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Fish and Fishery Products Trade by Pakistan: Comparative Advantage, Trends and Competitiveness

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Abstract

The present study assesses the trends and determines the competitiveness and comparative advantage of Pakistan's fish and fishery products in global market during the period from 2004-2021. This research uses Revealed Comparative Advantage index (RCA), Revealed Symmetric Comparative Advantage (RSCA), Relative Export Advantage Index (REA), Vollrath index (RCA#), Revealed Comparative Disadvantage (RCDA), Relative Trade Advantage (RTA) and Net Export Index (NEI) to measure competitiveness and comparative advantage of fish and fishery exports of Pakistan. This study collected relevant data at Harmonized System (HS) 4-digit level from UN COMTRADE database from 2004-2021. The RCA, RSCA, REA and Vollrath index reveal that Pakistan faced comparative advantage in the fish and fishery exports in the world market. The index of RCDA indicates that Pakistan faced a competitive advantage in the imports of Fish and Fishery products imports during 2004-2021.The RTA index designates that Pakistan enjoyed a net comparative advantage in this export sector during concerned time period. The index of NEI shows that Pakistan was a net-exporter of fish and fishery products.

Keywords: Comparative advantage, fish and fishery products, competitiveness, RSCA, Balassa index, Vollrath index

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Introduction

Fish and fishery products trade had been expanded rapidly in the recent years in global world.The world exports of fish and fishery exports tripped from 40.68 billion USD in 2000 to 120.64 billion USD in 2018 over the last twenty years. Though, the COVID-19 pandemic has reduced the exports of fish and fishery products in world market to 106.13 billion USD in 2020 (un comtrade, 2022). The fish and fishery exports of Pakistan was recorded 137421 thousand US dollars in 2004 and increased by 146657 thousand USD in 2005. The growth rate of increase in exports was recorded by 6.72 % in 2005 and 14.35 % in 2006 due to increase in world demand of fish and fishery products. Pakistan faced a decline of 3.96% in 2007, 11.32% in 2009, 7.56% in 2015 and 21.44% in 2020 in the exports of fish and fishery products in world market due to decreased in the world demand. In 2021, the demand of world exports is increased by 19.13 % and to fulfil this demand Pakistan also increased its exports by 6.92 %. The share of fish and fishery exports in total exports of Pakistan is 1% in 2004 and faced a minor change 1.38% in 2021 (Un Comtrade, 2022). The major destinations for Pakistani fish and fishery exports are China, Thailand, UAE, Malaysia, Japan, Korea, Indonesia, Viet Nam and USA.

Exports are providing an opportunity to bring foreign exchange earnings in to country. In the free trade conditions, the economies can specialize in the production of goods and become the net-exporter of these products which they have comparative advantage (De Benedictis and Tamberi, 2001). David Ricardo, the classical economist, first to explain the idea of comparative advantage in 1816(Ruffin 2002). An economy with a comparative advantage over another economy in producing a commodity much have a relatively lower opportunity costs in production of this commodity as compared to other economies. The measurement of comparative advantage has been a difficult task in global trade theories. The RCA is the comparative advantage measurement through observed data and trade patterns. Chaudhary and Saleem (2001) examined the exports pattern, exports comparative advantage, exports instability, Complementarity and commodity concentration of exports of Pakistan by employing different indices of RCA. Comparative advantage of wheat crop in Pakistan was examined by Anwar et al., (2005) by employing Balassa index. The RCA was employed by Gopal *et al.,* (2009) to examine the comparative advantage of finfish export from India from 2001 to 2005. The findings of the analysis indicated that India had not faced a comparative advantage in the above-mentioned exports. Riaz and Jansen (2021) worked on spatial patterns of Pakistan's agricultural exports by employing RCA method. Khan and Uzma (2016) worked on the need for structural transmission in the exports sector of Pakistan by using diversification in the products. The determinants of export competitiveness of Pakistan are investigated by Irshad and Xin (2017) by utilizing RCA method during 2003-2015.The RCA index and OLS method were utilized by Oktavilia*et al.,* (2019)

to examine the competitiveness in the fishery exports sector of Indonesia during 2010-2016.Ali *et al.,* (2019) examined the comparative analysis on expansion of Pakistan fisheries products to China and world. The results of this study show that there exists a gap between products of fisheries products and its exports in Pakistan. The effect of J-Curve in the trade of Pakistan and UK was measured by Usman et al., (2021) by utilizing different methods. The competitiveness and comparative advantage examined by Khanal and Deb (2022) in fish and fishery products of India by employing RCA and RSCA from 2000 to 2021. The findings of current analysis indicate that India faced CA in this sector during the said time period. Sultana *et al*., (2021) investigate the effect of sea food safety standard and common language on Exports of Pakistan to Europe. The competitiveness and barriers of Indonesian exports of ornamental fish examined by Tarihoran*et al*., (2023) by utilizing CMSA, RCA index and competitiveness matrix formulas methods during 2012-2021. The results of this study illustrate that Indonesia had not a significant CA in world market and faced key barriers, such as regulations, quality of products, shipment, marketing and other external and internal barriers.

The key purpose of current research is to measure the competitiveness and comparative advantage in the vegetable exports in the global market. There is no valuable study is available in literature to examine the competitiveness in vegetable sector by utilizing several indices during 2004-2021. There is a dire need to conduct a study which measures the competitiveness and comparative advantage in the vegetable export sector of Pakistan. The purposed study will be beneficial for researchers and stakeholders involved in Pakistan's vegetable business in developing better policies to enhance exports.

Materials and Methods

Data

Fish and Fishery Products (fish and crustaceans, mollusks, and other aquatic invertebrates) are traded globally under the major eight categories listed in UN-COMTRADE database in 4-digit harmonized system (HS) codes listed as HS 0301-HS 0308. For simplicity, the present study reveals the fish and fishery products as follows: live fish (0301), chilled and fresh fish (0302), frozen fish (0303), fish fillet and other fish meat (0304),salted and smoked fish (0305), crustaceans (0306), mollusks (0307) and some other aquatic invertebrates (0308).

Analytical Techniques

The purpose of current study is to measure the comparative advantage of Pakistan's fish and fishery export products. In 1817, Ricardo pointed out that an economy has a CA in producing a commodity if the opportunity cost of producing that

commodity in terms of other commodities is lower in that economy than in other economies (Krugman, Obstfeld and Melitz, 2018). The Ricardian model shows that "trade between two countries can benefit both countries if each country the commodities in which it has a CA" (54).

Balassa index of Revealed Comparative Advantage (RCA)

The Balassa index explains whether an economy has an RCA in the actual exports. The exports of any economy are affected by many factors, such as transportations, technology, cost-effective process of production and importing networks in world. The RCA index considers all the factors of exports and illustrates a estimate of the economy's CA situation. The RCA index of fish and fishery products can be expressed as follows;

$$Bl = \frac{X_i^t / \sum X_i^t}{X_i^w / \sum X_i^w} \quad (1)$$ (Source: Sofia, 2004, Irshad and Anwar, 2019).

Where, X_i^t= Fish and fishery products exports of Pakistan, $\sum X_i^t$ = Country's total exports, X_i^w = Fish and fishery exports of the world and $\sum X_i^w$=Total exports of the world

The range of RCA index is from 0 to infinity, with 1 as the point of breakeven. An RCA index of less than one indicates that the commodity does not faced a CA, while the value is greater than one shows the presence of CA. Further, the RCA index is not symmetrical as it cannot compare the both sides of the breakeven point.

Revealed Symmetric Comparative Advantage (RSCA)

The present analysis utilized Relative Export Advantage (REA) index to measure the export competitiveness of fish and fishery products of Pakistan in world market. If REA<0 indicating comparative disadvantage, whereas positive REA values depicts comparative advantage. (Maqbool and Sofia, 2018). This index is explained as follow.

REA= Ln(RCA) (3) *(Source: Kuldilok et al., 2013)*

Vollrath (1991) established the index of comparative advantage, which is observed as a superior measure of competitiveness as the very issue pertaining to the double-counting in world trade is eradicated (Topcu and Sarigul, 2015).

$$RCA\# = \frac{\left\{\frac{v_{ij}}{(\Sigma_i v_{ij}) - v_{ij}}\right\}}{\left\{\frac{(\Sigma_j v_{ij}) - v_{ij}}{[(\Sigma_j \Sigma_i v_{ij}) - (\Sigma_j v_{ij})] - [(\Sigma_i v_{ij}) - v_{ij}]}\right\}} \quad (4)$$ *(Source: Topcu and Sarigul, 2015)*

Where

$v_{ij=}$ Pakistan's fish and fishery exports

$\sum_i v_{ij}$= Pakistan's entire exports

$\sum_j v_{ij}$= World's fish and fishery exports

$\sum_j \sum_i v_{ij}$= World's entire exports

Furthermore, the present analysis also employed the Revealed Comparative Disadvantage (RCDA) index, which is symmetric to the Balassa index of RCA.Though, instead of exports of the country, the import data is used for measuring RCDA. RCDA>1 indicates the importer country suffers from a comparative disadvantage in the fish and fishery products.

$$RCDA= \frac{M_i^F / \sum M_i^F}{M_i^w / \sum M_i^w} \quad (5)$$ *(Source; Baniket al., 2021)*

Where, M_i^F= Imports offish and fishery products, $\sum M_i^F$= Total imports of the concerned country, M_i^w=Fish and fishery imports of world, $\sum M_i^w$= Total imports of the global market

For Pakistan, Vollrath index of revealed trade advantage (RTA)is employed to asses revealed competitive advantage in fish and fishery products. Relative Trade Advantage (RTA) is explained as follows:

$$RTA = RCA - RCDA = \frac{X_i^t / \sum X_i^t}{X_i^w / \sum X_i^w} - \frac{M_i^F / \sum M_i^F}{M_i^w / \sum M_i^w} \quad (6)$$ *(Source; Maqboolet al., 2021)*

Moreover, Balassa also employed another index of RCA, the Net Export Index (NEI).

$NEI = (Xij-Mij)/(Xij+Mij)$ (7) *(Source; Maqboolet al., 2021)*

where X represents exports and M refers to imports of the country.

The value of NEI lies between 1 and -1, if NEI =1shows that Pakistan is a net exporter in this sector, while NEI= -1 highlights that Pakistan is net-importer.

The absolute value |NEI| clarifies the portion of inter-industry trade relative to the total trade of any product group, and (1-|NEI) consequently represents the portion of intra-industry trade (Vixathep, 2011).

Results and Discussions

The objective of this analysis is to examine the competitiveness and comparative advantage in the fish and fishery exports of Pakistan in global market by employing RCA, REA, RSCA, Vollrath index, RCDA, RTA and NEI during 2004-2021.

Table 1: Pakistan's Revealed Comparative Advantage of the Fish and Fishery Products export and Imports in Global Market during 2004-2021

Years	RCA	RSCA	REA	RCA#	RCDA	RTA	NEI|	-|NEI|
2004	1.88	0.306	0.633	1.895	0.008	1.874	0.988	0.012
2005	1.64	0.242	0.494	1.647	0.011	1.628	0.977	0.023
2006	1.88	0.306	0.632	1.892	0.01	1.871	0.981	0.019
2007	1.85	0.299	0.617	1.863	0.01	1.844	0.979	0.021
2008	2.36	0.406	0.86	2.383	0.006	2.358	0.987	0.013
2009	1.92	0.315	0.652	1.932	0.005	1.915	0.99	0.01
2010	1.99	0.331	0.688	2.003	0.012	1.977	0.978	0.022
2011	1.92	0.316	0.655	1.936	0.016	1.908	0.971	0.029
2012	2.28	0.39	0.823	2.296	0.024	2.252	0.962	0.038
2013	2.41	0.413	0.879	2.431	0.049	2.359	0.933	0.067
2014	2.43	0.417	0.887	2.453	0.053	2.375	0.922	0.078
2015	2.44	0.419	0.892	2.467	0.063	2.378	0.905	0.095
2016	2.39	0.41	0.871	2.418	0.055	2.335	0.903	0.097
2017	2.74	0.465	1.006	2.774	0.061	2.675	0.895	0.105
2018	2.82	0.476	1.036	2.858	0.028	2.789	0.951	0.049
2019	3.02	0.502	1.105	3.069	0.03	2.989	0.959	0.041
2020	2.59	0.443	0.953	2.626	0.023	2.57	0.964	0.036
2021	2.29	0.393	0.83	2.315	0.02	2.272	0.956	0.044

Sources; (Authors' own calculations based on ITC)

The table 1 explains the findings of several RCA indices to measure the export performance and competitiveness in the Fish and Fishery products exports in world market from 2004-2021. The findings of RCA index illustrate that Pakistan enjoyed comparative advantage during the selected time period. Further, the results of RSCA,REA and Vollrath index (RCA#) highlight that Pakistan faced a comparative advantage in this export sector. The index of RMA indicates that Pakistan faced a

competitive advantage in the imports of fish and fishery products imports during 2004-2021.

The RTA index designates that Pakistan enjoyed a net comparative advantage in this export sector during concerned time period. The index of NEI shows that Pakistan was a net-exporter of these products. Moreover, the absolute values of |*NEI*| index displays the portion of inter-industry trade, whereas 1-|*NEI*| illustrate the portion of intra-industry trade relative to the world trade of fish and fishery exports of Pakistan.

Conclusions and Policy Implications

The exports of the Pakistani fish and fishery products industry is critical as a source of foreign exchange earnings, and those who make a living from it feel its impact even on a micro level. This study measured the comparative advantage and competitiveness of the Pakistani fish and fishery trade on global markets from 2004-2021 and came to some conclusions. The findings of the analysis illustrate that RCA values are greater than 1 means Pakistan faced comparative advantage in the fish and fishery products from 2004-2021. Further, REA, RSCA and Vollrath index also show that Pakistan enjoyed competitive and comparative advantage in this sector.The index of RMA indicates that Pakistan faced a competitiveadvantage in the imports of fish and fishery products imports during 2004-2021.The RTA index designates that Pakistan enjoyed a net comparative advantage in this export sector during concerned time period. The index of NEI shows that Pakistan was a net-exporter of these products.

Pakistan must develop regulations and policies that help the long-term sustainability of the fish and fishery industry, such as regulations governing fishing practices to avoid breeding and overfishing practices and standards for fish production and export. Pakistan government should also help micro-enterprise breeders gain greater asses to financing and global markets, facilitate trade, enhance the quality and quantity of the products, improving skills of breeders,broodstock and resources. Moreover, Pakistan should implement strict isolation and disease control policies for transhippers and exporters to ensure the safety and health of fish exports.

Limitations of the study

The present study does not sense of completeness or without limitations. The data on fish and fishery products is insufficient before 2004 in the UN COMTRADE, the secondary data was used in current analysis began in 2004, limiting the analysis of Pakistan’s export competitiveness to the last 18 years.Further, the data of 4-digit HS codes for fish and fishery products exports taken in the current study are those with codes 0301-0308. If other types of fish and fishery products are traded and not for consumption, but exist outside of these selected HS codes, they are not considered in

current analysis. In future, the fish and fishery products exports competitiveness and performance can be examined based on producing regions and cluster.

Declarations

Ethical Approval: Ethics approval was not required for this study.
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Competing Interest/Conflicts of Interest: The author declares no competing interests.
Availability of Data and Material: The data and material that support the findings of this study are available from the author upon reasonable request.

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