AN ECONOMIC ANALYSIS ON THE DOMESTIC CONCERNS OF THE FISH EXPORT MARKET IN INDIA

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Abstract

Despite the robust growth of exports of fish products, in recent years, there has been a consistent decline in international fish product prices for various reasons and the increased production did not contribute a proportionate increase in the export earnings in dollar terms. Though international fish trade is experiencing such constraints, the Government of India through its export development agencies has set out a vision plan so that India becomes one among the top five fish exporting countries in the world. Conceiving this perception, the study was undertaken with the following objectives, *viz.*, to examine the level of price transmission between the fish export markets in India and to analyze the constraints prevailing in Indian fish trade in the perspective of various stake holders. This study is taken up in the national perspective and hence India as a whole is treated as the study area. The co-integration of export prices of shrimp at three markets *viz.*, Chennai, Calcutta and Mumbai, was studied to analyze the level of market integration. Garrett's ranking technique was used to analyze the problems encountered by fishermen and export agencies in the process of marketing of fish. In this regard, it is suggested that the government should initiate policies to enable these states to perform better so that the cumulative growth rate will grow higher. The market integration analysis revealed that there was no price transmission between the three major ports involved in the export of shrimp. This implies upon the fact that the degree of market intelligence of the exporters needs to improve to a still better level. In order to enhance the market intelligence level of exporters the authorities may take steps to publish the export price data in an easily accessible electronic public domain on daily basis. Awareness as well as technological know-how might be provided to fisherman to maintain the quality of fish which they intend to supply to exporters. This would also further aid to fetch back a remunerative price to fisherman.

Key words : Economic analysis, stake holders, Fish export market.

Introduction

The marine fish products are the most precious animal protein for the country. Besides being a vital source of food supply for the people all around the globe, it provides employment to millions. It is also a vital item of trade for many nations. It is the single largest source of animal protein in most parts of the world, particularly in the developing countries.

Fish products are a heavily traded commodity. Roughly 40 percent of global fish output by value is traded across international borders. High in export performance, India's shipment of 13,77,244 MT of seafood earned US$ 7.08 billion during the financial year 2017-18, with frozen shrimp and frozen fish continuing to be the flagship export items, as compared to figures of 11,34,948 MT and 5.77

billion dollars, respectively in the preceding fiscal year registering a growth of 21.33%. Fish exports are an important component of food exports, as they constitute more than 70 percent of the food exports.

Despite the robust growth of exports of fish products, in recent years, there has been a consistent decline in international fish product prices for various reasons and the increased production did not contribute a proportionate increase in the export earnings in dollar terms. Also it's a fact that in the post liberalization era, such international price undulations are more severe which, apart from affecting export earnings, also has serious impacts on domestic prices leading to consequent fall outs. The degree of such integration between various domestic and international markets, its pros and cons are needed to be investigated, which would help for future policy revamp.

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With this understanding on the problems discussed above, the proposed study was carried out with the following specific objectives.

• To examine the level of price transmission between the fish export markets in India.

• To analyze the constraints prevailing in Indian fish trade in the perspective of various stake holders.

Materials and Methods

The formulation of suitable methodology is a pre-requisite in social science research. India as a whole treated as a study area, the data collected from the source of Indiastat.com-2018.

Growth Rate

The slope of linear trend is a fixed value per unit time period. Often, particularly over long span of time, this is an inadequate description. A time series increasingly by a constant percentage has the growth properties of compound growth rate. In the present study, volume of exports and export prices was analyzed for growth trends with the help of model,

$Y_t = Y_t(1+r)^t e^u$

Where,

Y_t = Value at time 't'

Y_0 = Initial value

r = Growth rate

T = Time in years, 0, 1, 2………30 and

u = Random error term

For the purpose of estimation, the equation is expressed in logarithmic form:

$\ln Y_t = \ln Y_0 + T \ln (1+r) + u$

$Y_t = a + bT + u$

Where,

$Y_t = \ln Y_t$

$a = \ln Y_0$

$b = \ln (1+r)$

The steeper the regression line, *i.e.*, the larger the value of b, the higher the compound growth rate, r. The value of r is readily obtained as follows,

Since,

$b = \ln (1+r)$

$e^b = 1+r$

$r = e^b - 1$

Market Integration of Different Export Markets

Two price series belonging to spatially separated markets are said to be integrated if there exists a long-term equilibrium relationship between them. The degree of transmission of price signals between these two markets can be obtained by fitting a classical regression model given by Equation (1):

$Y_t = \beta_0 + \beta_1 X_t + e_t$ $\hspace{2cm}$ (1)

Where,

Y_t = Price at the dependent market

X_t = Price at the independent market

β_0 = Constant,

β_1 = Long-run elasticity of price transmission and

e_t = Error-term.

However, assumptions of the classical regression model necessitate that both Y_t and X_t variables should be stationary and the errors should have a zero mean and finite variance.

The stationarity of a series can be tested using a unit root test, the most widely used being Augmented Dickey-Fuller unit root test. It would test the null hypothesis that the series has a unit root, i.e. non-stationary. The test is applied by running the regression of the form given in Equation (2):

$$Y_t = \beta 1 + \Delta Y_{t-1} + \Delta \alpha i \sum_{i=1}^{m} Y_{t-1} + \varepsilon t \hspace{1cm} .(2)$$

Where, εt is a pure whiter noise error-term and

$\Delta Y_{t-I} = (Y_{t-1} - Y_{t-2})$.

Once it is established that the order of integration is the same for the variables of interest, the second stage of testing co-integration can be undertaken. The co-integrating equation is the same as Equation (1). The error- term arising from this regression in then subjected to testing of stationarity. The ADF test in this context is known as Augmented Engle-Granger test whose critical values were provided by Engle and Granger, (1987). Davidson and Mackinnon, (1993) have revised these values and in the present study, these values have been

Table 1: Compound Growth Rate of Item-wise Fish Export (1997-2017).

S. No	Fish Product	Compound Growth Rate
1	Frozen Shrimp	7.0
2	Fr. Fin Fish	5.0
3	Fr. Cuttle Fish	4.5
4	Frozen squids	6.0
5	Dried items	16.6
6	Live items	7.8
7	Chilled items	17.0
8	Other items	12.0

Table 2: ADF Unit Root Test on Export Price of Shrimp at Different Markets

Market	With Constant		With Constant and Time Trend		Without Constant and Time Trend	
	Level	First Difference	Level	First Difference	Level	First Difference
Chennai	-3.5*	-	-4.63***	-	-0.07	-9.47*
Calcutta	-4.87*	-	-3.87**	-	-0.39	-10.80*
Mumbai	-2.78*	-	-4.72*	-	-0.42	-9.02**
Note: * denotes significance at 1 percent level; ** denotes significance at 5 percent level; *** denotes significance at 10 percent level.						

Table 3: Co-Integration Rank Test for Shrimp Export Prices in Different Markets.

| Hypothesized No. of CE(s)	Eigen Value	Max –Eigen Statistic	0.05 Critical Value	Prob**
None*	0.382245	8.64782	16.89730	0.0045
At Most 1	0.071632	6.19278	10.22480	0.6794
At Most 2	4.02	0.009857	3.128807	0.9252
Note: * Denote rejection of the hypothesis at the 0.05 level; ** Mac Kinnon-Haug-michelis (1999) P – values.				

used. The stationarity in the error-term confirms co-integration between the series and the existence of long-term equilibrium. However, there can be short-term disequilibrium, which means that a price change in one market is no immediately passed on to the other species. Using the Error correction model (ECM), the speed of adjustment towards the long-run path can be ascertained and the model is represented by Equation (3):

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 e_{t-1} + \varepsilon\, t \qquad (3)$$

Where, e_{t-1} is the lagged error-term of the co-integrating regression and t is the disturbance- term. The magnitude of α_2 explains the speed at which the price approaches equilibrium and it is expected to be negative, so that the equilibrium is restored in the long-run.

In the present study, the co-integration of export prices of shrimp at three markets *viz*, Chennai, Calcutta and Mumbai, was studied to analyze the level of market integration. Augmented Dickey-Fuller unit root test was employed to test the stationarity of time series export price data of the three fish export markets.
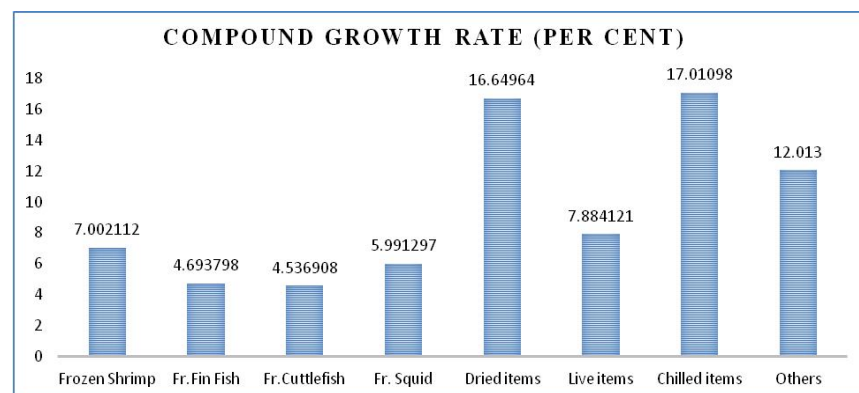
Fig. 1: Compound Growth Rate for Item-wise Fist Export (1997 to 2017).

Garrett's Ranking Technique

To study the constraints in fish trade, Garrett's ranking technique was employed (Garrett, 1969). The order of merit assigned by the intermediaries in the trade were converted into ranks using the formula,

$$\text{Percent Position} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where,

R ij = Rank give for i^{th} factor by j^{th} individual

N ij = number of factors raked by j^{th} individual

By referring to Garrett's table, the percentage positions estimated were converted into scores and then for each factor the scores of various responded were added and mean value was arrived at. These means were arranged in descending order. The problem having the highest mean value was considered as the most important and was given the highest rank and vice versa.

In the present study Garrett's ranking techniques was used to analyze the problems encountered by fishermen and export agencies in the process of marketing of fish.

Results and Discussion

Growth Trends in Item-wise Fish Export

The Compound growth rate of different items of export as classified by Marian Products Export Development Authority (MPEDA) is presented in table 1 & fig. 1.

It could be noticed from the Table I that the compound growth rate for chilled items was the highest with 17.0 percent, followed by dried items16.6 percent and other items (12.0 percent).

Market Integration of Different Fish Export Markets

The price transmission among different export markets has serious implications on various stake holders of the business esp. on producers of fish. In order to study the integration of shrimp export among Chennai, Calcutta and Mumbai export market, as the first step, an augmented Dickey-Fuller (ADF) unit root test was applied to ascertain the non stationarity of daily export price series obtained from all the

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Table 4: The Vector Error Correction Estimates for Shrimp Price Series at Different Markets.

Error Correction	CHE	CAL	MUM
Coint Eq 1	-0.073592064	-0.071575988	0.052814224
	0.03402	0.07246	0.1072
	-2.16320	-0.9878	0.49267
CHE (-1)	0.178089	0.388938506	0.36326752
	0.1725	0.40212	0.35420
	1.0324	0.96722	1.0256
CAL (-1)	-0.031204209	-0.369649656	-0.509549052
	0.1427	0.1928	0.34602
	-0.21867	-1.91727	-1.4726
MUM (-1)	-0.05676011	0.11996022	0.018985728
	0.08126	0.1678	0.24721
	-0.6985	0.7149	0.0768
C	-0.021067852	0.22742124	-0.004016688
	0.4276	1.0212	1.2792
	-0.04927	0.2227	-0.00314

Note: CHE : Current price of shrimp at Chennai; CAL : Current price of shrimp at Calcutta; MUM : Current price of shrimp at Mumbai; CHE (-1) : Old day lagged shrimp price at Chennai; CAL (-1) : Old day lagged shrimp price at Calcutta; MUM (-1): Old day lagged shrimp price at Mumbai.

three markets. The result of the exercise is presented in the table 2.

To allow for the various possibilities, the ADF test

Table 5: Constraints Encountered by Exporter.

S. No	Statements	Garrett Mean Score	Rank
1	Non availability of exportable fish varieties	71.8	I
2	Non – availability of quality fish stock	67.2	II
3	Lack of skilled manpower	63.1	III
4	Low market intelligence	58.4	IV
5	Price fluctuation in international markets	51.2	V
6	Infrastructure facilities for trade, (transport, cold storage, etc.,)	45.2	VI
7	Poor labour availability	39.1	VII

Table 6: Constraints Encountered by Exporter.

S. No.	Statements	Garrett Mean Score	Rank
1	High perishable nature	69.5	I
2	Domination by few auctioneers / Wholesaler	64.2	II
3	Price fluctuation	61.9	III
4	Higher commission charge	52.3	IV
5	Export promotion agencies concentrate their activities on assisting exporters, leaving little development for fisherman.	47.8	V
6	Fisherman do not have any alternative source of income generation	41.3	VI
7	High fishing expenditure and the risk of poor catch	35.2	VII

was estimated in three different forms *viz*., with constant, with constant and time trend, without constant and time trend (As random walk). The time series corresponding to all the markets were found to be stationary at level itself, in the forms "with constant" and "with constant and time trend" as the null hypotheses of the presence of a unit root could be rejected. The price series were found to be non stationary when ADF test was estimated in the form "without constant and time trend", at the level and all series became stationary after first differencing. Hence subsequently co-integration and error correction model were estimated with the assumption that all the series take the form of "without constant and time trend".

The co integration rank test for export prices of shrimp in the market *viz*., Chennai, Calcutta and Mumbai as calculated indicated (Table 3) one co integration equation at the 0.05 level.

It could be observed from the vector error correction estimates for the Chennai, Calcutta and Mumbai markets (Table 4) that one day lagged retail price of shrimp has only very limited influence on current day prices. Except in the case of Calcutta, the previous day price of other two markets had no influence either on its own current price or on current price of other markets.

The inference that could be drawn is that there is no price transmission between the three major ports involved in the export of shrimp. This implies upon the fact that the market intelligence is poor with exporters.

Garrett Ranking Analysis

Identification of major constraints encountered and ranking them in respondent's perception is one of the most practical and reliable approaches followed in social sciences researches which helps the researcher to find tangible solutions for many complex issues.

Garrett ranking technique has been used in this study to rank the constraints encountered by fisherman and exporter in fish marketing.

Constraints Encountered by Exporter

The various constraints encountered by exporters were ranked & presented in this table 5. The Garrett analysis revealed that non-availability of exportable fish variety, non-availability of quality fish stock and non-availability of skilled labour were ranked first, second

and third, among various constraints. These are the major constraints encountered by exporters.

Constraints Encountered by Fisherman

The problems encountered by fisherman in marketing of fish are presented in table 6. The table could reveal that high perishable nature, domination by wholesaler and auctioneers and price fluctuation were ranked first, second and third among various constraints. The first and third problems could be addressed by establishing better cold storage facilities and second problems could be solved by extending soft loans to fisherman by institutional agencies, so that they could get away from the clutches of auctioneers and wholesalers.

Summary and Conclusions

• The market integration analysis revealed that there is no price transmission between the three major ports involved in the export of shrimp. This implies upon the fact that the market intelligence is poor with exporter. In order to enhance the market intelligence level of exporter the authorities may take steps to publish the export price data in an easily accessible electronic public domain on daily basis.

• Awareness as well as technological know-how might be provided to fisherman to maintain the quality of fish which they intend to supply to exporters. This would also further aid to fetch back a good price to fisherman.

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