Analysis of China's Aquatic Products Export Trade Indices

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Abstract. China is the world's largest aquaculture country and the world's largest exporter of aquatic products. How to promote the export of aquatic products is of great practical significance to optimizing the allocation of aquatic product production resources in China. Under the influence of trade protection and the epidemic, external demand is sluggish, and China's aquatic product exports are facing a huge impact. In this paper, the 2017-2020 aquatic product classification data were analyzed using HS 4-bit coded aquatic product classification data. Through the analysis of the trade competitiveness index, the analysis of the trade index within the industry and the analysis of the comparative advantage index, the competitive characteristics of the export of various aquatic products were clarified, and the contradictions in the results of the index were discussed in depth. In view of the rising cost of aquatic product exports, four counter-measures are proposed from the perspective of international cooperation.

Keywords: Aquatic products exports, Export Trade Indices, China.

1 Introduction

China's aquaculture production accounts for more than 60% of the global output. It is the world's largest aquaculture country and also the world's largest exporter of aquatic products. How to promote the export of aquatic products has important practical significance for optimizing the allocation of aquatic products production resources in China. Under the influence of the epidemic situation superimposed by the prevalence of trade protection, the external demand is weak, and China's aquatic products exports are facing a huge impact.

Miao (2022) examined the factors affecting the fluctuation of China's aquatic products exports to the United States, Japan, South Korea, the Association of Southeast Asian Nations (ASEAN) and the European Union, and found that import demand is the most important factor affecting China's aquatic products exports [1]. The export competitiveness of China's aquatic products has always been a hot topic in the study of aquatic products export [2-5]. However, it is still difficult to avoid the declining competitiveness of China's aquatic products in recent years. Xu Wei (2020) studies show that trade facilitation and FTA agreements brought about by the Belt and Road cooperation can improve China's aquatic product exports [6]. In recent years, the prevalence of trade protectionism has caused China's aquatic products exports to encounter severe trade barriers [7-10].

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This paper uses the export data of aquatic products from 2017-2020 to calculate the trade competitiveness index and intra-industry trade index, and shows the comparative advantage index to analyze the competitive advantage, intra-industry trade level and comparative advantage of China's export aquatic products. It also discusses the rising export cost.

2 Classification of Aquatic Products and Data source

In order to facilitate the analysis and comparison of international market data, the aquatic product trade data in this paper adopts the HS 4-digit code statistical data of customs. The types of aquatic products include 0301-0308, 1603-1605. The statistics of world aquatic products are from the International Trade Centre UNCTAD/WTO (ITC), and the data for 2017-2020 are available. The import and export data of China's aquatic products are from customs statistics.

3 Analysis of Trade Competitiveness Index

3.1 Trade Competitiveness Index

Trade competitiveness index (*TC* index) is also called trade specialization coefficient in some studies. The calculation method is as follows:

$$TC = \left(X_{ij} - M_{ij}\right)/\left(X_{ij} + M_{ij}\right) \quad (1)$$

Where X_{ij} is the export volume of j products of country i, M_{ij} is the import volume of j products of country i.

There are two points of view in the index analysis: one is that it shows the strength of international market competition. If the *TC* index is greater than zero, it indicates that this kind of commodity has strong international competitiveness. The closer it is to 1, the stronger the competitiveness; If the *TC* index is less than zero, it indicates that the goods are not internationally competitive. The closer they are to - 1, the weaker their competitiveness is; The index is zero, indicating that such goods are intra-industry trade, and their competitiveness is comparable to the international level. The other is that it shows the product life cycle stage, including import stage, import substitution stage, export expansion stage, mature stage and reverse import stage. Different views reflect different trade concepts. The former is the concept of trade protection, and the latter is the concept of free trade.

3.2 Analysis results of Trade Competitiveness Index

The statistical chart (see **Figure 1.**) is drawn according to the *TC* index of China from 2017 to 2020. In order to observe the characteristics of product types, with the main trade mode of product exports in 2020 as a reference, the product types dominated by general trade are marked as solid lines, and the product types dominated by processing trade are marked as dashed lines. The higher the proportion of processing trade, the shorter the segment of the dotted line. The width of the broken line is determined by the proportion of international market share in 2020. Color does not represent any meaning, just to distinguish different data series.

There are 1603, 1604, 1605 types of aquatic products with great competitive advantages in China's export. The competitive advantages of 0304 and 0305 have gradually declined. 0304 will still maintain a large competitive advantage in 2020, while 0305 has a small competitive advantage. 0301 experienced a decline in its competitive advantage in 2019, but still maintained a large competitive advantage. The competitive advantage of 0307 will decline, and the competitive advantage of 2020 will be smaller. 0308 The competitive advantage has dropped sharply, and has been transformed into a competitive disadvantage from a larger competitive advantage in 2017 to 2020. 0303 has a small competitive disadvantage. The competitive disadvantage of 0306 is increasing, and it is already in a big competitive disadvantage. The competitive disadvantage of 0302 is significantly reduced, and the competitive disadvantage in 2020 is relatively small.

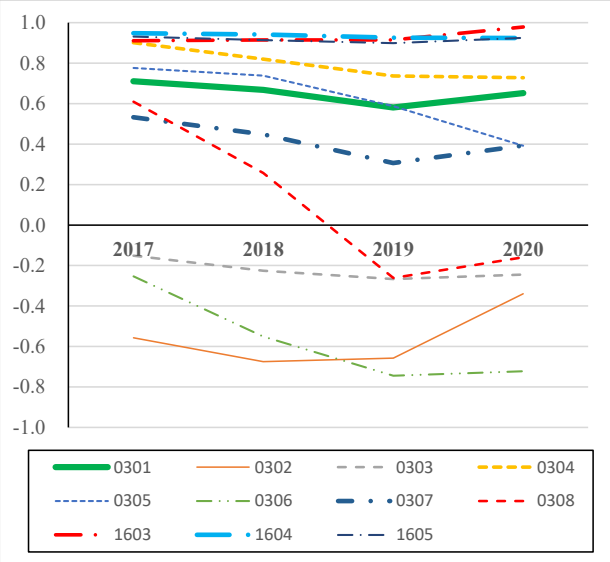

Fig. 1. 2017-2020 Line Chart of China's Aquatic Products Trade Competitiveness Index

The *TC* index results show four states. The first is the relatively stable state in the face of the epidemic situation and the impact of trade protection policy. Compared with 2017, the fluctuation in 2020 is within 10%, with 030103604 and 1605. The second is 030603070308, with a significant decline in the impact index. The third is the steady decline of the index year by year, with 03040305. The fourth is the rising trend of the index, with 03021603 higher than the level of previous years in 2020.

4 Analysis of Index of Intra-industry Trade

4.1 Index of Intra-industry Trade

The intra-industry trade index measures the degree of intra-industry trade of a product. The calculation method is as follows:

$$IIT = 1 - \left|X_{ij} - M_{ij}\right| / \left(X_{ij} + M_{ij}\right) \quad (2)$$

Where X_{ij} is the export volume of j products of country i, M_{ij} is the import volume of j products of country i.

4.2 Analysis results of Index of Intra-industry Trade

According to China's *IIT* index shown in **Figure 2**, the level of intra-industry trade in 2020 was high at 0308 and reached a high level at 0302, 0303, 0307. The level of intra-industry trade of 030203050308 was at a medium and low level in the previous period, and it will increase significantly in 2020. 0303 The level of intra-industry trade has declined from 2017, but still remains at a high level. 0307 Intra-industry trade rose from a medium level to a high level. The level of intra-industry trade in 0301 and 0304 is relatively low. 160316041605 Intra-industry trade has remained at a low level.

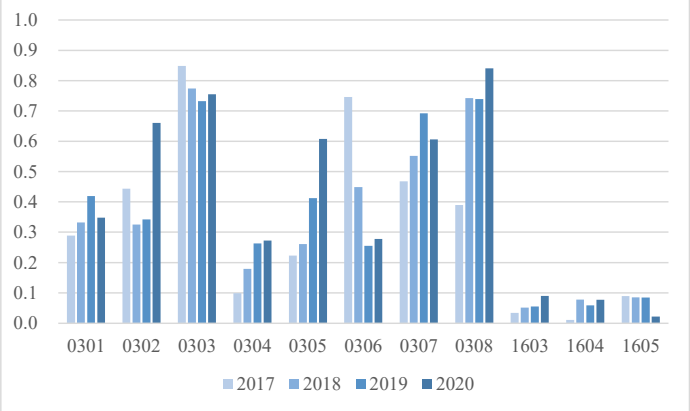

Fig. 2. Histogram of intra-industry trade index of aquatic products in China from 2017 to 2020

5 Analysis of Revealed Comparative Advantage Index

5.1 Revealed Comparative Advantage Index

Revealed Comparative Advantage Index（*RCA*） calculates the ratio of a country's share of a certain product in its total export value to that of the world's total export value, which is used to show the comparative advantage of a country's certain product.

$$RCA_{ij} = \left(X_{ij} / X_{it}\right) / \left(X_{wj} / X_{wt}\right) \quad (3)$$

Where X_{ij} is the export volume of j products of country i, X_{it} is the export volume of all products of country i. In order to analyze the comparative advantages of various types of aquatic products exports, j is defined as a certain type of aquatic products, and t is defined as all aquatic products.

5.2 Analysis results of Revealed Comparative Advantage Index

RCA index shows that the types of aquatic products with comparative advantages in China in 2020 are 0301, 0304, 0307, 1603, 1604 and 1605 in **Figure 3**. The comparative advantages of 0301 and 1605 are very significant. The comparative advantages of 0307 and 1604 are significant. The comparative advantages of 0304 and 1603 are not significant. The type of aquatic products that do not have comparative advantages or have comparative disadvantages is 0303, 0305 ,0306, 308. The comparative disadvantage of 0302 is very significant. The comparative disadvantage of 0306 is obvious. The comparative disadvantage of 0303, 0305 and 0308 is not significant. 0308 and 1603 experienced the transformation of comparative advantages, 0308 changed from comparative advantages to comparative disadvantages, and 1603 changed from comparative disadvantages to comparative advantages.

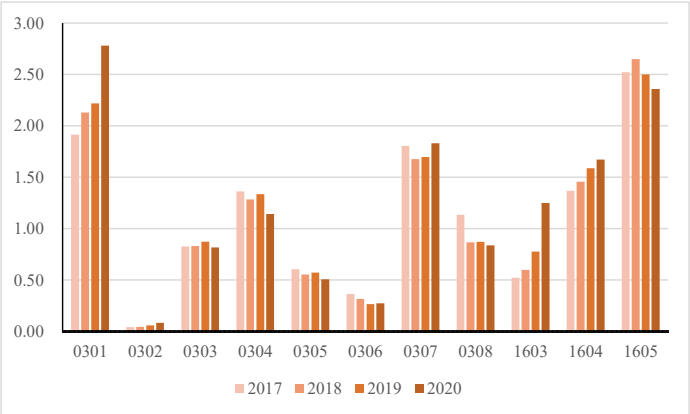

Fig. 3. Histogram of comparative advantage index of China's aquatic products in 2017-2020

4 Conclusion

This paper uses the HS 4-digit coded aquatic product classification data from 2017-2020, analyzes the trade competitiveness index, intra-industry trade index and display comparative advantage index, clarifies the competitive characteristics of various aquatic products exports. There are contradictions between competitive advantage and comparative advantage, and the index results cannot be used as the basis for decision-making. 0304, 0305 and 0308 have strong competitive advantages, which are gradually declining. Many studies on international competitiveness have suggested that we should strengthen and support the production of these types of products. 0304 is the least significant type with comparative advantages, and 0305 and 0308 have no comparative advantages. The competitive advantage of 0307 is at a medium level and is still declining, but its comparative advantage is still significant and rising. It is not convincing to discuss countermeasures based on the results of competitive advantages alone. The purpose of advantage analysis is to provide reference for resource allocation decisions. The limited resources are not evenly distributed in the allocation process, but are focused. Obviously, the above contradictory results cannot be decided by any one index alone. Based on the results of our current situation analysis, the practical problems we face are studied and judged through theoretical analysis.

This paper mainly analyzes the export data from the perspective of China, without in-depth analysis and discussion of trading partners and potential markets. The study of these problems is closely related to the foreign investment, outsourcing and origin transfer in the countermeasures and suggestions, which can further accurately locate the international cooperation objects. However, time and space are limited, and the discussion of these issues will be the direction of follow-up research.

Acknowledgments

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