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Research on the Current Situation of Aquatic Product Trade between China and ASEAN and Its Influencing Factors

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ABSTRACT: All the time, The trade of aquatic products plays an essential role in agricultural development. The Association of Southeast Asian Nations (ASEAN) is one of the most important markets for China’s aquatic product trade.Based on an in-depth analysis of the current status of aquatic product trade between China and ASEAN, this paper conducts an empirical investigation into the key factors influencing bilateral trade in this sector. The research findings reveal that, at present, the volume of aquatic product trade between China and ASEAN is substantial. However, significant trade imbalances persist. The trade structure demonstrates intense competition, coupled with a relatively high degree of market concentration. More specifically, variables such as China's GDP, population size, exchange rate fluctuations, and geographical trade distance exert a pronounced positive influence on aquatic product trade. Conversely, membership in the same free trade area exhibits a certain negative effect on trade flows. Under the framework of the "dual circulation" development strategy, China should aim to upgrade the value chain of its aquatic product industry, foster market diversification, and further identify potential growth areas for enhanced cooperation with ASEAN. Such measures will contribute to the sustainable and steady expansion of aquatic product trade between the two regions.

KEYWORDS:ASEAN countries, aquatic product, trade gravity modeling.

I. INTRODUCTION

Since the signing of the Free Trade Agreement between China and ASEAN in 2006, the policy communication between the two parties has been continuously deepened. The pace of economic and trade cooperation has accelerated significantly, and the trade ties of agricultural products have grown increasingly closer.During the period from 2006 to 2023, the aquatic product trade between China and ASEAN demonstrated a year - by - year growth trend within the context of China - ASEAN agricultural product trade, registering an average growth rate of 18.88%. The trade volume of aquatic products skyrocketed from 301 million US dollars in 2006 to 4.421 billion US dollars in 2023, with the bilateral trade volume expanding nearly 15 - fold compared to 2006. ASEAN has emerged as China's largest export market for aquatic products and the primary source of aquatic product imports (Chen Ninglu et al., 2023).The aquatic product trade between China and ASEAN not only satisfies the production and consumption needs both domestically and internationally, but also strengthens the economic and trade relations between the two sides. Moreover, it aligns with the requirements of China's agricultural development strategy under the new "dual circulation" development paradigm.Nevertheless, in recent years, issues such as trade imbalance and a decline in the proportion of bilateral aquatic product trade in agricultural product trade have emerged in the aquatic product trade between China and ASEAN. Against the backdrop of many countries globally implementing grain export restrictions due to the COVID - 19 pandemic and the increasing volatility in the international agricultural product market, conducting in - depth research on the aquatic product trade between China and ASEAN holds great practical significance for better addressing the fishery trade under the new development pattern featuring the mutual promotion of domestic and international dual circulation.

II. LITERATURE REVIEW

In the realm of existing literature, research concerning the trade of aquatic products between China and ASEAN predominantly unfolds along the following three dimensions:

Comprehensive Exploration of the Competitiveness and Complementarity of ASEAN's Aquatic Products

Zhang Jiaqing et al. (2015) and others employed the complementarity index and export similarity index to measure the competitiveness and complementarity of aquatic products between China and ASEAN. The findings indicated a high degree of similarity in the export structures of aquatic products between the two parties; The research by X F Luo et al.(2017) highlighted there is a large gap between the aquatic products of China and ASEAN in many product categories. Roni Bhowmik et al.(2021) and Hao Jie (2020) used the TC index, the RCA index, the TCI index, and the IIT index to conduct a comprehensive measurement, pointing out that the trade structure of China's and ASEAN countries' aquatic products is irrational, and that trade competitiveness and complementarity coexist. and complementarity coexist. Bai Ziming et al.(2022) through the application of social network analysis, discovered that while the density of the China - ASEAN aquatic product trade network had witnessed a slight decline, it generally remained at a relatively high level.

In - Depth Qualitative Analysis of the Characteristics and Trade Potential of China - ASEAN Aquatic Product Trade

A number of scholars have delved into the characteristics and trade potential of China - ASEAN aquatic product trade from a qualitative standpoint (Zhu Kunping et al., 2022; Ju Ping et al., 2018). These studies commonly assert that there exists substantial development potential and ample room for growth in the aquatic product trade between China and most ASEAN countries. Nevertheless, they also confront challenges such as trade imbalances and the relatively weak international competitiveness of exported aquatic products (Zhang Ying et al., 2021).

Investigation into the Influencing Factors of China - ASEAN Aquatic Product Trade

Relevant research has demonstrated that factors including the gross domestic product, population size, openness level, and financial environment of both countries can exert a substantial influence on bilateral aquatic product trade (Zhang Yi, 2019). Based on an empirical analysis of China - ASEAN aquatic product trade data spanning from 2000 to 2011, Shao Guilan et al. (2013) determined that economic scale, preferential tariffs under the China - ASEAN Free Trade Area (CAFTA), and the per capita GDP gap are pivotal factors driving the growth of bilateral aquatic product trade. In comparison, the impacts of geographical distance, total aquatic product output, and population size are relatively limited. Du Jun et al. (2016) unearthed that the construction of port infrastructure significantly facilitates bilateral aquatic product trade. Zhao Liang et al.(2025) utilized trade data of seven major categories of aquatic products between China and ASEAN countries from 2012 to 2022, integrating the Constant Market Share (CMS) model to systematically analyze the influencing factors of China - ASEAN aquatic product trade. Moreover, some scholars have adopted the three - margin approach to explore the marginal influencing factors of China's aquatic product exports to ASEAN (Liu Chenyang et al., 2021).

In summary, existing research primarily revolves around the current state of ASEAN's aquatic product trade, the quantification of its competitiveness and complementarity, and the determinants affecting China's aquatic product exports. However, from the perspective of China, studies specifically dedicated to exploring the trade relationship of aquatic products between China and ASEAN remain relatively scarce. There is also a dearth of in - depth analyses regarding how specific factors impact the aquatic product trade between the two parties. In light of this, this paper, drawing upon the United Nations Commodity Trade Statistics Database, undertakes a systematic analysis of the current situation of aquatic product trade between China and ASEAN. Subsequently, relevant variables are introduced to construct a trade gravity model, with the aim of providing theoretical underpinnings for the sustainable development of future aquatic product trade between China and ASEAN.

III. CURRENT STATUS OF THE INTERNATIONAL TRADE IN AQUATIC PRODUCTS BETWEEN CHINA AND ASEAN

Current situation of trade scale

As can be observed from Figure 1, when examining the trade scale, the overall import and export trade of aquatic products between China and ASEAN has exhibited a consistent upward trend. The trade volume expanded from 301 million US dollars in 2006 to 4.421 billion US dollars in 2023,

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registering an average growth rate of 18.88%. This clearly indicates a continuous elevation in the international trade level of aquatic products between China and ASEAN. More specifically, with the exception of certain individual years, the export volume of Chinese aquatic products to ASEAN has generally exceeded the import volume. In 2022, the export value reached its peak at 2.269 billion US dollars. By contrast, the growth of the import trade volume was relatively sluggish in the early stages. However, in recent years, it has witnessed rapid development. Notably, in 2019, the import volume surpassed the export volume for the first time, thereby transforming the trade surplus into a trade deficit. In 2022, the import value reached a maximum of 3.463 billion US dollars. In terms of the trade proportion, during the period from 2006 to 2023, the share of the aquatic product trade between China and ASEAN in the overall agricultural product trade between the two parties has maintained a steadily increasing trend. In 2006, the total trade volume of aquatic products between China and ASEAN accounted for 2.51% of the total agricultural product trade volume between them. By 2023, this proportion had increased to 7.51%. This adequately demonstrates that the aquatic product trade between China and ASEAN is assuming an increasingly crucial position within the context of the agricultural product trade between the two regions.

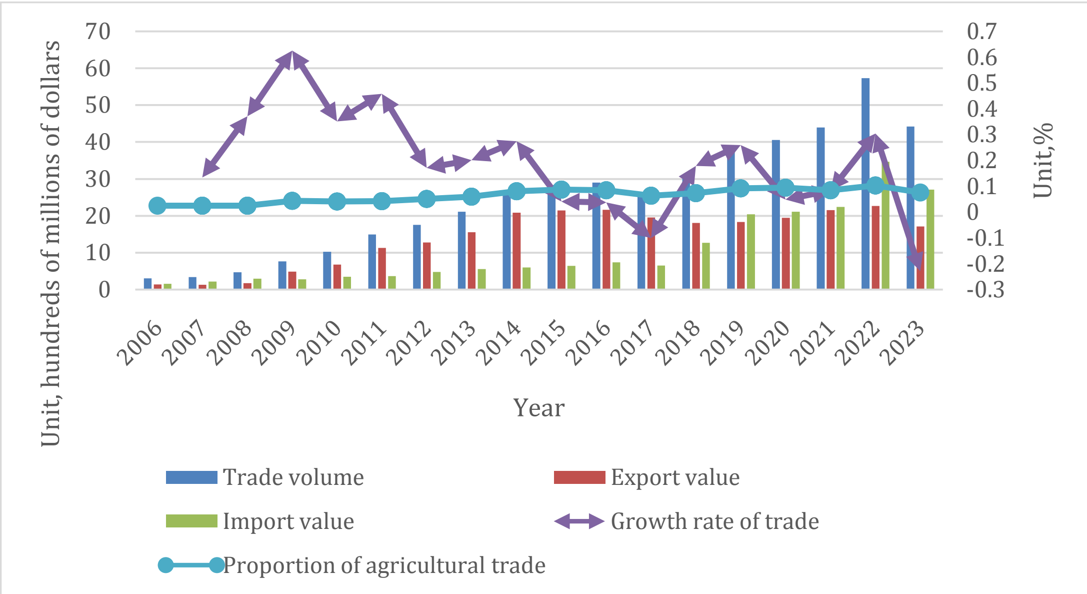

Figure 1: China's aquatic products international trade to ASEAN countries countries from 2006 to 2023
Source of data: United Nations Comtrade Database.

Current situation of trade structure

From Based on the statistical data presented in Table 1 ,In reference to the HS92 coding system, aquatic products can be meticulously classified into the following categories: 0301 live fish, 0302 fresh or chilled fish, 0303 frozen fish, 0304 fish fillets, 0305 dried, salted or in brine, smoked fish, 0306 crustaceans, and 0307 mollusks. During the period from 2006 to 2023, the import and export volumes of the segmented aquatic product categories between China and ASEAN have witnessed a continuous upward trend. Among these, 0303 frozen fish, 0306 crustaceans, and 0307 mollusks have exhibited particularly notable growth rates. Specifically, in 2006, within the context of the aquatic product import and export trade between China and ASEAN, 0303 frozen fish had the highest trade volume. Following this, 0306 crustaceans ranked second, and 0307 mollusks came in third, while the trade volume of 0302 fresh or chilled fish was the lowest. The trade volumes of the top three categories accounted for a substantial 84.38% of the total trade volume of all aquatic products, thereby demonstrating a relatively high level of concentration in the aquatic product trade. By 2023, 0307 mollusks had ascended to the top position among all product categories. Its trade volume reached 1,870.92 million US dollars, accounting for 42% of the total trade volume of all aquatic products. 0303 frozen fish ranked second, with a trade volume of 1,180.01 million US dollars, accounting for 27% of the total. Meanwhile, the trade volume of 0302 fresh or chilled fish still remained at the lowest level, amounting to merely 43.63 million US dollars. The combined trade

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volumes of the top three categories accounted for a staggering 92% of the total trade volume of all aquatic products, further accentuating the prominent characteristic of high concentration in the aquatic product trade.

Current situation of trade market

From Based on the statistical data presented in Table 2, in 2006, within the context of China's import and export trade of aquatic products with ASEAN, China had the closest trade ties in aquatic products with Thailand, with a trade volume amounting to 87.30 million US dollars. Malaysia ranked second, registering a trade volume of 59.53 million US dollars. Subsequently, Indonesia, the Philippines, and Vietnam followed in that order, while no trade in aquatic products had been initiated between China and Laos at that time. Specifically, the combined trade volume of aquatic products between China and the aforementioned top five countries accounted for a substantial 90% of the total trade volume of aquatic products between China and all ASEAN countries. This proportion clearly indicates a relatively high level of market concentration. In recent years, the trade of aquatic products between China and Vietnam has witnessed remarkable growth. By 2023, in the market distribution of China's import and export trade of aquatic products with ASEAN, Vietnam had ascended to the top position, with a total trade volume reaching 1,091.21 million US dollars. Indonesia ranked second, with a total trade volume of 1,053.78 million US dollars. Thereafter, Thailand, the Philippines, and Malaysia followed in sequence. Collectively, the total trade volume of aquatic products of these six countries accounted for nearly 93% of the total trade volume of aquatic products between China and ASEAN. The proportion of other countries was relatively insignificant, further underscoring the prominent characteristic of high market concentration within this particular market.

IV. METHODS

Model setting and variable selection

The trade gravity model proposed by Tinbergen (1962) and Poyhonen (1963) in the 1960s is adopted. Because of the complexity of the factors affecting the trade in aquatic products between China and ASEAN countries, based on the research of many scholars, and in order to avoid heteroskedasticity and non-normal distribution of the residuals of the data, the logarithmic form of the extended gravity model is constructed as follows:

$$\ln Trade_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ijt} + \beta_4 \ln Peo_{it} + \beta_5 LPI_{it} + \beta_6 ER_{it} + \beta_7 FTA_{ijt} + \varepsilon$$

where$\ln Trade_{ijt}$ denotes the value of trade in fish products between i and j in period t;β_0 is a constant and$\ln GDP_{it}$ represents the gross domestic product of the country i in period t, $\ln GDP_{jt}$ represents the gross domestic product of the country j in period t; $\ln Dist_{ijt}$ denotes the spherical distance of major cities between the two countries;$\ln Peo_{it}$ represents the population size of country i in period t;LPI_{it} represents the logistics performance index between country i and country j in period t;ER_{it} represents the exchange rate of country i to the U.S. dollar in period t;FTA_{ijt} is a dummy variable representing whether the two countries belong to the same FTA in period t;ε is a random perturbation term (see Table 3).

Table 1: Structure of China's aquatic products international trade to ASEAN countries from 2006 to 2023, Million.

Years	HS Code Product Categories						
	0301 Fish, live	0302 Fish, fresh or chilled	0303 Fish, frozen	0304 Fish, fillets	0305 Fish, dried, salted or in brine, smoked	0306 Crustaceans	0307 Molluscs
2006	3.87	1.92	158.47	29.85	14.30	53.57	39.17
2007	7.43	2.53	176.14	27.10	16.28	57.84	54.08
2008	11.12	4.76	266.85	35.00	13.30	74.57	62.50
2009	9.97	4.83	373.62	55.27	10.45	217.74	88.89
2010	17.13	5.15	523.79	50.70	10.60	293.71	126.81
2011	10.95	2.47	774.97	98.32	6.69	389.28	215.14
2012	26.61	3.59	845.12	96.22	8.71	483.51	290.44
2013	45.68	3.09	831.77	138.91	17.63	551.78	518.96
2014	43.91	3.66	889.65	237.75	22.24	690.11	797.31

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2015	41.46	3.75	850.17	292.77	22.45	490.99	1093.14
2016	53.77	10.63	1015.35	273.50	16.96	511.73	1017.35
2017	69.74	10.39	1120.42	295.30	57.66	277.31	777.36
2018	92.89	15.51	1137.14	510.15	63.14	415.15	839.38
2019	117.64	28.01	1306.09	692.44	108.31	739.44	878.50
2020	118.24	49.85	1371.18	570.82	167.29	716.28	1064.18
2021	158.26	55.46	1282.37	441.91	125.59	969.93	1338.94
2022	218.02	49.56	1382.38	758.62	246.01	1548.97	1451.72
2023	244.65	43.63	1180.01	447.90	245.42	996.41	1870.92

Source of data: United Nations Comtrade Database.

Table 2: China's country-specific international of aquatic products trade with ASEAN countries from 2006 to 2023, Million.

serial number	2006				2023			
	nations	Total trade	export amount	import amount	nations	Total trade	export amount	import amount
1	Thailand	87.30	22.59	64.72	Vietnam	1091.21	309.65	781.57
2	Malaysia	59.53	46.42	13.11	Indonesia	1053.78	208.87	844.91
3	Indonesia	58.40	15.05	43.35	Thailand	732.24	321.20	411.05
4	Philippines	41.05	39.88	1.17	Philippines	679.97	578.03	101.94
5	Vietnam	24.20	4.23	19.97	Malaysia	519.36	219.13	300.23
6	Singapore	22.37	14.74	7.63	Myanmar	242.30	0.21	242.10
7	Myanmar	3.97	0.00	3.97	Singapore	96.23	67.22	29.01
8	Brunei	3.36	0.03	3.33	Laos	2.93	2.93	0.00
9	Cambodia	0.95	0.00	0.95	Brunei	2.00	1.53	0.47
10	Laos	0.00	0.00	0.00	Cambodia	0.87	0.71	0.17

Source of data: United Nations Comtrade Database.

Table3: Definition of main variables

variant	concrete meaning	Expec-ted to meet	explanation
$\ln Trade_{ijt}$	Total fish trade between country i and country j in period t	explanatory variable	
$\ln Export_{ijt}$	Fish exports from country i to country j in period t		
$\ln Import_{ijt}$	Fish imports from country i to country j in period t		
$\ln GDP_{it}$	The gross domestic product of Country i in period t	+	The greater the economic scale of the importing country, the stronger its latent demand capacity for aquatic product imports generally tends to be. This, in turn, drives the expansion of the scale of aquatic product import trade.
$\ln GDP_{jt}$	The gross domestic product of Country j in period t	+	The greater the economic scale of the exporting country, the stronger its latent supply capacity for aquatic product exports generally becomes. This, in turn, propels the expansion of the scale of aquatic product export trade.
$\ln Dist_{ijt}$	Spherical distance of major cities between the two countries	-	The greater the distance, the higher the transportation and communicationcosts. Consequently, this results in a smaller volume

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			of bilateral trade in aquatic products.
$\ln Peo_{it}$	Population size of country i in period t	+	The larger the population of the importing country, the greater its potential demand for aquatic products generally is. This, in turn, contributes to the growth of the bilateral trade volume of aquatic products.
LPI_{it}	Logistics performance index for country i in period t	+	A higher Logistics Performance Index indicates stronger transportation capabilities, thereby driving the expansion of the bilateral trade scale.
ER_{it}	Exchange rate of country i to the United States dollar for period t	+	The appreciation of the domestic currency renders the prices of foreign aquatic products relatively lower. This, in turn, stimulates an upsurge in potential import demand. Conversely, when the domestic currency depreciates, the import demand will decline.
FTA_{ijt}	Whether the two countries are in the same FTA in period t	+	Should two countries sign a free trade agreement, it would contribute to the reduction of trade barriers, thereby facilitating the development of bilateral aquatic product trade.

Sample selection and data sources

This study undertakes an empirical investigation by utilizing the relevant data of China - ASEAN aquatic product trade spanning from 2006 to 2023. In an effort to enhance the reliability and precision of the research findings, the scope of the study is further extended to incorporate countries that have maintained close trade relations with China in the aquatic product sector in recent years. The final sample encompasses the ten ASEAN countries, along with Germany, Japan, South Korea, Spain, the United States, Australia, Canada, India, Russia, and the United Kingdom, amounting to a total of 20 sample countries. This research classifies aquatic products in accordance with the HS92 coding system. Specifically, the classification includes: 0301 live fish, 0302 fresh or chilled fish, 0303 frozen fish, 0304 fish fillets, 0305 dried, salted or in brine, smoked fish, 0306 crustaceans, and 0307 mollusks. The data regarding aquatic product trade is sourced from the United Nations Commodity Trade Statistics Database (UN Comtrade). Macroeconomic variables such as Gross Domestic Product (GDP), population size, exchange rate, and Logistics Performance Index are obtained from the World Bank Database. The geographical distance variable between two countries is derived by calculating the spherical distance between their major cities and making conversions based on the annual average exchange rate. The relevant underlying data is sourced from the CEPII Database. Information related to Free Trade Agreements (FTAs) is retrieved from the China Free Trade Zone Service Network (http://fta.mofcom.gov.cn/).(See Table4)

Table 4: Descriptions of the variables used

variant	observations	Mean	Std.Dev	Minimum	Maximum
$\ln Trade_{ijt}$	360	18.45	3.98	0.69	21.85
$\ln Export_{ijt}$	360	16.79	5.41	0.00	21.46
$\ln Import_{ijt}$	360	16.82	4.85	0.00	21.78
$\ln GDP_{it}$	360	26.98	1.96	22.71	30.72
$\ln GDP_{jt}$	360	29.95	0.37	29.24	30.47
$\ln Dist_{ijt}$	360	12.63	0.68	10.54	13.91
$\ln Peo_{it}$	360	17.69	1.65	12.81	21.09
LPI_{it}	360	3.34	0.60	1.86	4.30
ER_{it}	360	2425.53	5391.07	0.50	23787.32
FTA_{ijt}	360	0.55	0.50	0.00	1.00

Table 5: Results of the regression analysis

variant	Import/export - model (1)	Exports - models (2)	Imports - Models (3)
$\ln GDP_{it}$	-0.275 (-0.933)	1.617*** (2.915)	-1.912*** (-4.332)
$\ln GDP_{jt}$	0.387*** (5.719)	0.236*** (2.036)	0.404*** (3.184)
$\ln Dist_{ijt}$	0.187*** (3.449)	0.115 (1.161)	0.451*** (5.422)
$\ln Peo_{it}$	7.385*** (11.034)	3.875** (3.252)	11.183*** (9.796)
LPI_{it}	-0.013 (-0.631)	-0.075 (-0.189)	2.04*** (6.22)
ER_{it}	0.000*** (5.100)	0.000*** (2.900)	0.000*** (5.25)
FTA_{ijt}	-0.19** (-2.568)	-0.500*** (-3.322)	0.005 (0.033)
Constant	-118.838 (-13.797)	-103.918*** (-6.829)	-154.751*** (-10.139)
Observations	360	360	360
R-squared	0.945	0.923	0.954
F-test	73.67	42.87	55.8
Husman test	48.484***	28.114***	37.279***
Model Type	FE	FE	FE

V. RESULTS

An F - test was employed to compare the mixed - effects model and the fixed - effects model. Consequently, the fixed - effects panel data model was selected. Subsequently, a Hausman test was carried out to further verify that, between the random - effects and fixed - effects specifications, the fixed - effects regression model was the appropriate choice. The results of the sample regression indicated that the majority of variables were statistically significant (See Table5).

The economic size of the importing country ($\ln GDP_{it}$), in the export model, the coefficient is significantly positive, which indicates that this variable plays a facilitative role in China's aquatic product exports. Specifically, for every 1% growth in the economic scale of the importing country, the total volume of China's aquatic product exports will increase by 1.617%.Conversely, in the import model, the growth of the importing country's GDP exhibits an inhibitory effect. That is, for every 1% increase in the economic scale of the importing country, the total volume of China's aquatic product imports will decline by 1.912%.A possible underlying reason is that with the economic development and rising consumption levels in the importing country, to satisfy the demands of domestic consumers, the importing country will reduce the export volume of aquatic products, thereby leading to a decrease in the value of China's aquatic product imports.

The economic size of the exporting country ($\ln GDP_{jt}$), In all models, this variable is significantly positive, indicating that as the economy of the exporting country expands, the consumption power of its residents strengthens. This, in turn, boosts the aquatic product trade between the exporting country and China.Furthermore, the influence of this variable on imports is more pronounced than on exports. More specifically, for every 1% growth in the economic scale of the exporting country, the value of China's aquatic product exports will increase by 0.404%.

Trade distance ($\ln Dist_{ijt}$), In the model, the regression coefficients of this variable are all significantly positive; however, their signs deviate from theoretical anticipations.A probable explanation lies in the fact that in recent years, the continuous enhancement of maritime infrastructure, the upgrading of cold - chain transportation equipment, and the application of novel technologies have effectively mitigated the costs and complexities associated with long - distance transportation. Consequently, in comparison with other influencing factors, geographical distance exerts a relatively minor restrictive influence on the trade of aquatic products.Furthermore, countries in close geographical proximity to China's capital, such as Japan and South Korea, are major producers of aquatic products. Japan, in particular, is renowned for its world - famous Hokkaido fishing grounds, which yield abundant aquatic products. This not only suffices to fully meet domestic market demands but also enables Japan to emerge as one of the world's key exporters of aquatic products.Conversely, most RCEP member states that are geographically distant from China's capital are predominantly located in Southeast Asia. These countries typically exhibit relatively low levels of economic development and limited capacities for aquatic product production. As a result, they demonstrate a greater reliance on imports of Chinese aquatic products, thereby registering relatively larger import volumes (Gao Weixin et al. 2024).

Population size ($\ln Peo_{it}$), In all models, this variable is significantly positive, suggesting that the larger the population size of the importing country, the higher the demand and consumption levels of bilateral aquatic products.Aquatic products, characterized by their high nutritional value, environmental friendliness, and safety, are increasingly becoming a crucial component of the daily diet of both domestic and international consumers. As the population size grows, the demand for aquatic products correspondingly increases. This trend creates favorable conditions for China to tap into potential international markets.Consequently, the growth in the population of the importing country contributes to the development of aquatic product trade between China and that country.

The Logistics Performance Index (LPI_{it}), In the import model, this variable shows a significantly positive value, indicating that the higher the Logistics Performance Index (LPI) of the importing country, the greater the volume of China's aquatic product imports.Aquatic products, being perishable goods, impose stringent requirements on various aspects of logistics, including packaging, transportation, and warehousing. The comprehensive logistics costs have emerged as a significant constraint on the development of aquatic product trade between China and ASEAN.Consequently, the countries concerned should further enhance the construction and optimization of cold chain logistics systems and related infrastructure for aquatic products.

Foreign exchange rate (ER_{it}), This variable exerts a significantly positive influence on the aquatic product trade between China and importing countries, and the sign of the regression coefficient aligns with theoretical expectations. Evidently, the stability of the financial environment is emerging as a crucial restrictive factor in the development of aquatic product trade between China and ASEAN. Thus, it is of particular urgency to expedite the process of enhancing the facilitation of cross - border trade settlement.

Whether or not it is a member of the Free Trade Area (FTA_{ijt}), this variable exhibits a negative influence on the aquatic product trade between China and importing countries, and the sign of the regression coefficient deviates from theoretical expectations.Notwithstanding, within the import model, this variable assumes a positive value. Although it fails to meet the significance test criteria, it nonetheless tentatively suggests a certain positive impetus for China's aquatic product exports.Since the conclusion and implementation of free trade agreements between China and countries such as Australia, South Korea, and the ten ASEAN member states, the trade volume of aquatic products has witnessed a substantial upsurge.However, the number of countries having concluded free trade agreements with China remains relatively restricted. Negotiations for free trade areas with numerous other countries are still underway. As a result, the impact of these agreements on aquatic product trade is gradually materializing, and a certain time - lag effect persists.

VI. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The This research undertakes a comprehensive and systematic statistical analysis of the current state of development of the aquatic product trade between China and ASEAN. By adopting an extended trade gravity model as the econometric approach, it empirically examines the primary factors influencing the aquatic product trade between China and ASEAN. The following major findings are derived from this study: Firstly, in recent years, the international trade of aquatic products between China and ASEAN has achieved remarkable headway. The scale of trade has been continuously expanding, particularly in the sub - categories of aquatic products such as frozen fish (HS code 0303), crustaceans (HS code 0306), and mollusks (HS code 0307). Nevertheless, the market concentration of this trade remains relatively high, being predominantly concentrated among five ASEAN member states, namely Vietnam, Thailand, Indonesia, the Philippines, and Malaysia. Secondly, factors such as China's gross domestic product (GDP), population size, and trade distance exert a significantly positive influence on the aquatic product trade. Additionally, the exchange rate of the Renminbi (RMB) also impacts trade flows to a certain degree. Conversely, the variable of "whether belonging to the same free trade area" exhibits a negative effect, suggesting that the current free trade area mechanism has not fully realized its anticipated promotional effects.

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Recommendations

First, optimize the export structure of aquatic products and the layout of trade markets. On the one hand, efforts should be made to further expand the export volume of Chinese aquatic products with comparative advantages, such as frozen fish (HS code 0303) and mollusks (HS code 0307), to ASEAN, thereby promoting the balanced development of bilateral aquatic product trade. Regarding similar products where there is intense competition between the two sides, like fish fillets (HS code 0304), it is essential to actively foster horizontal intra - industry trade and expedite the development of the deep - processing industry of aquatic products. By integrating the brand advantages, geographical indications, cultural implications, and green and sustainable features of export products, new growth drivers for aquatic product foreign trade can be explored. On the other hand, it is necessary to further strengthen and stabilize market linkages with existing major trading partners such as Vietnam, Indonesia, and Thailand. Simultaneously, particular attention should be paid to unlocking the market potential of countries with significant trade potential but relatively small current trade volumes and high growth rates, such as Myanmar and the Philippines. This approach aims to enhance the sustainability and diversity of bilateral trade. Second, strengthen infrastructure connectivity. To solidify the foundation for information exchange and business cooperation between China and ASEAN, proactive measures should be taken to promote the online sales model of aquatic products and diversify sales channels. Additionally, considering that aquatic products fall into the category of perishable fresh agricultural goods, their trade imposes stringent requirements on various logistics aspects, including transportation, warehousing, and loading and unloading. Thus, a well - developed cold chain logistics system is of utmost importance for enhancing the quality and market competitiveness of aquatic products. It is recommended that, at the regional level, the establishment of a dual - line cold chain logistics information sharing platform in the Middle East be promoted. This can effectively reduce transportation costs and improve logistics efficiency, providing robust support for the efficient and stable development of China - ASEAN aquatic product trade.

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