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DECOMPOSITION ANALYSIS OF EXPORT OF INDIAN MARINE PRODUCTS

Shyam Salim and P. S. Ananthan*

INTRODUCTION

indian fisheries sector plays an important role in the socio-economic development of the country, in view of its potential contribution to national income, nutritional security, employment opportunities, social objectives, and export earnings. Fisheries sector contributes 4.3 per cent to the agricultural GDP and export earnings are presently valued at over Rs. 6,700 crores from a volume of 4.6 lakh tonnes. Marine products form an important group of primary commodity exported from India accounting for about four per cent of the total export earnings. The important marine products exported from India are frozen shrimp, frozen lobster, frozen fish, frozen squid and frozen cuttlefish. The five major markets contributing to the Indian exports include Japan, USA, European Union, South East Asia and Middle East. Internationally, traded fisheries products are characterised by a high degree of heterogeneity, reflecting the wide range of species and of processing techniques. Products from quite distinct species can nevertheless be in direct competition at market. Conversely, similar fish products from the same family can command quite different prices. The sea food industry in many countries are undergoing a rapid change to process more and more ready to cook and to eat in convenient packs. Indian seafood industry, by and large, still remains as a supplier of raw materials to the preprocessors in foreign countries and 90 per cent goes in bulk packs which is the prime reason for the drastic reduction in the unit value realization. India depends heavily on one product (shrimp) and one market (Japan) for its marine products export and thus there is a need for product and market diversification. It is in this backdrop that the decomposition analysis of Indian marine exports is being studied in order to disaggregate the export earnings based on the different parameters.

DATA AND METHODOLOGY

The overall objectives of the proposed investigation is to decompose the export earnings of Indian marine products during the periods of pre-liberalization (1979-1990) and post-liberalization (1991-2002).The study was based on the secondary data collected from various published governmental and non-Governmental sources. The data pertaining to total

* Scientists, Agricultural Economics and Agricultural Extension, respectively, Central Institute of Fisheries Education, Fisheries University Road, Versova, Mumbai - 400 061, respectively.

quantity exported, their value in rupees and their unit value realization to the different market destinations were collected from the FAO Year Book of Fishery Statistics, Statistics of Marine Product Export from India published by the Marine Products Export Development Authority (MPEDA-Cochin), Ministry of Commerce, Government of India and Marine Product Exports Review.

Decomposition Model

There has been commendable increase in the Indian fisheries export in terms of quantity, value and unit value over the years. In order to examine quantitatively the effect of export quantity and the export unit value and their variability on the export value over the years decomposition analysis was performed. For better understanding, the variance of the export value was measured in two-time period viz., pre-liberalization period (1979-1990) and post-liberalization period (1991-2002). The export quantity and export unit value of Indian fisheries were detrended for further decomposition analysis.

In order to find out the source of growth and variability in Indian marine products exports, the Hazell's (1982) decomposition model was employed. The export quantity and export unit values were first detrended using the linear relations of the form :

$$z_t = a + b + e_t \quad .....(1)$$

Where z_t denoted the dependent variable (export quantity and export unit value)

t = time variable, and

e_t = random variable residual with zero mean and variance s2

After detrending the data, the residuals were centered on the export mean export quantity and export unit value resulting in the detrended time series data of the form :

$$z^*_t = e_t + \bar{z} \quad .....(2)$$

Where $\bar{z}$ = mean of export quantity/unit value

z^*_t = detrended export quantity or unit value

The detrended values were subjected to the following analysis

$$EV = EQ.\ EUV \quad .....(3)$$

EV = The export value of marine products

EQ = The export quantity of marine products

EUV = The export unit value of marine products

The variance of the Export Value (V (EV)) will be expressed as:

$$V(EV) = \overline{EQ}^2 V(EUV) + \overline{EUV}^2 + \overline{EUV}^2 V(EQ) + 2\overline{EQEUV}\ Cov\ (EQ, EUV)\ Cov\ (EQ.EUV)^2 + R \quad ....(4)$$

Where, $\overline{EQ}$ and $\overline{EUV}$ = the mean export quantity and mean export unit value

R= the residual term which is expected to be small

It is apparent from this expression that V (EV) was not only a function of the variances in export quantity and unit value, but also of the mean export quantity and unit value and of the covariance between quantity and unit value. Clearly, a change in any one period of these components would lead to a change in V (EV) between these two periods and similarly average export value E (EV) can be expressed as:

$$E(EV) = \overline{EQ}\ \overline{EUV} + COV\ \{EQ.EUV\} \quad .....(5)$$

It was affected by the changes in the covariances between export quantity and unit value and also by the changes in the mean export quantity and unit value. The objective of the decomposition analysis is to partition the changes in the V (EV) and E (EV) between the two periods into constituent parts. which could be attributed separately to changes in the mean, variances and covariance of export quantity and export unit value,

$$\text{which is } E(EV_1) = \overline{EQ_1 EUV_1} + COV\ \{EQ_1.EUV_1\} \quad .....(6)$$

$$E(EV_{11}) = \overline{EQ_{11} EUV_{11}} + COV\ \{EQ_{11}.EUV_{11}\} \quad .....(7)$$

Each variable in the second period could be expressed as the counterpart in the first, plus the change in the variable between the two.

For example,

$\overline{EQ_{11}} = \overline{EQ_1} + \Delta\overline{EQ}$ and $\Delta\overline{EQ}_{11}.\text{-}EQ_1$ Therefore,

$$E(EV_{11}) = (\overline{EQ_1} + \Delta\overline{EQ})\ (\overline{EUV_1} + \Delta\overline{EUV})\ + Cov\ (EQ_1, EUV_1) + \Delta\ Cov\ (EQ.\ EUV) \quad .....(8)$$

The change in the average export value [? E (EV)] was then obtained by subtracting equation (3.11) from (3.13).

This was reduced to

$$\Delta E(EV) = E(EV_{11}) - E(EV1)$$

$$= \overline{EQ1} + \Delta\overline{EUV}.\ \Delta\overline{EQ} - \Delta\overline{EQ}.\Delta\overline{EUV} - \Delta Cov(EQ,EUV) \quad .....(9)$$

TABLE 1. COMPONENTS OF CHANGE IN AVERAGE EXPORT VALUE

Sl.No	Source of Change	Symbol	Components of Change
1.	Change in mean export value	$\Delta\overline{EUV}$	$\overline{\Delta EQ}$, $\overline{\Delta EUV}$
2.	Change in mean export quantity	$\overline{\Delta EQ}$	$\overline{\Delta EUV}.\overline{\Delta EQ}$
3.	Interaction between changes in (1) and(2)	$\Delta\overline{EUV}\ \Delta\overline{EQ}$	$\Delta\overline{EUV}\ \Delta\overline{EQ}$
4.	Change in EQ-EUV covariance	ΔCov(EQ.EUV)	ΔCov(EQ,EUV)

Decomposition analysis was done for decomposing the sources of growth on average export value and variance of export value of Indian marine products. Also, the decomposition of the sources of growth in average export value and variance of the export value was analysed for the major marine products like frozen shrimp, frozen lobster, frozen squid, frozen cuttlefish and fresh and frozen fish and the estimated results are furnished in Table 2.

Table 2. COMPONENTS OF CHANGE IN THE VARIANCE OF EXPORT VALUE

	Source of Change		Components of Change
	Description	Symbol	
1	Change in Mean	$\Delta\overline{EUV}$	$2\overline{EQ}_1\Delta\overline{EUV}$ Cov $(EQ_1EUV_1)+([2EUV_1\Delta$
2	Change in mean EQ	$\Delta\overline{EQ}$	$2\ \overline{EUV}_1\Delta\overline{EQ}$ Cov $(EQ_1.EUV_1)+[2\overline{EQ}_1EQ+(\Delta\overline{EQ})^2]$ $V(EUV_1)$
3	Change in EUV variance	$\Delta V(EUV)$	$(\overline{EQ_1})^2\Delta V(EUV)$
4	Change in EQ variance	$\Delta V(EQ)$	$(\overline{EUV_1})^2\Delta V(EQ)$
5	Interaction between changes in mean EUV and EQ	$\Delta\overline{EUV}\Delta EQ$	$2\Delta\overline{EUV}\Delta\overline{EQ}$ Cov (EQ_1,EUV_1)
6	Changes in EQ-EUV Covariance	ΔCov(EQ EUV)	$[2\overline{EQ}_1\overline{EUV}_{1\text{-}2}Cov(EQ_1,EUV_1)$ $\Delta Cov(EQ,EUV)\text{-}[Cov(EQ,EUV)]^2$
7	Interaction between changes in mean EQ and EUV covariance	$\Delta\overline{EQ}\Delta V(EUV)$	$[2\overline{EQ}\Delta\overline{EQ}\text{-}(\overline{EQ})^2]\Delta V(EUV)$
8	Interaction between changes in mean EUV and EQ covariance	$\Delta\overline{EUV}\Delta V(EQ)$	$[2\overline{EUV}\Delta\overline{EUV}\text{-}(\Delta\overline{EUV})2]\Delta V(EQ)$
9	Interaction between changes in mean EQ and EUV and changes in EQ-EUV covariances	$\Delta\overline{EUV}\Delta V(\overline{EQ})$ Δ Cov(EQ,EUV)	$[2\overline{EUV}_1\Delta\ \overline{EQ}+2(\overline{EQ}1\Delta\overline{EUV})+2\Delta$ $\overline{EQ}\Delta\overline{EUV}]$ $\Delta Cov(EQ,EUV)$
10	Change in residual	ΔR	ΔV(EQ,EUV)-Sum of other components

Where $EQ_1\text{-}\Delta\overline{EUV}$ and $\overline{EUV}_1.\Delta\overline{EQ}$ arose from the changes in mean export unit value and mean export quantity. They are called as the pure effects, as they arose even when no other sources of change.

$\Delta\overline{EQ}.\Delta\overline{EUV}$ was an interaction effect which occurred from the simultaneous occurrence of changes in mean export unit value and mean export quantity. Obviously this term will be zero if either the mean export value or the mean export quantity remains unchanged.

Δ COV (EQ.EUV) arose from the changes in the variability of the export quantity or export unit value.

Since

$$COV (EQ, EUV) = \rho[V (EQ) V (EUV)]^{1/2} \quad \ldots\ldots\ldots\ldots(10)$$

Where p is the correlation coefficient, then it could be seen that Δ COV (EQ.EUV) arose from the changes in the variances of export quantity and unit value and from the changes in the correlation between the two.

The changes in the variance of export value V (EV) can be decomposed in an analogous way .The components of the change in the variance of export value are shown below. Thus, there are ten sources of changes in export value variance - four of these namely, changes in mean export unit value, changes in mean export quantity, interaction between changes in mean export quantity and mean export unit value, and changes in the export quantity-unit value variance, are similar to that of Table 2.

But changes in export value variance had also occurred from the changes in the variances of export quantity and unit value, and from changes in interaction terms between all these components.

RESULTS AND DISCUSSION

The components of changes in the export value of Indian marine products in terms of change in mean export quantity and mean export unit value and their variability besides the interaction effect were set out in Table 3.

TABLE 3. DECOMPOSITION ANALYSIS OF THE COMPONENTS OF CHANGE IN AVERAGE EXPORT VALUE OF INDIAN MARINE PRODUCTS

Sl No	Source of Change	Percentage Share
1	Change in Mean Export Unit Value	1.18
2	Change in Mean Export Quantity	95.93
3	Interaction between changes in (1) and (2)	3.03
4	Change in EQ-EUV covariance	-0.13

The results indicated that the contribution of change in mean export quantity was the highest among the other components of change, i.e., the increase in mean export quantity accounted for 95.93 per cent of the increase in average export value. This was expected because the export quantity had recorded significant higher growth rates during both the period whereas the export unit value recorded a negative growth rate during the post- liberalization period. The changes in the covariance between the mean export quantity and mean export unit value accounted for 0.13 per cent decrease in the mean export value. The changes in the covariances could arise through the changes in the variance of export quantity and export unit value. With regard to interaction effect, the export quantity was

benefited to a small extent (3.03 %) from both mean export quantity and mean export unit value. Among the various components, the contribution of change in mean export quantity of Indian marine products was the dominant source for the change in average export value followed by the interaction between changes in the mean export quantity and mean export unit value. The components of change that affected the stability of export value are shown in Table 4.

TABLE 4. DECOMPOSITION ANALYSIS OF THE COMPONENTS OF CHANGE IN THE VARIANCE OF EXPORT VALUE OF INDIAN MARINE PRODUCTS

Sl. No.	Source of Change in Variance Description	Percentage Share
1	Change in Mean EUV	-0.12
2	Change in Mean EQ	26.23
3	Change in EUV Variance	0.06
4	Change in EQ Variance	79.83
5	Interaction between changes in mean EUV and EQ	-0.34
6	Changes in EQ-EUV Covariance	-4.32
7	Interaction between changes in mean EQ and EUV covariance	0.66
8	Interaction between changes in mean EUV and EQ Covariance	5.11
9	Interaction between changes in mean EQ and EUV and changes in EQ-EUV Covariance	-11.53
10	Change in residual	4.43

The change in variability of export quantity accounted for 26.23 per cent in the variance of export value .The coefficient of variation was worked out at 18.05 per cent and 26 per cent respectively during the pre-liberalization and post-liberalization periods .The change in the variance of export quantity was the important source in increasing the export value variance to the extent of 79.83 per cent. The change in the covariance between mean export quantity and mean export unit value was - 4.32 per cent showing the variability effect of both the mean export quantity and mean export unit value reduced the instability of export value variance to a small extent thus generating a stabilizing effect among all others components of change.

The effect of interaction term was also important in determining the stability of the export value and when added together contributed six per cent of the increase in the variance of total export value. The interaction terms arose in part from the change in mean export unit value and export quantity covariance and had induced a change in the behaviour of the exporters, which affected the mean or variance of the export quantity and had led to the instability of the export value.

SUMMARY AND CONCLUSIONS

The results indicated that the contribution of change in mean export quantity was the highest among the other components of change,i.e.,the increase in mean export quantity accounted for 95.93 per cent of the increase in average export value. Among the various components, the contribution of change in mean export quantity of Indian marine products export was the dominant source for the change in average export value followed by the interaction between changes in the mean export quantity and mean export unit value. The effect of interaction term was also important in determining the stability of the export value and when added together contributed six per cent of the increase in the variance of total exports value. The interaction terms arose in part from the change in mean export unit value and export quantity covariance and had induced a change in the behaviour of the exporters, which affected the mean or variance of the export quantity and had led to the instability of the export value.

The decomposition analysis of the Indian marine products export earnings indicated that, the revenue had been generated primarily from the changes in the export quantities and interaction between the export quantity and export value with no sizeable contribution and realization from the unit value. Thus, there is an immediate need for the value addition and diversification of the seafood exports, upolding a brand image that would be imperative to maintain India's position in the world seafood market.

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PRODUCTION AND SALE PATTERN OF VEGETABLES IN TAMIL NADU : A STUDY ON MARKETING EFFICIENCY AND NET INCOME

T. Elenchezhian and S. Kombairaju*

INTRODUCTION

Most of the growers of brinjal, lady's finger, tomato and small onion in Tamil Nadu sell their produce through market intermediaries. The direct sales to retailers are negligible except in the case of lady's finger. This has been evidenced in the inverse relationship between farmer's net share and the length of marketing channel.The most reverse effect is that inefficient marketing system arising out of long channel reduces the producer's share particularly of the small and marginal farmers. These farmers are not only affected by lack of information but also with wide range of fluctuating prices due to the presence of many middlemen in vegetable markets. This situation has also adversely affected the consumers. The establishment of farmer-market is an important step in recent years to suitability improve the marketing channel of vegetables. Organisationally, farmer-market is being managed by an Agricultural Officer and other officials. The price fixing committee of farmer-market consists of officials and farmers and thus, they jointly fix the maximum selling price. In practice, the farmers sell their vegetables for different prices depending upon the time and period of sale and bargaining power of the consumers, but the prices charged by them does not exceed the price fixed by the committee. However, there is lack of sufficient evidence how does it affect the sale pattern and the farmer's net income. An attempt is, therefore, made here to study the comparative pictures of the sale pattern of vegetables in farmer-market (FM) and central-market (CM) with the following objectives i) to examine the production and sale pattern of vegetables growers; ii) to study the marketing efficiency of FM and CM and iii) to analyze influence of time period of sale on farmer's net income.

METHODOLOGY

Farmer-market and central-market are the two major assembling markets for vegetables in Madurai city of Tamil Nadu. In channel I (farmer-market), consumers directly purchase vegetables from farmers, which is the shortest one and it does not need to bear any cost on market intermediaries. In channel II (central-market), the farmers sell their produce

* Research Scholar and Dean and Professor, Department of Agricultural Economics,Centre for Agricultural and Rural Development Studies (CARDS),Tamil Nadu Agricultural University, Coimbatore - 641 003, respectively.