Export Performance of Eggs from India: An Economic Perspective

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ABSTRACT

Bird eggs are common food and poultry eggs are the most popular choice across the globe. They are inexpensive source of nutrition. The present study was framed to study the export performance of eggs from India. The statistical tools like growth rate, instability and Cobb-Douglas Production Function were used in the study. Time series data for the last 20 years i.e. 1996-97 to 2015-16 pertaining to production and export collected from FAO STAT were used in the analysis. The entire period was divided into two sub-periods i.e. period-I (1996-97 to 2005-06), period-II (2006-07 to 2015-16) to see the periodic affects. The results revealed that, the growth rates of production of eggs were computed to be positive and significant during all the periods under investigation. It was further observed that during period-II, the growth rates of export quantity and export value of eggs were obtained significantly negative, while the growth rate of unit value of export of eggs was found positive and non-significant. This may be due to the outbreaks of bird flu in 2008 leading to ban on importing poultry products from India. Overall the production of eggs was assessed more or less stable. But, export quantity, export value and unit value of export showed larger instability. Egg export was observed to be positively and significantly influenced by export price, India’s share in world production, while it was negatively and significantly influenced by exchange rate. India lacks access to developed country markets due to stringent food safety and quality standards. Therefore to capture higher share of world trade, sanitary measures, standardization of packaging, grading, infrastructure and irradiation facilities and simplification in export procedures may be emphasized to increase eggs export and fetch foreign exchange.

Key words: Cobb Douglas production function, Compound growth rate, Eggs, Export, Instability.

INTRODUCTION

Poultry is one of the fastest growing segments of the agricultural sector in India today. While the production of agricultural crops has been rising at a rate of 1.5 to 2 per cent per annum, eggs and broilers has been rising at a rate of 8 to 10 per cent per annum. Rising incomes and changing consumer preferences have provided significant market opportunities for poultry produce like eggs to developing countries like India (Agarwal et. al, 2017). According to the top officials of Import/Export Code (IEC) and World Economic Outlook (WEO) reports to the Times of India (Nov, 2017), India is the fastest growing egg producer in the world. India is adding three billion eggs every year. India is experiencing rapid growth in its poultry sector. It is now the world’s third largest egg producer after China and USA. Egg production in the country during 2017-18 was 27.95 billion. The largest egg producing states in the country were Andhra Pradesh (18.7%), Tamil Nadu (18.3%) and Telangana (13.3%). Other states like West Bengal, Haryana and Kerala contributed more than 5%. India accounts for about 5.65 percent of the global egg production with annual growth rate of 8.03 per cent per annum. Besides these states, Karnataka, Punjab, Haryana, Maharashtra and Uttar Pradesh are major egg contributors (Anonymous, 2018).

India is one of the largest egg producing countries and 17th largest egg exporter country in the world. India’s egg export value stood at USD 33.03 million in the year 2017. India exports seven types of eggs to the world which are Table Eggs, Hatching Eggs, White Shell Egg, Fresh Egg, SPF Egg, Duck Egg and Quail Egg. India’s export of table eggs and hatching eggs stood at 35.09% and 31.53% of the total egg exports which was USD 11.59 million and USD 10.41 million respectively in the year 2017. As per egg export report of India released by Export Genius showed that eight Indian states are exporting eggs to other countries. Tamil Nadu, Maharashtra and Kerala are the largest egg exporting as well as egg producing states of India. Chhattisgarh, West Bengal andhra Pradesh, Delhi and Karnataka are next in the list of the biggest egg exporting states of India. Tamil Nadu is the biggest egg exporter state of India as more than

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half of the eggs are being exported from this state only. India has exported different types of eggs to 24 countries across the world. Oman, Maldives, Kuwait, Qatar, Bahrain, Comoros, Iraq and Iran are the main egg exports destinations of India. India egg exports to Oman worth USD 24.12 million which represented 73.02% of the total exports during 2017. Maldives is the second largest egg export partner of India and 15.30% value of egg shipments (USD 5.05 million) arrived in Maldives in the year 2017. Table egg and hatching eggs are India’s most exported types of eggs to other countries. India exports three-fourth of the eggs to Oman only as it is the biggest egg export market for India (Sandeep et al., 2013).

On the basis of above facts, there is a need to study the performance of egg export from India to formulate future action plan to further boost export performance to earn foreign exchange.

MATERIALS AND METHODS

Selection of period
To study the export performance of eggs, the data regarding production, export quantity and export value of eggs in India from 1996-97 to 2015-16 i.e. for 20 years was used. The investigation was carried out by divided the entire period into two sub-periods and period as whole. The sub-periods were period-I (1996-97 to 2005-06), period-II (2006-07 to 2015-16) and overall period (1996-97 to 2015-16).

Nature and source of data
The study is based on secondary data collected from the official website of FAO.

Estimation of growth rate
The exponential form of growth model was used to study the trend and thereby performance of eggs exports in terms of production, export quantity and value of export. The formula used to compute compound growth rate has been given below

\[ Y = a \cdot b^t \]  

Where,
- \( Y \) = Depended variable for which growth rate is to be estimated (Production / Export quantity / Value of egg export/unit value of export)
- \( t \) = Time variable
- \( b \) = Regression coefficient
- \( a \) = Intercept

\[ \log(Y) = \log a + t \log b \]

Then the per cent annual compound growth rate ‘r’ was computed by using the formula

\[ \text{CGR (r)} = [\text{Antilog } (\log b) -1] \times 100 \]

The significance of the regression coefficient was tested by using the student’s t’ test.

Instability index
Instability in export is expected to hamper the process of economic development. The degree of instability in production, export quantity and export value of eggs was measured so as to find out the fluctuation in export of eggs during last 20 years. To study the export instability, Coefficient of variation (CV) and Cuddy Della Valle Instability index (CDVI) were used to estimate the variation in the export of eggs.

Coefficient of Variation

\[ \text{Coefficient of variation (C.V)} = \frac{\sigma}{\bar{X}} \times 100 \]

Where,
- \( \sigma \) = Standard deviation
- \( \bar{X} \) = Arithmetic mean

The simple coefficient of variation (CV) often contains the trend component and thus over estimates the level of instability in time series data characterized by long term trends. To overcome this problem, the instability index given by Cuddy-Della Valle (1978) which corrects the coefficient of variation was used.

Cuddy Della Valle Instability index

\[ \text{Instability Index} = \text{CV} \sqrt{1 - R^2} \]

Where,
- CV= Simple estimates of coefficient of variation in per cent
- \( R^2 \) = Coefficient of determination

Trend analysis
The trend in production, export quantity, export value, domestic and international price of eggs was computed for the series data for the period 1996-97 to 2015-16.

Index numbers
An index number is a statistical measure designed to show changes in variables or group of related variables with respect to time. Index numbers were calculated by using average of triennium ending 1999 (TE-2019) as a base year. The following formula was used to estimate the index number.

\[ \text{Index number} = \frac{\text{Current year’s value}}{\text{Best year’s value}} \times 100 \]

By using the above mentioned formula, the index number for world production, India’s production, world export quantity, India’s export quantity, value of export, domestic price and International price of India were calculated separately.

Cobb- Douglas production function
For estimating the factors influencing export of Indian eggs, the Cobb-Douglas type of exponential function was used. The quantity export was considered as a dependent variable.

\[ Y=aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5} \]

Where,
- \( Y \) = India’s export (T)
- \( X_1 \) = Export price (Rs./Kg)
- \( X_2 \) = India’s share in world production (%) 
- \( X_3 \) = Ratio of domestic consumption to production
- \( X_4 \) = Exchange rate (Rs./US dollar)
**RESULTS AND DISCUSSION**

The analysis of the data by using above analytical tools was done and the results were obtained accordingly as follows:

**Growth rates in production and export of eggs**

The exponential functional form was employed to compute the growth rate and the results are presented in Table 1. The results revealed that, the growth rates of production of eggs were computed to be 6.63, 4.97 and 5.61 per cent per annum for period-I, period-II and overall period which were positively significant at 1% level of probability. The growth rates of export quantity was assessed to be 9.36 per cent per annum during period-I which was non-significant whereas, the growth rate of export value was observed to be 17.56 per cent per annum and was found significant at one per cent level of probability. On the other hand, growth rate for the unit value of export during period-I was found to be 8.64 per cent per annum which was significantly positive. During period-II, the growth rates of export quantity and export value of eggs were observed significantly negative, while the growth rate of unit value of export of eggs was found positive and non-significant. The negative growth rates of export quantity and export value of eggs in period-II may probably be due to the outbreaks of bird flu in 2008 leading to ban on importing poultry products from India. Nearly seven to eight countries had imposed ban on import of poultry products from India and a loss of nearly Rs. 32 lakh per day was estimated. The overall growth performance of production, export quantity and export value of eggs in India was observed positively significant. Similar results were also obtained by Ramdurg et al., 2010 who conducted a study on analysis of seasonality and growth trend in marketing of poultry eggs and chicken in Dharwad district of Maharashtra.

**Instability in production and export of eggs in India**

The instability indices for production, export quantity, export value and unit value of exports are presented in Table 2. Perusal of the table indicated that production of eggs was comparatively more stable in period-II of investigation. Similar trends were observed for the export quantity, export value and unit value of export of eggs from India during the same period of investigation. Overall the production of eggs was assessed more or less stable. But, export quantity, export value and unit value of export depicted larger instability.

**Index number**

The index numbers were worked out for the production, export quantity of eggs for world as well as India and for export value and unit value of eggs. The basic objective of estimating index numbers was to assess the trends in production, export, export value and unit value of eggs to study the comparative performance of India at global level. For computing index values the data pertaining to the year 1996-97 to 2015-16 i.e. of last 20 year were used. The results of the analysis are presented in Table 3. It is evident from the table that the index numbers of production, export, export value, Domestic price and International price of eggs both at national and international level have shown gradual increase in almost all the periods. The table further indicated that the indices of production

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**Table 1:** Period-wise Compound growth rates of production, export quantity, export value and export unit value of Indian eggs (1996-97 to 2015-16).

| Particulars       | CGR (%) | t-value | R²  |
|-------------------|---------|---------|-----|
| **Production**    |         |         |     |
| Period - I        | 6.63**  | 14.32   | 0.96|
| Period - II       | 4.97**  | 34.94   | 0.99|
| Overall Period    | 5.61**  | 37.58   | 0.98|
| **Export Quantity**|       |         |   |
| Period - I        | 9.36    | 1.67    | 0.28|
| Period - II       | -9.93** | -5.22   | 0.79|
| Overall Period    | 9.42**  | 4.21    | 0.51|
| **Export Value**  |         |         |   |
| Period - I        | 17.56** | 5.19    | 0.77|
| Period - II       | -4.57** | -2.89   | 0.51|
| Overall Period    | 7.99**  | 5.13    | 0.59|
| **Unit value of export**| |         |   |
| Period - I        | 8.64**  | 4.71    | 0.73|
| Period - II       | 1.72    | 2.08    | 0.35|
| Overall Period    | 0.85    | 1.03    | 0.05|

**Note:** CV- Coefficient of variation; CDVI- Cuddy-Della Valle's Instability.

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**Table 2:** Instability index of production and export of Indian eggs (1996-97 to 2015-16).

| Particulars       | CV (%) | CDVI (%) |
|-------------------|--------|----------|
| **Production**    |        |          |
| Period - I        | 19.40  | 3.45     |
| Period - II       | 14.88  | 1.98     |
| Overall Period    | 31.26  | 3.32     |
| **Export Quantity**|       |          |
| Period - I        | 76.39  | 35.13    |
| Period - II       | 33.87  | 18.26    |
| Overall Period    | 54.37  | 49.99    |
| **Export Value**  |        |          |
| Period - I        | 56.73  | 27.97    |
| Period - II       | 21.04  | 14.48    |
| Overall Period    | 47.54  | 34.01    |
| **Unit Value of export**| |          |
| Period - I        | 26.16  | 16.55    |
| Period - II       | 13.50  | 5.61     |
| Overall Period    | 25.55  | 24.15    |

**Note:** CV- Coefficient of variation; CDVI- Cuddy-Della Valle's Instability.
was observed to the highest. i.e. 154.06, 278.22 for India and the whole world in 2015-16 while the lowest index number value was obtained in 1996-97 i.e. 96.68 and 96.99, respectively.

Comparing the world export with India's export, the higher value for world export was found 217.76 in 2012-13 and for India it was 667.75 in 2006-07 while the lowest index number was found in 1996-97 for world export as well as India's export i.e. 96.14 and 93.15, respectively. In case of export value, the highest index value number was found to be 565.17 in 2006-07 whereas for export value lowest index number value was 81.91 in 1998-99. For unit value of export the highest index value number was computed to be 174.19 in 2002-03 and the lowest index number value was 73.19 in 1996-97. However, for domestic price and international price the highest index number value obtained 272.72 and 174.19, respectively in 2015-16 and 2005-06. While the lowest index number values for domestic and international prices were 87.88 and 73.19 respectively in 1996-97.

Factor influencing the export of Indian eggs

It was also tried to identify the factors affecting export of eggs from India. For this purpose Cobb-Douglas production function was used as this function is widely used for identification of the influencing factors (Table 4).

The results depicted that the coefficient of determination i.e. $R^2$ for export of eggs was estimated to be about 92 per cent, which indicated that the variable considered in the model explained the variability in the export of eggs from India. Egg export was observed to be positively and significantly influenced by export price, India's share in world production, while it was negatively and significantly influenced by exchange rate.

CONCLUSION

India's egg export observed to be increasing gradually but the per cent share to global egg export seemed to be declining. There is a scope to expand India's egg export potential. High priority should be given to the production

### Table 3: Index number of production, export and prices of Indian eggs. (Base year= Triennium ending average of 1997).

| Year | World production | India production | World export | India export | Export value | Unit value of export | Domestic prices | International prices |
|------|------------------|------------------|--------------|--------------|-------------|----------------------|-----------------|----------------------|
| 1997 | 96.68            | 96.99            | 96.14        | 93.15        | 115.71      | 73.19                | 87.88           | 73.19                |
| 1998 | 99.84            | 99.86            | 99.97        | 108.06       | 102.38      | 104.56               | 100.00          | 104.56               |
| 1999 | 103.48           | 103.15           | 103.89       | 98.78        | 81.91       | 122.25               | 112.12          | 122.25               |
| 2000 | 106.63           | 124.13           | 104.14       | 112.62       | 108.95      | 113.81               | 100.00          | 113.81               |
| 2001 | 108.80           | 131.21           | 107.08       | 104.11       | 129.21      | 91.01                | 112.12          | 91.01                |
| 2002 | 111.53           | 134.93           | 109.68       | 150.19       | 118.06      | 142.05               | 100.00          | 142.05               |
| 2003 | 113.24           | 136.88           | 111.19       | 420.15       | 122.25      | 152.63               | 112.12          | 152.63               |
| 2004 | 115.85           | 153.17           | 115.93       | 482.33       | 319.94      | 142.05               | 112.12          | 142.05               |
| 2005 | 118.19           | 156.65           | 122.49       | 583.22       | 366.33      | 167.49               | 151.51          | 167.49               |
| 2006 | 120.82           | 171.65           | 135.76       | 487.18       | 296.94      | 169.17               | 151.51          | 169.17               |
| 2007 | 124.23           | 179.77           | 155.95       | 667.76       | 565.17      | 108.15               | 112.12          | 108.15               |
| 2008 | 128.72           | 185.87           | 184.53       | 520.33       | 449.57      | 130.58               | 112.12          | 130.58               |
| 2009 | 131.22           | 197.03           | 194.57       | 438.93       | 416.86      | 113.71               | 181.82          | 113.71               |
| 2010 | 133.94           | 206.06           | 201.32       | 346.11       | 331.69      | 108.71               | 193.94          | 108.71               |
| 2011 | 136.56           | 211.45           | 199.45       | 336.71       | 348.54      | 119.53               | 212.12          | 119.53               |
| 2012 | 139.89           | 222.96           | 200.71       | 359.04       | 423.51      | 108.60               | 242.42          | 108.60               |
| 2013 | 142.82           | 233.95           | 217.76       | 237.94       | 282.61      | 119.82               | 251.51          | 119.82               |
| 2014 | 146.19           | 250.79           | 205.97       | 311.23       | 351.55      | 130.32               | 272.73          | 130.32               |
| 2015 | 150.00           | 263.31           | 208.15       | 302.74       | 352.55      | 127.43               | 233.33          | 127.43               |
| 2016 | 154.06           | 278.22           | 210.63       | 283.96       | 328.90      | 136.57               | 272.73          | 136.57               |

### Table 4: Export function analysis (Cobb-Douglas).

| Particular             | Coefficient | Standard error | t-value |
|------------------------|-------------|----------------|---------|
| Intercept              | 5.16        | 0.43           | 2.75    |
| Export Price $X_1$     | 1.18**      | 0.58           | 7.43    |
| India's share in world production $X_2$ | 4.29** | 0.58 | 7.43 |
| Ratio of domestic consumption to production $X_4$ | -4.38 | 3.43 | -1.28 |
| Exchange rate $X_5$    | -2.11**     | 0.54           | -3.88   |
| Ratio of domestic price to world export price $X_6$ | -0.15 | 0.32 | -0.48 |

** - denotes significant at 1 % level.
and export of eggs. The production of Indian eggs is considerably increasing but its export was observed declining in terms of percentage share of egg export to egg production. India lacks access to developed country markets due to stringent food safety and quality standards. Therefore to capture higher share of world trade, much emphasis need to be given on sanitary measures, standardization of packaging, grading, infrastructure and irradiation facilities and simplification in export procedures so as to increase export of India. For increasing export of eggs, there is need to change the economic scenario, where more competitors are lining up in the egg trade. Government policy should aim at increasing productivity of birds, reducing cost per unit of production, improving trade standards and meeting all trade related barrier which are of greater concern for the importing nation.

REFERENCES
Agarwal, P, Singh, R., Tewari, H and Rani R. (2017). India’s Trade Performance in Poultry Products. Int. J. Curr. Microbiol. App. Sci. 6(10): 451-460.
Anonymous, (2018). Livestock Production Statistics of India - 2018, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers' Welfare. doi: https://doi.org/10.20546/ijcmas.2017.610.055
Ramdurg, A.J., Khan, H.S., Mathur, M.D. and Mahajanshetti, S.B. (2010). An analysis of seasonality and growth trends in marketing of poultry eggs and chicken in Dharwad district. Karnataka Journal of Agriculture Science. 23(4): 632-634.
Sandeep, S., Kumar S. and Gangwar, L.S. (2013). India’s export performance in Poultry products and the Potential export destinations. Agricultural Economics - CZECH. 59(3): 134-142.