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# Determinants of Tea Exports: An Empirical Evidence from India

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***Abstract***

*Exports contribute to the economic growth of developed and developing countries. Due to the increase in the pace of exports, developing countries like India are on the path of development by earning international liquidity. Tea constitutes one of the major agricultural exportable commodities of India. India's tea export prices have fluctuated over the period causing an impact on agricultural exports. Several other factors also influence India's tea exports. This study has focused on the determinants of Indian tea exports. For empirical verification, the Augmented Dickey-Fuller (A.D.F) test, Johansen Co-integration test, and O.L.S model had been applied. There was a long-term equilibrium relationship between India's tea exports and all the selected variables. The O.L.S model reveals the positive relationship between exports of tea and the real effective exchange rate, exports of agricultural goods, the price of the good (tea), and the price of the substitute good (coffee).*

***Keywords:*** *Tea Exports, REER, A.D.F. test, Johansen Co-integration Test, O.L.S. Model.*

## Introduction

When goods are produced in a country and consumed by another country, it is called exports of goods. Export is one of the components of international trade. An economy needs to increase its exports because more exports will help increase the competitive advantage. India's agrarian tradition and diverse regional climate have greatly benefited the global food supply. Indian agriculture has contributed to foreign trade even in its traditional form. Agriculture has been a source of exchange for India in the past. However, most of the export earnings of agriculture came from standard items like tea, cashews, and spices. These days, there are many agricultural products are exported from India. This study focuses on India's exports of tea products and describes the export pattern of tea from 2001 to 2018. The present study mainly focuses on identifying the variables that influence tea exports. Tea has played a crucial role in the Indian economy. It is one of the most popular as well as lowest-cost hot drinks in the world and is consumed by 85 percent of individuals. The tea industry of India was sort of two hundred years old. A British national discovered tea plants, which were growing in Assam (higher Brahmaputra valley). In 1838, tea was cultivated in Assam and was shipped to the United Kingdom for Dutch auction [Nathan and Sreeniva, 2014: pp1-22]. India incorporates a dual tea base, compared to other tea-exporting countries. C.T.C (crush, tear, curl) and Orthodox both types of tea were produced in India. There is leaf as well as dirt tea in both the CTC and Orthodox Grades available on the market. India is a global generous

manufacturer as well as a consumer of tea. According to one of the estimates of the Tea Board of India, the global tea production in India is 27 percent. The top leading tea companies in India are Wagh Bakri Ltd., Goodricke Group Ltd., Duncan's Industries, Hasmukhrai & Co., Hindustan Lever Ltd., Tata Tea Ltd., Girnar Food & Beverages Pvt. Ltd. and Sapat Packaging Industries. There is a range of opportunities in the Indian tea industry. The tea industry is an agro-based labor-intensive industry, providing employment approx. 1,000,000 people. According to the statement of the Tea Board of India, India stands the fourth number in exporting tea at the global level after China, Sri Lanka, and Kenya. The quantity of exported tea from India to the world was worth USD 785.92 million over the financial year 2018. Crush, tear, curl (CTC) and well-established tea, additionally, black tea and biotic tea were the most effective wrathful tea from India and were widespread within the worldwide market. The most traded tea from India to other nations across the globe is black tea. India's exports of black tea increased by 80.46 per cent of all tea exports, compared to regular tea's recorded rate of 15.66 per cent. Additionally, tea was primarily exported in the forms of green tea, herbal tea, masala tea, and lemon tea. Some of the studies related to determinants of tea export have been reviewed as follows: Nayyar (1987) analysed that many internal and external factors are responsible for the performance of tea exports. A decrease in the growth of agricultural production reduces exports of agricultural items; As a result, the increasing internal demand was a discouragement to exporters of manufactured goods, while external factors are favourable like foreign demand from India to sustain export growth during this period. Nagoor (2009) examined factors that affect tea exports in India. An increase in internal demand, a slow rise in harvest, and slow growth of the range below growth are the prominent factors that account for the bad results of tea exports in India. These were unable to maintain the situation for a tea rise in the global supply related to global demand as domestic demand more than the international demand. Tea becomes income elastic, and it is highly elastic in growing nations. Kumar (2013) analysed the trends of India's tea imports. Assam is one of the major tea emerging states which constitute half of the country's overall production. Around 70 percent of the consumption of tea is from China, Kenya, Sri Lanka, and India. They have used time series analysis to analyse the data. The tea leaves manufacturing differs according to the area, natural weather, and its responses more than production or low production as well as quality which causes different prices in India's north and south regions. So, implement several technologies to raise production and regulate the tea price variation in India. The portion of the agriculture sector contributed 14.6 percent of India's Gross Domestic Product in 2009-2010. They suggested that the government should

implement the EXIM (export-import) policy to raise the amount of tea exported and diminish the volume of tea imports. Sahni (2014) analysed the trend in India's exports. The performance of India's exports was significant at the time of the post-reform era. India's exports were changed by increasing the proportion of rising economies, OPEC, Latin America, Africa, and Asia. Athukorala (1991) examined the determinants of agricultural exports in developing countries by using the time-series regression approach. The factors of agricultural export (the comparative importance of external demand conditions, competitiveness, and commodity diversification) were analysed. World demand, the index of competitiveness in ancient export, and the export diversification index were the used variables. It is observed that export variety and competitiveness contribute to the export growth of agricultural goods in developing countries. It has been suggested that demand-side factors are unfavourable and supply-side factors are contributing to diversification and competitiveness to stimulate the agricultural exports of developing countries. Saikat (2002) analysed the determinants of India's exports. The error-correction method is used to examine the demand-supply model of export determination. In the short run, individual demand and supply factors were found to be important, but in the long run, their confluence is very likely determined. Were, et al. (2002) analysed the factors affecting Kenya's export quantity. An experimental method was used along with the typical trade model which incorporated the rate of exchange and external earnings. The rate of exchange was identified as an influencing factor in the export patterns. The reaction of the supply side in the direction of value inducement for exporting goods and services was significant. Alternative descriptive variables are given varied outcomes. The results showed that other non-valuable factors like the prices of participation, cost of labour, and access to recognition performance are important parts of manufacturing and export.

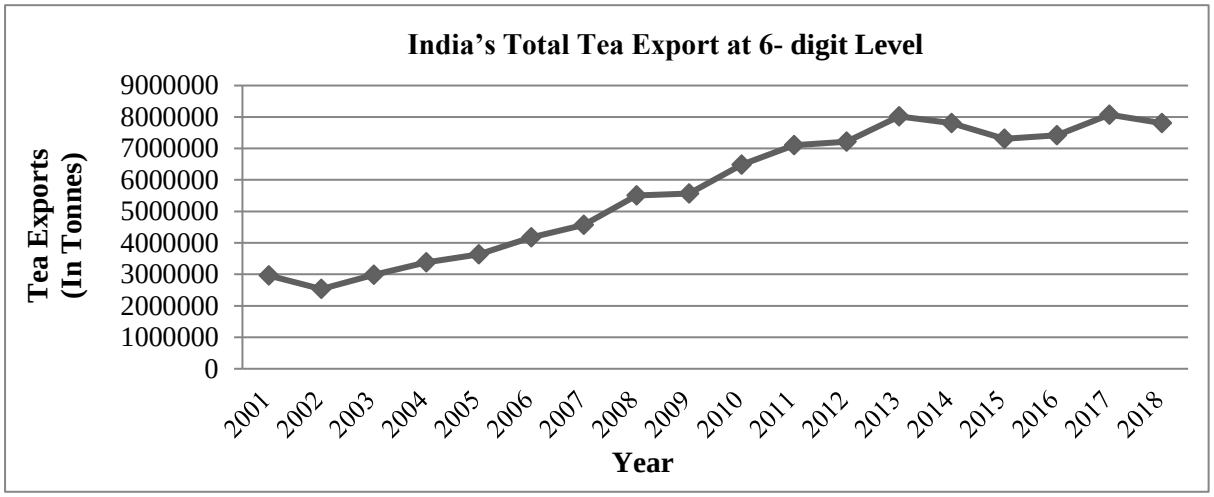
Shrabanti and Maumita (2015) observed tea exports as the basis of exchange rates in India for a long period. India's involvement in world tea manufacturing and distribution declined in recent years. They concluded that the diminishing trend of the growth rate of exports and fluctuations is an issue for the Indian tea market. Tarek and Sultan (2015) analysed the determinants of agricultural export in India. Time-series data were used. ADF and PP tests were used to check the stationary. Co-integration analysis has been done for a long-term link among agricultural exports of India as well as REER, production, demand for agricultural commodities, and per capita income of India. They found that one of the elements that affect export growth is the REER. Muthamia and Muturi (2015) analysed the contributing factors of earnings from the tea trade such as RER (real exchange rate), the inflation rate, and external

revenue. Unit root and co-integration tests were applied to analyse the data. They found external profits have an inverse connection with tea export gains. They suggested that a better monetary policy would support price stability and gains from tea exports. Bala and Sudhakar (2017) examined the overall performance of the export of agricultural goods in India. India's comparative advantage in exports was examined by revealed comparative advantage (RCA). It exhibits an increasing advantage in cotton, maize, fruits, and many vegetables, but decreases in some spices, rice, and wheat. They suggested that yield betterment through growth in TFP (total factor productivity) is a conceivable factor that would affect the creation of exportable investments and improve the conditions of export in India. Sivakumar (2018) used secondary data to analyse the performance of tea industries in South India. He suggested that the government should fix bearable value for tea plants to raise the tea trade of a country towards raising the earnings from the external trade. Uwimana (2018) analysed the causal relationship between tea exports and its determinants. Aggregate savings, revenue of main trading partners, real effective exchange rate (REER), and global market prices of tea were the determinants that influence tea exports.

**Trend Analysis of India's Tea Exports**

Tea is one of the most popular drinks (beverage) in the world. Tea is the 2nd most consumed drink after water globally. India is the 4th largest tea exporter at the global level after China, Sri Lanka, and Kenya. In FY2018 export quantity of Indian tea was USD 785.92 million.

**Figure1. India's Total Tea Export**




***Source**: International Trade Centre-Trade Map*

Figure 1 shows the total tea export of India measured on the -axis whereas time in years on-axis. In 2001-02 the quantity of total tea exports was 29,65,945t and it showed an increasing trend until 2013 then a sudden decline in the quantity of total tea exports was observed from

2013 to 2015. An improvement in the quantity of total tea exports was found from 2015 to 2017.

**Methodology**

This research investigates the relationship between exports of tea products as the described variable and many descriptive variables that influence tea, transfers: REER (real effective exchange rate), total agricultural export, and price of tea and its substitute good i.e., coffee. The secondary data is used from the period 2001 to 2018. The data is fetched from the RBI- Handbook (Reserve Bank of India-Handbook of Statistics on Indian Economy), World Bank-World Development Indicators, Tea Board of India-Tea Statistics and International Trade Centre-Trade Map. To analyse the data, the statistical package E-views are used.

**Model Specification**

This research uses export as a supply function which can be classified as follows:

$$Y_t = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + \cdots\cdots\cdots + u_t$$

Where:

$Y_t$ represents total tea export at time $t$.

$b_0$ is constant.

$x_1$ stands for the price of tea (real producer price of tea) at time t.

$x_2$shows the price of coffee (real producer price of coffee) at time t.

$x_3$indicates the REER (real effective exchange rate) at time t.

$x_4$defines the total export at period t.

$u_t$is the error term.

$b_1, b_2, b_3, b_4$ are coefficients of regressors.

**Test for Stationarity: Augmented Dickey-Fuller Test**

Loosely speaking, all the variables will be stationary if their statistical characteristics (mean as well as variance) do not fluctuate over time. In time series, it is necessary to test the stationarity to enquire about the relationship between all the selected variables. A.D.F. test is a modified version of the Dickey-Fuller test because the error term was unexpected to be white noise.

**Co-integration: Johansen Co-integration Test**

Co-integration explains the long-term and equilibrium association among two or more variables. After applying the A.D.F. test, Johansen's Co-integration test was used for the long-term and equilibrium relationships, assuming that all the variables are stationary on the

same level. Trace Statistics and Maximum Eigen Value are two test statistics that are used in Johansen's co-integration model.

**O.L.S. Method**

The OLS (Ordinary Least Square) method is used for assessing the unknown constraints in a linear regression method.

$$Expt_t = b_0 + b_1 unitP_t + b_2 unitQ_t + b_3 REER_t + b_4 TE_t + u_t$$

Where,

$Expt_t$ represents total tea export at time t.

$unitP_t$ refers to the unit price of tea at time t.

$unitQ_t$ indicates the unit price of coffee at time t.

$REER_t$ shows the real effective exchange rate at time t.

$TE_t$ defines total agricultural export at time t.

$u_t$is an error term.

**Results and Discussion**

To check the stationarity of the selected variables the A.D.F. Test was used. Table 1 demonstrates the outcomes of the A.D.F. test at a level and at first difference. All the variables are verified for stationarity through E-Views. At the level, none of the variables is stationary because the probability values of total tea export (0.7658), the real producer price of tea (0.0805), the real producer of coffee (0.4755), the real effective exchange rate (0.6952) and total exports (0.7544), these values are much higher than the 0.05 significance level of probability.

**Table 1: Results of A.D.F. Test**

| **Variables** | **At Level** | | **At First Difference** | |
|---|---|---|---|---|
| | **P-value** | **t-statistics** | **P-value** | **t-statistics** |
| Total Tea Export | 0.7658 | -0.889679 | 0.0053 | -4.251959 |
| Real Producer Price of Tea | 0.0805 | -2.789986 | 0.0001 | -6.241477 |
| Real Producer Price of Coffee | 0.4755 | -1.569891 | 0.0008 | -5.239938 |
| REER | 0.6952 | -1.087763 | 0.0044 | -4.398370 |
| Total Agricultural Exports | 0.7544 | -0.924564 | 0.0225 | -3.495306 |

Source: *Authors computation*

As a result, we accept our null hypothesis ($H_0$) and conclude that all variables have a unit root. All the variables are stationary at first difference as the probability values of total tea export (0.0053), the real producer price of tea (0.0001), the real producer of coffee (0.0008),

REER (0.0044) and exports of total agricultural products (0.0225), which are less than 0.05 significance levels of probability. Now, these variables can be used to check the long-run equilibrium linkage among the selected variables. Co-integration (Johansen co-integration) test was used to determine whether the selected variables had a long-run equilibrium association and for that, all variables were required to be stationary.

**Results of Johansen co-integration test (Table 2 and Table 3) are as follow:**

**Table 2 Trace Statistics**

| **Hypothesized No. of CE(s)** | **Trace Statistics** | **Eigen Value** | **Critical value of 5%** | **P-value** |
|---|---|---|---|---|
| r = 0 | 126.5676 | 00.974288 | 69.81889 | 00.0000 |
| r ≤1 | 67.99499 | 00.932657 | 47.85613 | 00.0002 |
| r ≤2 | 24.82781 | 00.641090 | 29.79707 | 00.1677 |
| r ≤3 | 8.432871 | 00.264159 | 15.49471 | 00.4203 |
| r ≤4 | 3.525003 | 00.197732 | 3.841465 | 00.0604 |

Source: *Authors computation*

**Table 3 Max-Eigen value**

| **Hypothesized No. of CE(s)** | **Max-Eigen Statistics** | **Eigen value** | **Critical Value of 5%** | **P-value** |
|---|---|---|---|---|
| r = 0 | 58.572610 | 00.974288 | 33.876870 | 00.0000 |
| r ≤ 1 | 43.167180 | 00.932657 | 27.584340 | 00.0002 |
| r ≤ 2 | 16.394930 | 00.641090 | 21.131620 | 00.2026 |
| r ≤ 3 | 4.9078690 | 00.264159 | 14.264600 | 00.7534 |
| r ≤ 4 | 3.5250030 | 00.197732 | 3.8414650 | 00.0604 |

Source: *Authors computation*

There were three co-integrating equations as the p-values are larger than 0.05 (the critical value at 5%). As a result, co-integration connections mirrored the long-term equilibrium association among all the selected variables (i.e., in long-run, all the variables are moving together). As a result, we accept our alternative hypothesis and conclude that there is a long term relationship between tea exports and its determinants.

The results of the O.L.S. method are given in Table-4.

**Table 4 Results of the OLS Model**

**Dependent Variable: Total Tea Export**

| **Variables** | **Coeff.** | **Std. Error** | **t- statistics** | **P-value** |
|---|---|---|---|---|
| C | -259445. | 1675413. | -0.154854 | 0.8793 |
| Real Producer Price of Tea | 5.363133 | 21.09949 | 0.254183 | 0.8033 |
| Real Producer Price of Coffee | 48.55845 | 28.15995 | 1.724380 | 0.1083 |
| Real Effective Exchange Rate | 20359.07 | 18536.65 | 1.098314 | 0.2920 |
| Total Agricultural Export | 0.015073 | 0.001470 | 10.25423 | 0.0000 |

Source: *Authors computation*

The above results are divided into three parts as follows: The first part informs us that the dependent variable is Total tea export. The second part is characterized by relative statistics as a result, this part communicates all the variables used in this research. In this part there are five columns:1) Variables; 2) Coefficient value; 3) Standard Error; 4) T-statistic and 5) Probability. The First Variable is recognised as C which means constant. It is a value of the dependent variable which will take place in the lack of relation to all the variables recognised in this research. After that, we will go to the second variable which is the tea price (Real Producer Price). The coefficient of the tea price is 5.363133. This value means that there is a direct association between the price of tea as well as total tea export with the repercussion that the rise in the price of tea is anticipated to increase by 5.363133 units in total tea export. The value of the standard error regression coefficient is 21.09949 and the value of the t-statistic is 0.254183. After that, the third variable namely the price of coffee (Real Producer Price). The coefficient of the price of coffee is 48.55845. This value means that there is a direct association between the price of coffee and total tea export with the inference that the rise in the price of coffee is forecasted to increase by 48.55845 units in total tea export. The value of the standard error regression coefficient is 28.15995 and the value of the t-statistic is 1.724380. The fourth variable is named REER and its coefficient value is 20359.07 which means that there is a directional connection between the REER and total tea export. The value of the standard error regression coefficient is 18536.65and the value of the t-statistic is 0.2920. The last variable is named total agricultural export. From the results, the coefficient of total agricultural export is 0.015073. This value indicates that there is a directional relationship between total agricultural export and total tea export with the repercussion that an increase in total agricultural export is predicted to increase by 0.015073 units in total tea export. The value of the standard error regression coefficient is 0.001470 and the value of the

t-statistic is 10.25423. The third part named global statistics as the result in this portion does not deal with a particular variable but explains the goodness-of-fit of the identified method or technique to test the relationship of the given variables.

The adjusted R-square (0.98) shows that the variables involved in the model describe 98 percentage variations in tea product exports. The equation can now be rewritten by adding the value of coefficients. Hence, the equation is: -

$$Expt_t = b_0 + b_1 unitP_t + b_2 unitQ_t + b_3 REER_t + b_4 TE_t + U_t$$

$$Total\ tea\ export = -259445.0 + 5.363133\ unitP + 48.5584\ unitQ$$
$$+20359.07\ REER + 0.015073\ TE$$

**Conclusion**

The research focused on determining the pattern of tea exports from India during this period and looks forward to the determining factor of India's exports of tea. There are many factors that influence India's tea exports some of them are tea price, the price of its substitute good, the real effective rate of exchange, and export volume. The price of tea is identified to have an impact on tea export from India, which demonstrates that when the price of tea increases, farmers respond by increasing the amount of tea, they produce, possibly by increasing the strength of their production of variable factors, as well as increasing the amount of tea they export. If the price of tea influences tea export, then the price of its substitute product (the price of coffee) is also established to have an impact on tea export from India. This shows that when the price of the substitute product (the price of coffee) declines, farmers react by increasing coffee quantity possibly by a decline in the strength of the variable factor's production as well as it will reduce tea's export. The real effective rate of exchange was supposed to be a significant factor in manipulating the quantity of goods produced. The direction of the relationship indicates that tea manufacturers must respond to price encouragement well before the exchange rate (Miano, 2010).The Government of India ought to sustain those aspects that affect positively the export of tea like a rise in the price of its substitute good (coffee), good quality production of tea, etc. And try to minimize those factors that negatively affect tea exports like a rise in the price of tea, domestic demand for tea, etc. Concerning the optimistic relationship between tea export, tea price, and tea export volume, the government should ensure that tea-producing states such as Assam, Kerala, Tamil Nadu, West Bengal, etc. attain great tea exports.

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