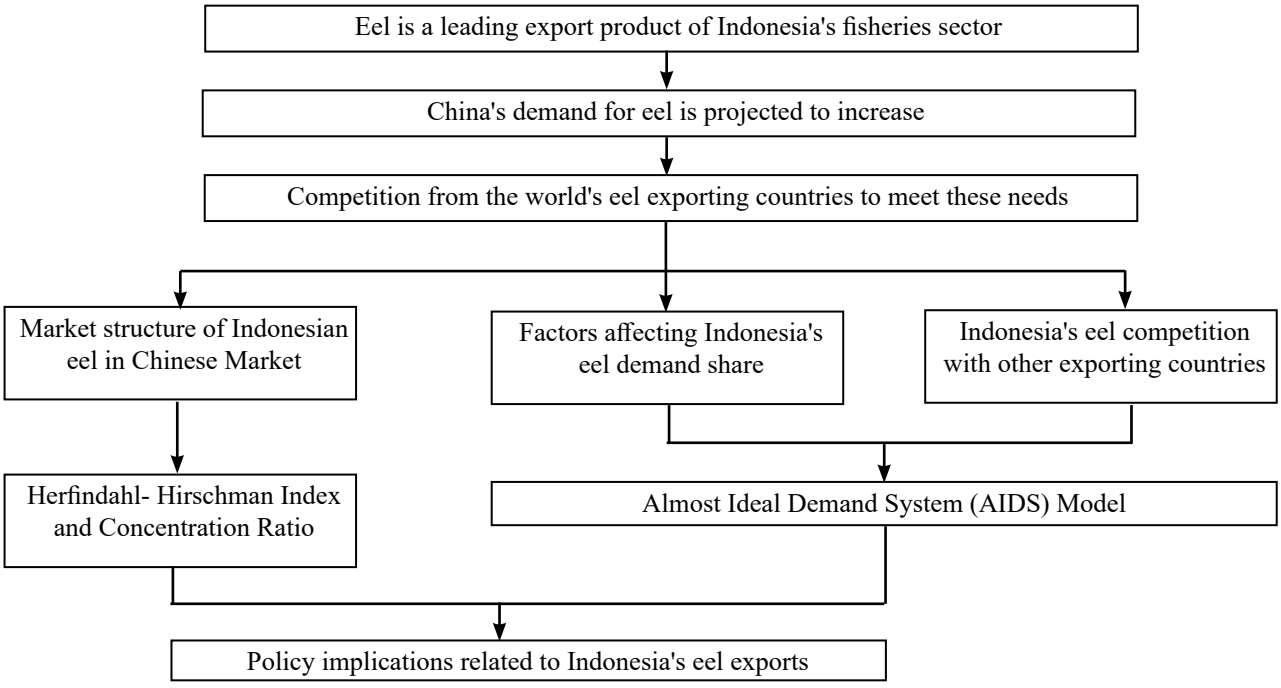

Figure 5. Research framework

Table 1. Market Structure Analysis Result

Year	Total share (CR4)	Total share (CR8)	HHI
2012	50.06*	96.35***	1.917+
2013	57.16*	87.62**	1.685+
2014	60.51*	83.99*	1.801++
2015	82.27***	93.09***	2.994++
2016	92.36***	97.52***	5.461++
2017	89.85***	99.72***	5.504++
2018	90.81***	99.81***	4.793++
2019	90.40***	95.84***	5.140++
2020	84.90***	88.46**	5.160++
2021	85.93***	96.37***	3.767++
2022	89.16***	97.83***	4.881++
2023	88.81***	96.60***	4.046++
Average	80.18***	94.43***	3.929++

Notes: *(Quite High); ** (High); *** (Very High)

The results of the CR4 and CR8 analyses show that the Chinese market has high market concentration. This indicates that the frozen eel export market in China is dominated by four major countries (Indonesia, India, Malaysia, and Pakistan), as well as eight major countries (Indonesia, India, Malaysia, Pakistan, Thailand, Bangladesh, Iran, and Korea). Although the overall trend shown by the CR8 analysis was similar to that of the CR4 analysis, there were significant differences in the early period (2012-2014) there are significant differences. In the early period, CR4 values tended to be low, whereas CR8 values were very high. This shows that, in the early period, exporting countries included in the CR8 calculation and not included in the CR4 calculation controlled for market share. Based on the results of the HHI analysis, an average value of 3.929 was obtained for the period 2012-2023 which indicates that frozen eel commodities in the Chinese market tend to lead to high market concentration. This HHI analysis is in line with the results of the previous analysis, namely CR4 and CR8, that the market concentration of frozen eel exports in the Chinese market is high.

According to HI and CR calculations, the market structure of frozen eels in the Chinese market tends to be an oligopoly. Baye and Prince (2013) stated that an oligopolistic market structure is a type of market in which a few large companies tend to dominate the market with product types that may be homogeneous or differentiated. However, it should be noted that if only a small number of producers (4-5) dominate 80%-90% of the market, then the market is classified as oligopolistic. This is because although there are a large number of producers, the actual competition is only between a few large producers who dominate the industry. Similar findings were obtained by Meliany et al. (2021), who studied the structure of the Indonesian natural rubber market. The study found that the Indonesian natural rubber market also exhibited oligopolistic characteristics, with only a handful of large players dominating the market, and high levels of market concentration and HHI.

In determining the market structure, in addition to the number of buyers and sellers and the concentration of market share, the type of product and market entry/exit barriers determine the market structure. In terms of the type of goods, frozen eels traded in the Chinese and international markets as a whole tend to be differentiated. Eels comprise 19 species with different characteristics (Muthmainnah et al., 2021). These differences in characteristics lead to differences in preferences because there is a tendency for consumers to choose certain products, in this case, certain eel species, based on the characteristics and qualities desired by consumers (Ramachandran & Basariya, 2020).

Consumers in the Chinese market tend to prefer frozen Japanese eels (Anguilla japonica), but due to export quota restrictions, consumption has shifted to Indonesian eels, particularly Anguilla bicolor, which has a similar taste and texture (Widiantoro, 2020). This difference in product type characterizes a differentiated oligopolistic market where traded products can be

either homogeneous or differentiated (Harianto et al., 2022), making the frozen eel export market in China an oligopolistic market.

In terms of market entry/exit barriers, the eel export industry is characterized by an oligopolistic market structure. The eel industry requires high investment and production costs and carries high risks, but offers high profit potential (Aulia et al., 2020; Yuan et al., 2022), which makes it difficult for new producers to enter and existing producers to exit the market, especially when coupled with limited information related to technology, seeds, and cultivation (Saleh et al., 2022). These high entry/exit barriers are characteristic of oligopolistic markets; therefore, the frozen eel export market in China can be categorized as an oligopolistic market (Harianto et al., 2022).

Factors Affecting the Share of Frozen Eel Demand in the Chinese Market

The AIDS model analyzed in this study was also used to analyze the factors affecting the demand for imports of frozen Indonesian eels in the Chinese market. The relationship between variables is observed from the coefficient value and p-value of each variable to determine the impact of the variable. The results of the analysis of the factors affecting the demand for Indonesian eels are shown in Table 2.

In the Chinese market, four independent variables were identified as having a significant impact on demand for frozen eel imports. These variables are The Price of Indonesia's Frozen Eels, the Price of the Rest of the World's Frozen Eels, the Exchange rate, and the GDP of the importing country. The other five variables, namely The Price of India's Frozen Eels, Price of Malaysia's Frozen Eels, Price of Thailand's Frozen Eels, Price of Pakistan's Frozen Eels, and Total import value do not have a significant effect on the demand for Indonesian frozen eels in the Chinese Market.

The Price of Indonesia's Frozen Eels variable exerts a positive influence on the demand for Indonesian frozen eels in the Chinese market. Therefore, it is important to ensure that any increase in the price of frozen Indonesian eels does not have a negative impact on the demand for frozen Indonesian eels in the Chinese market. It has been postulated that eels were previously categorized as luxury fish, thereby rendering the demand for frozen eel products relatively insensitive to price (Shiraishi & Crook, 2015). This suggests that the Chinese market perceives Indonesian frozen eel products as high-quality items such that price increases do not result in a significant decline in demand from China. Kristiani's (2024) research on Indonesian tuna exports to the Japanese market found similar results, where due to the high quality of the product, the price of tuna has a positive effect on its demand.

The price of frozen elels in the rest of the world (ROW) Frozen Eels has a negative impact on demand for frozen Indonesian eels in the Chinese market. Therefore, an increase in the prices of frozen eels from other exporters (outside the main exporters) may result in a decrease in the demand for frozen eels from Indonesia. This may be due to the complementary relationship between Indonesian frozen eels and frozen eels from the rest of the world. This is in line with the findings of Dewanti et al. (2020), who obtained similar results in their research.

The exchange rate variable exerts a positive influence on demand for frozen Indonesian eels in the Chinese market. Thus, an increase in China's exchange rate or depreciation of the rupiah will lead to an increase in demand for Indonesian frozen eels in the Chinese market. These estimation results align with the findings of previous research (Cahyaningtyas & Aminata, 2020; Septiana & Nugroho, 2011; Shahputeri & Nurmalina, 2023), which also identifies a significant positive relationship between the exchange rate variable and import demand. An increase in China's exchange rate against the rupiah implies an increase in its purchasing power, which may consequently result in an increase in the demand for Indonesian frozen eels.

The GDP of the importing country has a negative influence on demand for frozen Indonesian eels. Consequently, an increase in China's GDP may reduce demand for frozen eels from Indonesia. It is hypothesized that this is due to changes in the purchasing behavior of Chinese people when their income increases. Specifically, they prefer to buy eels in fresh or live forms rather than buying them in frozen form. This is because China is one of the main importers of live eels and fresh eels in the international market. The results of this analysis are also in line with the findings of Dewanti et al. (2020), who examined the factors that influence the demand for Indonesian coconut oil.

Table 2. Factors affecting demand for Indonesian frozen eels in Chinese Market

Independent Variable	Coefficient	p-value
The Price of Indonesia's Frozen Eels (PIdn)	0.7663***	0.000
The Price of India's Frozen Eels (Pind)	-0.1926	0.066
The Price of Malaysia's Frozen Eels (PMys)	-0.0548	0.278
The Price of Thailand's Frozen Eels (PTha)	0.0279	0.584
The Price of Pakistan's Frozen Eels (PPak)	-0.0348	0.388
The Price of the Rest of the world's Frozen Eels (PRow)	-0.5120***	0.000
Total import value (X)	0.1315	0.141
Exchange rate (ER)	0.9340**	0.042
GDP of the importing country (GDP)	-0.1712**	0.019
Signification of Indonesian AIDS Models in the Chinese Market:		
AIDS Model	R-square	0.6466
	p-value	0.0000

Notes: *** (Significant at the 1% level); ** (Significant at the 5% level)

In terms of the AIDS model, Table 2 shows that the Chinese AIDS model is considered significant and feasible. This can be observed from the p-value of the obtained model, which is 0.000, indicating that the model is significant at the 1% level. The r-squared value obtained was 0.6466, which indicates that the model used is sufficiently good and captures approximately 64.66% of the factors affecting the demand for frozen eels in the Chinese market.

Elasticity Estimation Results

The estimation of cross-price elasticity illustrates the relationship between frozen eel products from the main exporting countries, and identifies the extent to which demand will increase or decrease in response to a change in prices in other exporting countries (Nurzakiah et al., 2024). Table 3 shows that the cross-price elasticity between Indonesia and Malaysia was negative, indicating a complementary relationship. A negative cross-price elasticity value indicates a complementary relationship between the two products (Mankiw, 2018). The complementary relationship indicates no significant competition between the two countries in the Chinese market. An increase in the price of frozen Malaysian eels by 1% will result in a 0,034% decrease in the demand for frozen eels from Indonesia, ceteris paribus. Conversely, a 1% increase in the price of frozen Indonesian eels will lead to a 0,248% reduction in demand for frozen Malaysian eels in the Chinese market, ceteris paribus. A similar situation has occurred in the relationship between Indonesia and Malaysia in the export of natural rubber commodities in the international market (Nurzakiah et al., 2024) and the export of palm oil derivative products in the Italian market (L. Ximenes et al., 2022).

The relationship between Indonesian and Indian frozen eels is also complementary, which indicates that there is no fierce competition in the frozen eel products of the two countries. A 1% increase in the price of frozen Indian eels reduces the demand for Indonesian frozen eels by 0.224%. However, if there is a 1% increase in the price of frozen eels from Indonesia, the demand for frozen eels from India will decrease by 0.815%.

The relationship between Indonesian and Pakistani frozen eels is also complementary, indicating no competition between Indonesia and Pakistan in the Chinese Market. A 1% increase in the price of frozen eels from Indonesia would cause the demand for frozen eels from Pakistan to decrease by 0.022% in the Chinese market. If there is a 1% increase in the price of frozen eel fish in Pakistan, the demand for frozen eel fish in Indonesia will decrease by 0.254%.

The relationship between Indonesian and Thai frozen eels is substitutable, indicating the intense competition between Indonesia and Thailand in the Chinese market. This can be seen in the positive value of the cross-price elasticity of the two countries (Mankiw, 2018). If there is a 1% increase in the price of frozen Indonesian eels, demand for frozen Thai eels will increase by 0.107%. On the other hand, a 1% increase in the price of frozen Thai eels will decrease the demand for frozen Indonesian eels by 1.043%. Similar findings were observed in the relationship between Indonesia and Thailand on natural rubber exports in the international market (Nurzakiah et al., 2024).

Table 3. Cross-price elasticity of main countries exporting frozen eel in the chinese market

Country	IDN	MYS	IND	THA	PAK
IDN	-	-0.034	-0.224	0.107	-0.022
MYS	-0.248	-	1.975	-0.108	0.313
IND	-0.815	0.974	-	0.616	-0.047
THA	1.043	-0.142	1.643	-	0.888
PAK	-0.254	0.495	-0.151	1.070	-

Note: IDN (Indonesia); MYS (Malaysia); IND (Indian); THA (Thailand); PAK (Pakistan)

Table 4 shows that the results of the calculation of the price elasticity of frozen eels from the five main exporting countries in the Chinese market, namely Indonesia, Malaysia, Thailand, Pakistan, and India, are negative. This aligns with demand theory, which posits that an increase in the price of a commodity will result in a corresponding decline in demand (Pindyck & Rubinfeld, 2018). However, it is important to note that not all products exhibit the same price elasticity. Some products are classified as elastic, meaning that they are highly sensitive to price changes, whereas others are classified as inelastic, exhibiting less sensitivity to price fluctuations (Mankiw, 2018).

The results of the price elasticity calculation indicate that the Indonesian frozen eel market is the only market in which demand is insensitive to price changes. By contrast, frozen eels from Malaysia, Thailand, Pakistan, and India were classified as elastic, indicating a tendency to be sensitive to price changes. This is evident from the results of the price elasticity calculation, which classifies products as inelastic (absolute value < 1) or elastic (absolute value ≥ 1) (Pinto et al. 2022). This difference can be attributed to consumer purchasing behavior, which influences consumer responses to price fluctuations (Ximenes et al., 2022). Some consumers prioritize quality over price, whereas others are more concerned with price than product quality. Similar conditions occur for other Indonesian export commodities in the international market, such as tuna, skipjack, and tuna in the Japanese market (Kristiani, 2024).

In this case, Indonesia is the least sensitive to price changes in the Chinese market compared with other exporting countries. A 1% increase in the price of frozen eel from Indonesia will cause a price decrease of 0.365% in the Chinese market, ceteris paribus. This value tends to be smaller than other major exporting countries, so it can be an opportunity for Indonesia, as an exporter with the largest market share and the least sensitivity to prices, to control prices and increase profits from frozen eel exports in the Chinese market.

In contrast to Indonesia, frozen eels from Malaysia exhibit a high degree of elasticity or sensitivity to price fluctuations. A 1% increase in price resulted in a 1.197% decline in demand. The decline in demand experienced by Malaysia is the most significant among the exporting countries, indicating that an increase in price results in the largest decline in demand. Thailand exhibits a similar price elasticity of demand, with a 1% increase in prices resulting in a 1.099% decline in demand. Conversely, a 1% increase in the price of eels from Pakistan resulted in a 1.449% decline in demand. Similarly, a 1% increase in the price of frozen eels from India causes a 1.059% reduction in demand in the Chinese market.

Furthermore, the results of the expenditure elasticity analysis in Table 4 show differences in the types of frozen eel products in exporting countries in the Chinese market. Frozen eels from Indonesia, Malaysia, Pakistan, and India were classified as normal goods, while frozen eels from Thailand were classified as inferior goods. This can be observed from the value of expenditure elasticity. If the value was greater than zero, it was classified as a normal good. If the value is less than zero, it is classified as an inferior good (L. Ximenes et al., 2022).

Upon examination, Malaysia was identified as having the highest expenditure elasticity. This suggests that Malaysia is most likely to benefit from an increase in expenditure by China on frozen eel imports. A 1% increase in import expenditure is predicted to result in a 1.440% increase in Malaysia's frozen eel export demand. Indonesia is also expected to benefit from an increase in import expenditure by China, with a 1% increase in export expenditure on frozen eels leading to a 1.251% increase in demand.

Table 4. Own price and expenditure elasticities of frozen eel exporters in the chinese market

Country	Own Price Elasticity	Expenditure Elastisity
Indonesia	|-0.365|	1.251
Malaysia	|-1.197|	1.440
India	|-1.059|	0.690
Thailand	|-1.099|	-0.606
Pakistan	|-1.044|	0.688

India is the third-most favored country if China increases its spending on frozen eel imports. A 1% increase in import expenditure by China will result in a 0.690% increase in demand for frozen eels from India. Conversely, a 1% increase in China's frozen eel import expenditure led to a 0,688% increase in the demand for frozen eels from Pakistan.

In contrast to other exporting countries, frozen eels from Thailand are classified as inferior goods. Inferior goods are defined as those with negative income effects, where an increase in income results in a decrease in demand (Pindyck & Rubinfeld, 2018)microeconomics is probably the most relevant, interesting, and important subject they can study. (Macroeconomics is the second-most important subject.. This difference is thought to be due to the differences in the quality of Thai eels compared to other exporters. Based on Muthmainnah *et al.* (2021), Thai eels are generally caught accidentally and there are very few official aquaculture producers. This can affect the quality of exported eels, both in terms of quality standards and preferences in the Chinese market: frozen eels to other exporting countries, such as Indonesia and Malaysia, export frozen eel species that align with their preferences.

Managerial Implication

Based on these findings, Indonesian eel exporters and policymakers should focus on maintaining consistency in the quality and quantity of frozen eels. To enhance the value of frozen eel exports, diversification into fresh, live, or processed eel products should be considered. This requires technological upgrades and government support through downstream industry development programmes.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In conclusion, it can be stated that the export market structure of frozen eel in China is oligopolistic. The factors influencing the demand for frozen eel in China include the price of frozen eel in Indonesia, the price of frozen eel in the rest of the world, exchange rate, and gross domestic product (GDP) of the importing country. Indonesia competed with Pakistan and Thailand in the context of frozen eel exports. Indonesia competes with Pakistan and Thailand for frozen-eel exports. Indonesian frozen eel products are classified as normal goods but are inelastic, so they tend not to be sensitive to price changes. Overall, Indonesia is the second most favored country in the event of an increase in import expenditure by China.

Recommendations

Based on the results of this research, it is recommended that Indonesia leverage its competitive advantages in determining the pricing of frozen eels in the Chinese market and expand its market share in the global market. Furthermore, Indonesia can collaborate with Malaysia and India to capitalize on complementary market conditions. Collaboration can take the form of policies that support price stabilization or the formation of export alliances that can improve Indonesia's bargaining power in export-destination countries. However, this study is limited to frozen eel commodities. Future research could explore the potential competitiveness of eel exports in fresh, live, and processed forms. To provide a comprehensive picture of the optimal export strategy and which forms of export diversification have better maximized potential.

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