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Growth, Instability and Competitiveness in Exports of Sugar and Cotton from India

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ABSTRACT

The study examines the growth rate and instability and the comparative advantage of sugar and cotton exports and imports of India during 2001-02 to 2019-20. Findings of the study show that sugar and cotton export from India to the world increased at the rate of 13.54 and 26.93 percent per annum, with high instability index of 48.66 and 47.80 percent during the study periods. In the case of cotton exports, all destinations were found to have positive and significant growth. India's total sugar imports, Brazil supplied around 80 percent during the study period, which registered the highest and most significant growth of 62.89 percent with the highest instability of 75.74 percent. Our cotton imports are of extra long staple variety, which is not produced in sufficient quantity in India. The value of revealed comparative advantage for Brazil and Thailand were greater than India so they were major competitors for India in sugar exports during the study period. In contrast, Exports competitiveness of Indian cotton was increased from 2007 because of the value of RCA registered greater than unity.

HIGHLIGHTS

◉ The value of revealed comparative advantage for Brazil and Thailand were greater than India so they were major competitors for India in sugar exports.

◉ In case of cotton exports all destinations were found positive and significant growth in exports.

Keywords: Growth rate, instability index, exports, Imports and Exports competitiveness

The present paper attempts to study the export performance of two commodities, such as sugar and cotton, over the period 2001-02 to 2019-20. First, we discuss exports performance of sugar. Sugar is the most essential commodity; 80% of the sugar globally is derived from sugarcane rest from sugar beet. India is the second largest exporter of sugar in the world after Brazil in 2020-21. India's total sugar export was 2763 million US dollars. After Brazil, India is the second largest producer, accounting for 17% of global production. India's sugar exports stood at 5.9 million tons in the 2019-20 marketing year, which rose 20 percent to an all-time of 7.1 million tons in the 2020-21 marketing year (Indian Sugar Mills Association). Like sugar, cotton also plays a vital role in India's exports. The country's textile industry is predominantly cotton-based industry. The textile sector is also the second largest employment provider in the country after agriculture, employing over 119 million humankind directly and indirectly (Directorate general of commercial and intelligence, 2020-21). Textiles industry plays a vital role in the Indian economy. The Indian textiles industry contributes around 5% to the country's gross domestic product, 14 % to industrial production, and 11% to total export earnings. The growth and overall development of

the cotton and cotton industry play an essential role in the development of the Indian economy. After USA and Brazil, India is the third most significant exporter of cotton in the world market. The Indian raw cotton, including waste exports, accounted for 1057.82 million US dollars in 2019-20, which is almost doubled from 1897.20 million US dollars in 2020-21. Bangladesh, China, Pakistan, Vietnam, and Indonesia are the major destinations for Indian cotton exports (APEDA). India is also one of the largest importers of cotton in 2019-20, India's total cotton imports are 1528.82 million US dollars (ministry of commerce and industry).

MATERIAL AND METHODS

The growth rate in export and import, as well as comparative advantage, worked out of sugar and cotton. The study was based on the secondary data of exports and imports in value terms from 2001-02 to 2019-20. Data on exports and imports were collected from the Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Commerce and Industry, and Agricultural and Processed Food Product Export Development Authority (APEDA).

1. Growth rates analysis

The compound growth rate of sugar and cotton commodities exports and imports was worked out by using an exponential function of the form as under:

$$Y_t = ab^t \, U_t$$

By taking logarithms on both sides, the equation takes the form.

$$Log \, Y = Log \, a + t \, Log \, b + Log \, U_t$$

Where,

Y_t = Dependent variable (commodity exports and imports)

t = Time (Independent variable t = 1,2 .... *n*)

a = Intercept and

b = Regression coefficient

U_t = Error terms with usual assumptions

Compound growth rate was worked out as follows:

$$C.G.R. \, (r) = [antilog \, (logb) - 1] \times 100$$

Students ' test was used to test the significance of growth rates.

2. Instability analysis

Cuddy-Della index was used for estimating the magnitude of instability in agricultural exports and imports. This index was developed by John Cuddy and Della Valle to measure the instability in time series data (Cuddy and Della Valle, 1978). The magnitude of instability in exports and imports of sugar and cotton was computed by using the following methods:

The instability in exports and imports of cotton and sugar was worked out by the following formula:

$$Instability \, Index \, (I_x) = CV\sqrt{1 - \overline{R}^2}$$

Coefficient of variation (C.V.) was calculated as follows:

Coefficient of Variation (C.V.) =

$$\frac{\text{Standard Deviation } (\sigma)}{\text{Mean } (\underline{X})} \times 100$$

$$CV = \frac{\sqrt{\dfrac{\Sigma(X - \underline{X})^2}{N}}}{\underline{X}} \times 100$$

Where,

Adjusted R^2 = Coefficient of determination

N = No. of observations

The range of the instability index was explained as follows:

Low Instability = between 0 to 15 Per cent

Medium instability = greater than 15 and lower than 30 Percent

High instability = greater than 30 Percent

3. Comparative advantages and competitiveness

To analyze the India's Comparative advantages, Balassa's index of Revealed Comparative Advantage was used. The Revealed Comparative Advantage technique is a measure for identifying the international trade specialization in the extent to which a country has a comparative advantage in a commodity concerning another country or group

of countries. A country's comparative advantage is "revealed" by the value of RCA, if RCA is more than unity, then the country has a comparative advantage, and there is the scope of agricultural trade between India and other countries of the world.

Balassa, 1965 first formulated the original index of RCA and it was computed as:

$$B = \frac{\left(X_{ij} / X_{ik} \right)}{\left(X_{nj} / X_{nk} \right)}$$

Where,

B = RCA

X_{ij} = Exports of country 'i' of commodity 'j'

X_{ik} = Exports of country 'i' of a set of commodities 'k'

X_{nj} = Exports of a set of countries 'n' of commodity 'j'

X_{nk} = Exports of a set of countries 'n' of a set of commodities 'k'

Hence, country 'i' refers to India, commodity 'j' refers to any of the selected commodities, set of commodities 'k' refers to total exported commodities, and set of countries 'n' refers to the world.

Further, the revealed symmetric comparative advantage suggested by Dalum *et al.* (1998) was also calculated because of RCA suffers from the problem of asymmetry as 'pure' RCA is not comparable on both sides of unity, as the index ranges from zero to one if a country is said not to be specialized in a given sector, while the value of the index ranges from one to infinity if a country is said to be specialized.

Revealed symmetric comparative advantage (RSCA) was used in following formula:

$$RSCA = (RCA-1) / (RCA+1)$$

Since this method measures the ranges between -1 and +1 and indicates the free from the skewness problem.

RESULTS AND DISCUSSION

Growth rates in exports of sugar and cotton

The country-wise growth in exports of sugar from India from 2001-02 to 2019-20 is presented in Table 1. Indian sugar finds its biggest market in Sudan among various other destinations globally. Sudan reported the highest growth of 42.27 percent during the study period. Only Sri Lanka (4.57%) and Bangladesh (1.75%) exhibited insignificant and lower growth rates. Both countries levies import duties to protect their domestic sugar industry. The estimated annual compound growth rate of sugar exports from India to the world was 13.54 percent pent during the study period; this growth was found to be highly significant at 1 percent level. This higher growth in Indian sugar exports is due to the lower price of Indian sugar than other competitors. Australia and Brazil dragged India to WTO for its market distorting policies on sugar. They contended that the subsidies, including the farmer assistance, far exceeded the norms set by the WTO, resulting in higher sugar production/exports, which dampened the international prices and, consequently, hurt their domestic producers. India does have freight competitiveness in the Indian Ocean region where major sugar exporters could not supply at a lower price than India due to high transportation costs in the transportation of sugar from the countries like Brazil, Australia, China, European nations etc. (Deokate *et al.* 2013).

Table 1: Growth rate and instability in the export of sugar and by major destinations 2001-02 to 2019-20

Sl. No.	Destination	CGR (%)	Instability
1	Sudan	42.27**	52.43
2	Somalia	34.46*	83.89
3	Sri Lanka	4.57	74.11
4	Iran	31.43*	142.28
5	Bangladesh	1.75	95.79
6	Djibouti	34.80**	69.71
7	Saudi Arab	37.25**	49.05
8	World	13.54**	48.66

** Significant at 1 percent level of significance; * Significant at 5 percent level of significance.

India should focus on the countries of Indian Ocean to enhance its sugar. Sugar and exports to the world revealed a highly unstable of 48.66 percent due to fluctuations in sugarcane prices also led to under or over production of sugarcane during the study period. This is in accordance with the finding of Mishra (2017).

Table 2 showed that the compound growth rate for overall cotton exports from the country was found to be 26.93 percent, which was found to be statically significant at a 1 percent level. China is the largest market for Indian cotton exports, with growth of 33.59 percent. Bangladesh is the second largest destination for Indian cotton, with growth 45.74 percent per annum. Vietnam registered the highest growth by 47.36 percent, followed by other countries like Pakistan (33.67%), Indonesia (26.08%), Belgium (24.67%), Turkey (23.02), Thailand (20.42%), and Taiwan (13.41%) during the period. Countries such as Bangladesh, Vietnam Pakistan, China, and Indonesia are scaling up their cotton imports from India to meet their export-focused garment industries' requirement (Singh *et al.* 2017).

Table 2: Growth rate and instability in export of cotton by major destinations 2001-02 to 2019-20

Sl. No.	Destination	CGR (%)	Instability
1	China	33.59*	93.77
2	Bangladesh	45.74**	41.05
3	Pakistan	33.67*	91.27
4	Vietnam	47.36**	66.94
5	Indonesia	26.08**	50.51
6	Taiwan	13.41*	53.02
7	Thailand	20.42*	56.34
8	Belgium	24.67**	45.36
9	Turkey	23.02*	85.51
10	World	26.93**	47.80

*** Significant at 1 per cent level of significance; * Significant at 5 per cent level of significance.*

Besides, there was positive and significant growth in exports of cotton mainly attributed to the introduction of Bt-cotton, increased irrigation area under cotton, coupled with the successful operation of minimum support price by the Government of India (Beeraladinni *et al.* 2016). There are wide fluctuations in cotton exports to these countries. It was observed that instability index for cotton exports from India was 47.80 percent for the period 200102-2019-20, which was fluctuating in nature. Among the top destinations of Indian cotton exports, Bangladesh was the most stable market by showing the lowest instability at 41.05 percent. After that, Indonesia and Vietnam was (50.51%) (66.94%). China and Pakistan were found to be the unstable markets with a higher instability index of 93.77 and

91.27 percent, respectively, during the study period. A similar trend was observed in raw cotton exports by Parappurathu and Mathur (2008).

Growth rates in imports of sugar and cotton

The estimated annual compound growth and instability in imports of sugar are given in Table 3. India's total sugar imports Brazil supplied around 80 percent during the study period, which registered the highest and most significant growth of 62.89 percent with the highest instability of 75.74 percent.

Table 3: Growth rate and instability in import of sugar from major destinations 2001-02 to 2019-20

Sl. No.	Destination	CGR (%)	Instability
1	Brazil	62.89**	75.74
2	Germany	24.44**	32.93
3	USA	21.10**	27.69
4	China	22.43**	45.90
5	Netherland	11.69**	23.41
6	World	22.56**	57.29

*** Significant at 1 percent level of significance; * Significant at 5 percent level of significance.*

Table 4: Growth rate and instability in import of cotton from major destinations 2001-02 to 2019-20

Sl. No.	Destination	CGR (%)	Instability
1	USA	19.45**	66.20
2	Australia	13.69	181.07
3	Egypt	1.74	33.50
4	Mali	14.76	102.15
5	Cote D Ivory	14.76*	91.14
6	World	8.06**	54.96

*** Significant at 1 per cent level of significance; * Significant at 5 percent level of significance.*

It is evident from Table 4. USA, Australia, Egypt, Mali, and Cote D Ivory are major cotton suppliers, which account for around 70 percent of total cotton imports. USA and Cote D Ivory registered significant growth of 19.45 and 14.76 percent, whereas other suppliers showed insignificant growth. The cotton imports to the world revealed growth of 8.06 percent with high instability index of 54.16. All suppliers showed a high degree of instability due to price fluctuation in the world market. India imports extra long staple cotton, which is not produced in sufficient quantity in India. It is extra fine cotton

that is used for making superior cotton fabrics. Extra long staple made fabrics look more white, smooth, strong, and expensive than other varieties (Molier 2017).

Competitiveness in exports of sugar and cotton

It was revealed from Table 5, that India, Brazil, Thailand, and Guatemala showed comparative advantage during the study period. However, estimated RCA values of these countries fluctuated over the period. The RCA estimate for Indian sugar was 2.86 in 2001, which rose to 34.36 in 2007. A significant dip in competitiveness between 2013 and 2019 was evident from a lesser RCA value of 1.05 and 4.17. The primary reason behind this drop in exports is the availability of surplus sugar in the world sugar market and better quality sugar accessibility from Thailand at a competitive price. But these countries' RCA values were greater than India in later years. Brazil and Thailand were immediate competitors for India in sugar exports. A similar result was found by (Kumar, and Sheetal 2013), (Chaudhary and Kumar 2016).

Table 5: RCA and RSCA estimate sugar exports for India and other major world exporters

Country	Year			
	2001	2007	2013	2019
Balassa RCA				
India	2.86	34.36	1.05	4.17
Brazil	7.05	64.61	6.84	5.25
Thailand	3.84	39.11	4.44	7.11
France	1.41	12.21	0.83	0.96
Guatemala	9.14	72.75	11.26	11.56
Mexico	0.25	13.54	2.62	1.45
RSCA				
India	0.48	0.94	0.02	0.61
Brazil	0.75	0.97	0.75	0.68
Thailand	0.59	0.95	0.63	0.75
France	0.17	0.85	-0.09	-0.02
Guatemala	0.80	0.98	0.84	0.84
Mexico	-0.60	0.86	0.45	0.18

Exports competitiveness of Indian cotton was increased in 2007 (Table 6), because of value of RCA registered as greater than unity. The exports of cotton from India did not enjoy any comparative advantage until 2001. However, by 2007, 2013, and 2019, India was at a better position with RCA values of 11.21, 8.59, and 3.59, respectively.

Table 6: RCA and RSCA estimate cotton exports for India and other major world exporters

Country	Year			
	2001	2007	2013	2019
Balassa RCA				
India	0.07	11.21	8.59	3.53
USA	2.69	4.28	3.12	4.62
Brazil	0.68	0.96	1.10	3.56
Australia	3.91	1.50	6.38	0.02
Greece	7.12	4.23	6.29	9.08
Benin	57.40	40.70	58.62	83.19
RSCA				
India	-0.87	0.84	0.79	0.56
USA	0.46	0.62	0.52	0.64
Brazil	-0.19	-0.02	0.05	0.56
Australia	0.59	0.20	0.73	-0.97
Greece	0.75	0.76	0.73	0.80
Benin	0.97	0.95	0.97	0.98

Benin registered the highest value of RCA and RSCA among all the competitors during the overall study period. USA, Greece, and Benin were reported major competitors of India for cotton exports. In the case of cotton exports, Bangladesh, China, Pakistan, Vietnam, and Indonesia are the major destinations which import nearly 90 percent of India's total cotton during the study periods (Singh *et al.* 2020).

CONCLUSION

The result indicated that there is higher growth in Indian sugar exports due to the lower price of Indian sugar than other competitors. India has a distinct advantage of its geographical location. Major competitors for Indian sugar exports are Brazil, Thailand, Germany, Australia, China, and USA. India registered high growth in sugar imports because Indian sugar mills import Brazilian raw sugar, refine, and sell it. Our cotton imports are of extra long staple variety, which is not produced in sufficient quantity in India. All the destinations showed a high degree of instability in exports and imports for sugar and cotton. The values of Revealed comparative advantage for Brazil, Thailand, and Guatemala has greater than India, so they were immediate competitors for India in sugar exports. In the case of cotton, India's RCA value declined over the year.

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