Comparing quantitative analysis on revealed comparative advantages of aquatic products trade of china and ASEAN based on 21st century maritime silk road

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Abstract. As the world's leading aquaculture, aquatic production and trading country, China's development of aquatic products trade with ASEAN is facing a historic opportunity in the favourable circumstances of construction of the 21st century Maritime Silk Road. In order to make guidance of the product selection and transformation for corresponding export enterprises, this article makes a quantitative analysis the Revealed Comparative Advantage of aquatic products trade from China and ASEAN respectively based on the HS classification and thoroughly compares the *RCA* indices. The comparison results show that the international competitiveness of aquatic products structures of China and ASEAN are quite different with few overlaps of strong competitive products, and there is a great gap between the two areas in many kinds of products.

1. Introduction

The Maritime Silk Road is a main trade route combining the west world and China as an important network of economic, political and cultural communication. It came into being from the Qing and Han Dynasties. It has experienced the prosperity of Tang and Song Dynasties and the changes in Ming and Qing Dynasties. Starting from the southeast coast of china, through Southeast Asia and South Asia to Africa, it was also called Road of China, Tea Road and Fragrant Road. Over the prosperous period of ancient Maritime Silk Road, Southeast Asia has played a vital role and the relation between China and the Southeast Asia countries is long standing and enduring which results in a vigorous momentum of their economy and trade cooperation. Today, the glory of the trade between China and ASEAN will be carried on by the 21st-Century Maritime Silk Road proposed by Xi Jinping. In order to speed up the construction of China's new system of open economy, the China government initiate to put forth the construction of the 21st-Century Maritime Silk Road, and to build a new pattern of all-dimensional opening-up. As a result, based on the Framework Agreement on Comprehensive Economic Cooperation between China and ASEAN signed in 2002, the development of the economy relationship, especially the intra area trade between China and ASEAN will be poured into new motive power by the construction of the 21st-Century Maritime Silk Road.

Aquatic products are one of the world's most important agricultural products. As the world's leading country in realm of aquaculture, aquatic production and trading, China's development of aquatic products trade has great contribution to its national economy development [1].

ASEAN and China are interlinked by land and water and their thriving bilateral aquatic products trade has been prosperous for centuries. From 2002 to 2012, aquatic products trade between China and ASEAN has consistently been booming from US$309.31 million to US$1754.19 million, with a high growth rate of 22% annually and the trade surplus is also increasing year by year. With a series of policies supporting aquatic products trade releasing, the aquatic products trade between China and ASEAN will continue to develop at a high speed and ASEAN's status in China's export of aquatic products will become increasingly important. In view of this, this paper makes a comprehensive quantitative analysis and compares the Revealed Comparative Advantages of China's and ASEAN's aquatic products trade to the world based on the HS classification, in order to make guidance for the aquatic product selection and transformation for corresponding export enterprises.

The data in this paper was taken from the UN COMTRADE database from 2002 to 2012. The main codes of the scoped products, which are based on the definition of food and Agriculture Organization of the United Nations in accordance with HS standards for aquatic products classification, shall be found in *Table 1* with their explanations. The HS standard, which makes it easy to study on the classification of international trade commodities systematically, covers two classification and coding system of the Customs Co-operation Council Nomenclature (CCCN) and the Standard International Trade Classification (SITC). So far, there are more than 200 country members including China and ASEAN countries using the HS code to count the tax and trade volume. In recent years, the HS standards have been widely used in the study of regional trade, especially intra-industry trade [2].

Table 1. Aquatic products HS codes and category names.*

HS Code	Category name	HS Code	Category name
0301	Live fish	1604	Prepared or preserved fish, fish eggs, caviar
0302	Fish, fresh or chilled, whole	1605	Crustaceans, molluscs, etc, prepared or preserved
0303	Fish, frozen, whole	7101	Pearls, natural or cultured, not mounted or set
0304	Fish fillets, fish meat, mince except liver, roe	051191	Fish, shellfish and crustaceans (non-food)
0305	Fish, cured, smoked, fish meal for human consumption	121220	Seaweeds and other algae
0306	Crustaceans	130231	Agar-agar
0307	Molluscs	230120	Flour or meal, pellet, fish, etc, for animal feed
0508	Coral, shell, cuttle bone, etc, unworked, and waste	280120	Iodine
1504	Fish, marine mammal fat or oil not chemically modified	391310	Alginic acid, its salts & esters, in primary forms

*The above category names come from UN COMTRADE database.

2. Methods on Revealed Comparative Advantages Analysis

The Revealed Comparative Advantages is an index introduced by Balassa (1965) in international economics for calculating the relative export advantage of a certain country in a certain class of goods or industry [3]. It is widely used in classic way by scholars like Ishchukova and Smutka (2013)[4] to analyze specialization and the competitive performance of different sectors. The formula is:

$$RCA = (X_a^i \ / \ X_a) \ / \ (X_w^i \ / \ X_w) \quad (1)$$

where X_a^i is exports of product i from country a, X_a is total exports from country a, X_w^i is total exports of product i from the world and X_w is total exports from the world. The *RCA* value usually will be divided into four ranges as (0, 0.8), [0.8, 1.25], [1.25, 2.5] and (2.5，$+\infty$), which are designated as competitiveness of weak, moderate, strong and very strong [5]. The calculated *RCA* results of aquatic products of China and ASEAN are shown respectively in *Table 2* and *Table 3*.

Table 2. *RCA* index of China's aquatic products.

HS Code	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0301	3.939	3.906	4.418	3.747	3.607	2.857	3.581	2.907	2.731	2.749	2.615
0302	0.518	0.468	0.433	0.266	0.177	0.120	0.113	0.125	0.122	0.103	0.110
0303	1.164	0.899	0.795	0.688	0.713	0.549	0.536	0.614	0.801	0.975	0.933
0304	2.231	2.230	2.166	2.134	2.036	1.823	1.763	2.002	1.997	1.994	1.800
0305	0.895	0.876	0.794	0.747	0.677	0.577	0.633	0.679	0.693	0.658	0.698
0306	0.726	0.797	0.779	0.501	0.334	0.271	0.282	0.725	0.645	0.663	0.640
0307	2.275	1.813	1.792	1.376	1.268	0.991	0.983	1.480	1.707	1.684	1.712
0508	0.517	0.339	0.399	0.412	0.447	0.354	0.272	0.447	0.308	0.231	0.252
1504	0.061	0.045	0.041	0.094	0.127	0.136	0.148	0.285	0.390	0.500	0.361
1604	2.730	2.021	2.345	2.071	2.243	2.075	1.866	1.445	1.608	1.718	1.572
1605	3.461	3.930	3.835	3.929	3.952	3.409	3.427	2.500	2.557	2.870	3.001
7101	0.509	1.008	1.405	1.326	1.199	1.416	1.388	1.589	1.676	1.719	1.627
051191	0.518	0.465	0.690	0.800	0.753	1.168	2.256	1.984	0.470	0.534	0.815
121220	5.088	4.393	4.049	3.364	3.173	2.825	2.311	2.363	1.995	2.145	--
130231	2.059	2.092	2.018	2.402	2.698	2.322	2.087	1.940	2.101	2.322	2.233
230120	0.032	0.044	0.025	0.018	0.042	0.029	0.015	0.015	0.008	0.002	0.001
280120	0.013	0.019	0.019	0.016	0.006	0.008	0.004	0.002	0.002	0.009	0.005
391310	6.873	5.432	4.546	3.787	3.263	3.092	0.949	0.032	0.015	0.008	0.013

Table 3. *RCA* index of ASEAN's aquatic products.

HS Code	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
0301	2.800	3.079	2.620	2.455	2.372	2.546	2.478	2.632	2.704	2.249	2.513
0302	0.821	0.689	0.652	0.537	0.475	0.493	0.482	0.471	0.604	0.361	0.363
0303	0.825	0.854	0.845	0.692	0.674	0.836	0.991	0.794	0.797	0.772	0.789
0304	1.085	1.118	1.186	1.374	1.674	1.979	2.600	2.223	2.108	2.233	2.391
0305	1.271	0.946	0.855	0.877	0.909	0.908	0.918	0.833	0.870	0.833	1.058
0306	4.425	4.374	4.344	4.457	4.394	4.459	4.723	4.255	4.136	3.956	3.490
0307	2.698	2.622	2.580	2.546	2.576	2.719	2.638	2.205	1.818	1.816	1.782
0508	2.065	1.744	2.254	1.983	1.660	1.698	1.522	2.231	2.285	2.001	2.004
1504	0.157	0.236	0.232	0.253	0.179	0.303	0.509	0.556	0.565	0.751	0.677
1604	3.027	3.314	3.277	3.431	3.331	3.381	3.876	3.904	3.815	3.970	4.027
1605	4.603	4.035	4.021	3.752	3.957	4.085	4.405	5.081	4.661	4.683	4.135
7101	0.421	0.677	0.412	0.601	0.567	0.527	0.473	0.553	0.706	0.650	0.676
051191	2.314	1.880	2.746	2.288	1.125	0.939	0.773	0.984	1.040	1.051	0.894
121220	2.738	2.541	2.525	2.623	2.851	3.081	4.030	3.143	3.870	3.964	7.406
130231	1.090	1.158	1.019	0.963	0.879	0.908	1.412	1.181	0.987	1.017	0.956
230120	0.284	0.218	0.253	0.251	0.521	0.634	0.264	0.258	0.799	0.597	0.450
280120	3.969	0.055	0.068	0.053	0.037	0.038	0.041	0.058	0.047	0.055	0.037
391310	0.187	0.150	0.155	0.163	0.245	0.325	0.183	0.177	0.129	0.165	0.087

The results of *RCA* index from Table 2 and Table 3 reveals the facts as follows:

The level of international competitiveness of China's aquatic products is close to that of ASEAN's. The China's *RCA* index of the chosen categories that greater than 2.5, that is the very strong competitive group, are 0301 (Live fish), 1605 (Crustaceans, molluscs, etc.) and 121220 (Seaweeds and other algae); the products of strong competitive group (2.5≥RCA≥1.25) are 0304, 0307, 1604, 7101 and 130231; the moderate group (2.5≥RCA≥1.25) are 0301, 0304, 0307, 0508 and 051191. During 2002-2012, the export aquatic products of China which are generally more competitive than ASEAN's, are 0301 (Live fish), 7101 (Pearls, natural or cultured, not mounted or set), 121220 (Seaweeds and other algae), 130231 (Agar) and 391310 (Alginic acid, its salts & esters, in primary forms), among which the 0301and 130231 are stably strong competitive. Apart from these, the other export aquatic products of China are less competitive than the ASEAN's, particularly the deep processed aquatic products, like 0305 (Fish, cured, smoked, fish meal for human consumption) and 1504 (Fish, marine mammal fat or oil not chemically modified). This shows the disadvantage of technology and capital in the production of deep processed aquatic products.

The international competitiveness of China's aquatic products has been declining year by year. Although China has a strong international competitiveness of some kinds of aquatic products, the overall competitiveness of 18 kinds of products during 2002-2012 is showing a downward trend at different degrees only except for the 7101 and 130231. Especially the 0304 and the 121220 are losing their competitiveness and both were surpassed by ASEAN's.

3. Conclusions and Suggestions

By comparing the *RCA* indices, it is clear that the international competitiveness of aquatic products structures of China and ASEAN are quite different with few overlaps of strong competitive products, and there is a great gap between the two areas in many kinds of products, which indicates the complementarities of aquatic products structure between China and ASEAN. With the historical opportunity of the construction of the "Maritime Silk Road", China and ASEAN countries shall develop their marine cooperative partnership and play their own advantages to further expand the trade cooperation of aquatic products between the two areas. For this purpose, a few steps shall be taken by China to improve its international competitiveness of aquatic products and consolidate the aquatic products trade cooperation with ASEAN.

(1) Develop the law guarantee system and brand marketing strategies

Firstly, the authorities shall improve the legal supervision of the domestic aquaculture industry, clear the monitoring responsibilities of the industry regulators and unify the quality standards of aquatic products with the international standards. Secondly, high premium shall be put on market strategies and brand cultivations. The function of market promotion shall not be underestimated in order to enhance the export competitiveness and added value of China's aquatic products. Practically, some leading enterprises shall be fostered by appropriate policy support on their aquatic products export in order to upgrade the international competitiveness of China's aquatic products. Some strategies can be used like considering the regional characteristics, setting up publicity, building some leading branded products, encouraging cross-industry collaboration, expanding more distribution channels, increasing the exposure of excellent-branded products, providing high-quality supporting services and guiding the consumption of target market.

(2) Integrate the domestic aquatic industry resources

The aquatic industry resources shall be integrated to build up the industry power. The aquatic industry construction goals and overall layout need to be clear. Differentiated planning from nationwide to provincial and municipal range shall be made by studying intensively according to the geographical advantage of aquatic production. Expecting to achieve the scale economy and technology spillover effects to improve the operational efficiency of the whole industry chain and eventually enhance the international competitiveness of China's aquatic products, It is realistic to integrate all sectors of the aquatic industry chain, including production, processing, wholesale, retail and logistics so as to construct a number of aquatic products technology R&D bases, production and processing

industrial parks, products distribution centers and cross-regional cold chain logistics distribution centers.

Acknowledgment

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