Performance of Global Trade of Indian Silk in Post-Liberalization Era

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ABSTRACT: This paper examines the growth, instability and concentration of major silk goods exported from India. The time series data on export earnings of Indian silk goods from 1990-91 to 2020-21 were used for computation of growth, instability and concentration. The study period was divided into two parts representing pre-liberalization (1990-2004) and post-liberalization (2005-2020) periods in global T&C trade. The results indicate that the natural silk yarn, raw silk, fabrics and made ups, readymade garments recorded positive growth rates during the pre-liberalization period. But the growth of majority of silk goods turned to negative during the post-liberalization period. Silk wastes had the highest instability in export earnings followed by natural silk yarn and raw silk. The finished goods such as fabrics and made-ups, readymade garments and silk carpets had relatively less instability in the export earnings during the pre-liberalization period. The aggregate instability index for the post-liberalization period was less than pre-liberalization period, which indicates that the second period recorded lesser but more stable growth than the first period. The country-wise analysis shows that Sudan had the highest growth and instability followed by Nigeria, China, Australia and USA. The Hefindhal index and Herschman index values increased gradually during 1990-91 to 1999-00 and remained high till 2010-11 indicating that the silk export earnings were getting concentrated with less diversified products. But relatively less concentration indices in the subsequent period indicated more diversification of the exports.

Keywords: Growth, Instability, Concentration, Hefindhal index, Herschman index, Diversity Measures.

INTRODUCTION

Export is an important source of foreign exchange and plays a crucial role in the growth of a country's economy (Poudyal, 1988). India ranks second position in the exports of textiles and garments with a global share of 5%. Silk is one of the oldest fibers produced in India. India is the second largest producer and the largest consumer of silk in the world. In India, sericulture is considered as an important tool for rural development considering its employment and income generation potentials. The export of silk products from India was Rs. 1466.66 crores (US$ 198.30 million) in 2020-21, which accounted for 0.07 % of country's total export earnings. Though India is a major producer of raw silk, India's silk trade in the global market is not significant as major chunk of Indian silk production (about 85%) is primarily catering to the domestic market and Indian silk does not have adequate positive brand image in the international market (Roy, 2016). However, India has huge advantages in increasing its silk exports considering the fact that India is the only major silk producer apart from China in competitive price (Anjum and Khan, 2017).

The Textile & Clothing (T&C) trade was the most protected of all manufacturing industries in the global economy for about 50 years by creating various protectionist instruments such as quota limiting imports of textiles. However, T&C trade underwent substantial changes after implementation of Agreement on Textiles and Clothing (ATC) based on Uruguay Round of Multilateral Trade Negotiations (1986-93), which set a timeline for phasing-out the quota system over a ten year period from January 1995 to December 2004 to remove all types of quantitative restrictions in T&C trade and fully merge with the General Agreement on Tariffs and Trade (GATT). During the quota regime, textiles exports from India were slapped with quantitative restrictions by the developed countries limiting its T&C exports. Though the complete phase-out of quotas has provided opportunities for increasing

textile exports, the competition in the global T&C industry has intensified (Kim, 2019). There has been hardly any comprehensive study to analyze how the silk trade reoriented and adjusted to global trade liberalization in T&C. In this context, a study has been taken to analyze how Indian silk trade has performed after trade liberalization. The specific objectives of the study are as follows:

1. To analyze the trend and instability of trade of silk goods from India during the post-liberalization era.

2. To determine concentration/diversification of export earnings of selected silk goods from India after trade liberalization.

METHODOLOGY

The study was based on the time series secondary data on exports of silk commodities obtained from various publications of Central Silk Board, India. The required data for the present study was collected for the period between 1990-91 and 2020-21for an empirical analysis of growth and instability in export of silk products from India. In order to compare the performance of silk trade before and after conclusion of ATC, the study period was further divided into two sub-periods, viz. pre-liberalization period in global T&C trade(1990-91 to 2004-05) and post-liberalization period in global T&C trade (2005-06 to 2020-21).

Growth Rate Analysis. In the present study, the compound growth rate is computed for export of silk goods by using the exponential growth function of the form (Mote and Sananse, 2014).

$$Y_t = a\, b^t \qquad (1)$$

Where,

Y_t = Dependent variable for which growth rate is estimated

a = Intercept

b = Regression coefficient

t= Time variable

The compound growth rate is obtained for the logarithmic form of equation (1) as below:

$$\text{Log } Y_t = \text{Log } a + t \text{ Log } b \qquad (2)$$

Thus compound growth rate (g) in % is computed as

$$g = [(\text{antilog of } b) - 1) *100] \qquad (3)$$

Significance of growth rate was judged by Student's t-test.

Instability Analysis. The instability can be measured by different methods such as the coefficient of variation (CV), dispersion, Cuddy Della Valle index, Coppock instability index, etc. The present study applies the Cuddy Della Valle index (C-D index) for measuring the instability. C-D index first de-trends the given series and gives a clear direction about the instability. The use of coefficient of variation as a measure to show the instability in any time series data has some limitations. If the time series data exhibit any trend, the variations measured by CV can be overestimated, that is if the exports grow or decline at a constant rate, the instability

estimated using CV would exhibit higher values. As against that, C-D index attempts to de-trend the CV by using coefficient of determination (R^2). Thus it is a better measure to capture instability in exports (Ayalew and Sekar, 2016).

A low value of C-D index indicates the low instability in exports and *vice-versa*. C-D index was originally developed by Cuddy and Valle (1978) for measuring the instability in time series data that is characterized by trend. The estimable form of the equation is as follows:

$$CV = \frac{-}{\mu} \times 100 \qquad (4)$$

Where,

= Standard deviation of the variable

μ= Mean value of the variable

In the formula suggested by Cuddy and Valle (1978) to compute the index of instability, CV is multiplied by the square root of the difference between the unity and coefficient of determinations (R^2) in the cases where R^2 is significant. This can be expressed in a formula as follows:

$$\text{Index Instability (CD)} = CV \sqrt{(1 - R^2)} \qquad (5)$$

The present study also attempts to compute the instability of exports by using the trend line measure, based on the average percent deviation of the observed values proceeds from an exponential path (Paudyal, 1988). The instability index (II) can be expressed by the formula.

$$II = \text{Absolute} \left[\frac{X_t - \hat{X}_t}{\overline{X}} \right] \times 100 \qquad (6)$$

Where, II = Instability index, X_t = Actual value of exports in the year t, $\hat{X}_t$ =Estimated value of exports for the year t by using the exponential trend method, and $\overline{X}$ =Mean of the variable

Measures of Concentration

The present study has used concentration indices such as Herfindahl Index (HI) and Hirschmann Index to workout export diversification.

1. Herfindahl Index (HI): It is the sum of square of the proportion of individual activities in a portfolio. With an increase in diversification, the sum of square of the proportion of activities decreases, so also the indices (HI). This is a measure of concentration, alternately an inverse measure of diversification. The mathematical formula for calculating the index is as follows,

$$\text{Herfindahl index (HI)} = \quad P_i^2 \qquad (7)$$

Where P_i is the share of country 'i' in the world export trade of silk goods.

$$P_i = \frac{X_i}{\Sigma X_i} \qquad (8)$$

The Herfindahl index is bound by zero resulting with complete diversification and to one indicating complete specialization as shown in Table 1.

Table 1: Range of Herfindahl index and its concentration level.

Herfindahl Index	Concentration Level
<0.01	Perfect equality
0.01-0.15	Low
0.15-0.25	Moderate
=>0.25	High

2. Hirschmann Index: The index of commodity concentration was also calculated by employing Gini or Hirshman coefficient of concentration (Hirschman, 1945). The Hirshman's Index (H(x)) is computed by means of the following formula

$$H(x) = \sqrt{\sum_{r=1}^{n} P_i^2} \qquad (9)$$

Where P_i is the share of country 'i' in the world export trade of silk goods as shown in equation (8), and n is the number of countries.

The index, which ranges between 0 and 1 helps to identify the structure of markets. An index value of 1 indicates a monopoly and a value of 0 represents perfect competition.

Trend Value of Concentration and Diversification: The estimated indices by Herfindahl index have been taken as dependent variables and time has been taken as independent variable, trend values are measured through regression model.

$$Y = a + bt \qquad (10)$$

Where, Y is Concentration Indices and t is time component.

RESULTS AND DISCUSSION

The Indian silk exports increased from Rs.439.53crores in 1990-91 to Rs. 1466.60 crores in 2020-21, registering a compound growth rate of 4.81% per year (Table 2). A comparative analysis of the two study periods indicates that there was a positive growth in silk exports from 1990-91 to 2005-06 but declined in the subsequent period. Silk fabrics & made ups and readymade garments are the major items of India's export basket, which accounted for 80.39% of the total value of exports in 2020-21. As the demand-supply gap is large in raw silk production, India has an import dependency in raw materials such as raw silk and natural silk yarn. Therefore, India exports primarily the finished goods such as readymade garments, fabrics & made-ups and silk carpets, which grew at a rate of 6.61%, 4.50% and -3.82%, respectively during the period between 1990-91 and 2020-21. Silk waste is a by-product of silk reeling industry, the exports of which has been witnessing a strong growth during the last few years due to strong demand for it from China (Kumaresan and Indumati 2008).

Table 2: Growth and instability in Indian silk exports during the period between 1990-91 and 2020-21.

Product	Export Value (Crore Rs)			CAGR% (1990-91 to 2020-21)	C-D Index (1990-91 to 2020-21)
	1990-91	2005-06	2020-21		
Raw silk	-	1.57	1.44	19.96**	66.18
Natural silk yarn	-	66.64	27.93	31.52**	59.63
Fabrics & made-ups	280.11	2160.67	729.50	4.50**	40.67
Readymade garments	104.94	842.06	449.56	6.61**	30.10
Silk carpets	49.88	103.36	107.56	-3.82*	53.05
Silk waste	4.59	19.90	150.61	12.75**	68.14
Total	**439.53**	**3194.20**	**1466.60**	**4.81****	**31.38**

Note: ** Significant @ 1%, *Significant @ 5%.

The Instability analysis helps to assess the volatility in exports of silk goods. Silk waste with a C-D index of 68.14 had the highest instability among the silk goods exported from India, followed by raw silk (66.18) and natural silk yarn (59.63) (Kumar and Jain 2013).

Growth in exports of silk goods. The growth rates of exports of different types of silk goods during pre and post-liberalization periods are given in Table 3. The overall growth rate of the total silk exports was 14% during the pre-liberalization period, but turned to negative (-4.11%) during the post-liberalization period. The Indian silk exports were severely impacted after the great recession (2007-2009), which melted down the economy of the USA and many countries in Europe. As silk is a high income elastic commodity, the exports earnings from silk goods was affected due to economic slowdown caused by the recession in Europe and the USA, which are the major markets for Indian silk (Kumaresan, 2016). Umesh et al., (2009) reported that the Indian silk exports suffered severely during post-WTO era due to lack of competitiveness. Kumaresan (2016) also reported a reduction in export competitiveness of Indian silk products during 2014 compared to 2010.

Besides, as the prices of raw silk yarn/fabrics have significantly increased making the products unaffordable for major section of buyers in the domestic as well as in the international markets, the demand is shifting towards other cheaper blends of silk with synthetic and polyester fabrics, which look like pure silk fabrics and other low cost fabrics (Kim, 2019).

Table 3: Growth rates of export of silk goods for the pre and post-liberalization.

Product	CAGR (%)		
	Pre-liberalization period	Post-liberalization period	Entire period
Raw silk	82.03**	-9.34**	19.96**
Natural silk yarn	137.74**	-7.69*	31.52**
Fabrics &made-ups	12.08**	-6.57*	4.50**
Readymade garments	12.75**	-1.19*	6.61**
Silk carpets	6.93**	-3.15*	-3.82*
Silk waste	8.76**	19.84**	12.75**
Total	**14.00****	**-4.11***	**4.81****

**Note: ** Significant @ 1%, *Significant @ 5%.

While closely analyzing the commodity-wise growth rates during pre and post-liberalization periods, it is observed that the natural silk yarn and raw silk registered very high growth of 137.73% and 82.03%, respectively during the pre-liberalization period but on very low base in the initial years. The major items of the exports, fabrics & made ups and readymade garments recorded substantial growth rates of 12.75% and 12.05%, respectively during pre-liberalization. The exports of silk carpets and silk waste also grew positively during the pre-liberalization period (Pichad *et al*, 2014).

The export earnings of all the items except silk waste witnessed negative growth during the post-liberalization period. The exports of silk waste grew at a higher rate of 19.84% in the post-liberalization period compared to 8.76% in pre-liberalization period. The growth in export of silk waste is due to increasing demand for silk waste from China during the recent years. Increasing exports of silk waste is not a good sign for India. As the silk waste is the raw material for spun silk factories, the increasing export demand for silk waste adversely affects the availability of silk waste at a competitive price for domestic spun silk mills and raises the question of their sustainability as economically viable units (Malhotra and Pinky, 2012).

Instability in exports of silk goods. Irregular and sudden variations in exports creates the unfavorable impact on the overall growth of Indian silk industry as fluctuating income to the domestic producers causes uncertainty on investment decisions. The pattern of export instability ultimately depends upon growth and changing composition of export sector (Altman, 1980). C-D index and trend line instability index were used in the present study to compute the instability in the export earnings from silk during the pre and post-liberalization periods and the results are presented in Table 4. Overall, the export instability computed by C-D index method and trend line method were similar in pattern and there was no significant difference in the results (Tewari *et al.,* 2017).

Table 4: Instability in silk exports during pre and post-liberalization periods.

Product	C-D Index			Trend line Instability Index		
	Pre-liberalization period	Post-liberalization period	Entire period	Pre-liberalization period	Post-liberalization period	Entire period
Raw silk	44.95	55.35	66.18	26.87**	37.25**	35.61**
Natural silk yarn	56.91	28.66	59.63	31.67**	16.30**	40.09**
Fabrics & made-ups	33.06	9.97	40.67	17.22**	7.08*	20.74**
Readymade garments	31.99	20.17	30.10	18.56**	11.72*	16.55**
Silk carpets	21.56	79.34	53.05	14.18*	22.26**	28.18*
Silk waste	98.75	34.87	68.14	42.33**	13.00*	34.37**
Total	**16.39**	**9.92**	**31.38**	**12.10****	**7.56****	**13.39****

**Note: ** Significant @ 1%, *Significant @ 5%.

Silk waste had the highest instability in the growth in export earnings during the pre-liberalization period followed by natural silk yarn and raw silk. The finished goods such as fabrics& made-ups, readymade garments and silk carpets had relatively less instability in the export earnings during the pre-liberalization period. The aggregate instability index for the post-liberalization period was less than pre-liberalization period, which indicates that the second period recorded lesser growth with more stability compared to the first period. The export instability increased drastically for silk carpets during the post-liberalization period compared to pre-liberalization period, as the fluctuations in the export earnings from silk carpets increased significantly during the later period. The stability in the growth of export earnings from silk waste increased significantly during the post-liberalization period (Joshi and Singh 2015).

Growth and instability in country-wise silk exports. An analysis of export of Indian silk to the major destinations was attempted to get an overall idea about the Indian silk export market. The growth rates and instability in silk exports for the top 10 importing countries during 2011-12 to 2020-21 are presented in Table 5.

Table 5: Growth and instability in silk exports for top 10 countries[#].

Country	Export Value (Crore Rs.)			CAGR%	C-D Index
	2011-12	2015-16	2020-21		
U.S.A.	452.68	340.37	488.16	1.21**	26.10
U.A.E.	250.93	606.76	192.15	-5.35*	42.62
China	44.86	89.48	142.85	9.53**	18.44
U.K.	245.03	155.84	60.06	-13.06**	9.23
Nigeria	13.08	122.31	51.19	10.30**	44.88
Australia	46.11	27.67	49.49	3.36*	20.47
France	120.96	90.43	44.97	-9.79*	12.27
Germany	131.02	73.03	43.06	-10.42*	14.61
Sudan	7.87	74.82	42.91	12.75*	45.09
Italy	140.88	79.58	37.38	-12.72*	11.02

Note: # Top 10 countries refers to 2020-21; ** Significant @ 1%, *Significant @ 5%.

The silk exports to the USA, the largest importer of Indian silk products, recorded a modest growth (1.21%) with a moderate stability. The traditional markets for Indian silk goods such as the UAE, the UK, France, Italy and Germany recorded negative growth for silk exports from India during the post-liberalization period (Mahir and Abdelaziz, 2011). On the other hand, Indian exports to the non-traditional markets such as China, Sudan, Nigeria and Australia recorded positive growth in silk exports during post-liberalization period. The silk exports to China recorded a positive growth rate of 9.53% with a less instability compared to exports to other countries, as the exports was concentrated with only silk waste. Though the exports to Nigeria and Sudan grew better than other markets, the growth was characterized with high fluctuations compared to other markets (Devkota, 2004).

Concentration of silk exports. More concentration of a country's exports on a narrow range of products would lead to more fluctuations in export performance and earnings, which would in turn adversely affect the growth of the silk industry. The concentration of Indian silk exports was measured using Hefindhal and Herschman indices and the results are presented in Table 6. It can be inferred from the table that index values of Indian exports were extraordinarily high, as only very few items were considered for working out the values, and the concentration index values are highly sensitive to the level of aggregation. The Hefindhal index increased from 0.48 in 1990-19 to 0.51 in 1999-00. Similarly, Herschman index increased from 0.69 to 0.71 during the period indicating the export earnings generated from silk were getting concentrated with less diversified products. The Hefindhal index and Herschman index were in the range of 0.51 to 0.56 and 0.72 to 0.76, respectively during the period between 2002-03 and 2010-11 implying that the export earnings were derived from fewer commodities or less diversified commodities in the period. But in the subsequent period, the value of Herfindhal Index and Hirschmann Index reduced gradually to reach 0.36 and 0.60, respectively during 2020-21indicating reduced concentration or more diversification of the exports during the recent years.

Table 6: Concentration of silk exports during pre and post-liberalization periods.

Year	Pre-liberalization period		Year	Post-liberalization period	
	Hefindhal Index	Herschman Index		Hefindhal Index	Herschman Index
1990-91	0.48	0.69	2005-06	0.53	0.73
1992-93	0.47	0.68	2006-07	0.54	0.74
1992-93	0.47	0.68	2007-08	0.54	0.73
1993-94	0.46	0.68	2008-09	0.53	0.73
1994-95	0.48	0.69	2009-10	0.54	0.73
1995-96	0.49	0.70	2010-11	0.59	0.77
1996-97	0.50	0.70	2011-12	0.51	0.72
1997-98	0.46	0.68	2012-13	0.49	0.70
1998-99	0.48	0.69	2013-14	0.47	0.69
1999-00	0.51	0.71	2014-15	0.45	0.67
2000-01	0.40	0.63	2015-16	0.45	0.67
2001-02	0.35	0.59	2016-17	0.43	0.65
2002-03	0.56	0.76	2017-18	0.43	0.66
2003-04	0.54	0.73	2018-19	0.39	0.63
2004-05	0.53	0.73	2019-20	0.41	0.64
			2020-21	0.36	0.60

The concentration indices were also worked out for India's silk exports to its top 10 countries namely the U.S.A., the U.A.E., China, the U.K., Nigeria, Australia, France, Germany, Sudan and Italy and the results are shown in Table 7. The Hefindhal index has increased from 0.13 in 2011-12 to 0.16 in 2020-21 and the Hirschmann index increased from 0.36 to 0.39 in the same period indicating increasing the concentration of India's silk exports to those countries.

The trend lines were estimated by considering the concentration index as response variable and time line as predictor variable to understand the pattern of growth in export concentration over the period between 1990-91 and 2020-21. The coefficients of both the regression equations are insignificant, which show no impact of time on concentration or diversification of export value of silk goods (Table 8). Low R-square values and non-significant F statistics at 5% level indicate poor goodness of measure (Parihar, 2019).

Table 7: Concentration of silk exports for top 10 countries.

Year	India's export share with top 10 countries	Hefindhal Index	Hirschmann Index
2011-12	0.62	0.13	0.36
2012-13	0.61	0.12	0.35
2013-14	0.63	0.13	0.36
2014-15	0.63	0.15	0.39
2015-16	0.67	0.13	0.36
2016-17	0.68	0.14	0.37
2017-18	0.68	0.12	0.35
2018-19	0.69	0.11	0.33
2019-20	0.72	0.17	0.41
2020-21	0.79	0.16	0.39

Table 8: Results of trend line regression of concentration indices.

Index	Coefficients					ANOVA		
	Constant	B Coeff. (Time line)	t Stat	P Value	Equation	R Square	F Stat	P Value
Hefindhal Index	0.434	0.002	0.246	0.808	$Y_t = 0.434+0.002Xt$	0.002	0.06	0.808
Herschman Index	0.656	0.001	0.316	0.754	$Y_t = 0.656+0.001Xt$	0.004	0.100	0.754

CONCLUSION

The present study analyzes the performance of exports of Indian silk during the post-liberalization era in terms of growth, instability and concentration of exports. The silk exports grew at a decent rate of 14% per annum during the pre-liberalization period (1990-91 to 2004-05), but turned to negative (-4.11%) during the post-liberalization period. Major steps need to be taken for revival of growth in silk exports. The Indian silk exporters should concentrate on fashion, technology, quality and services and compete in the major silk consuming markets. New products can be explored out of silk according to the tastes and preferences of international markets. The Indian exporters should also actively participate in trade fairs, conduct personal visits and concentrate on customer relationship with the buyers for promoting their products in the international market. The Indian government should promote the image of 'Indian silk' in the global market by highlighting its unique craftsmanship and designs. The silk exports to the traditional markets such as the USA, Germany, France, Italy, UK etc., have reduced in the recent years. But the silk exports were more concentrated to the top exporting destinations. The exporters should explore new markets and expand the basket of products offering to diversify the market and reduce the export related risks (Chand and Raju, 2009). Demand-supply gap in raw silk in the country and inadequate production of quality raw silk adversely affect the competitiveness of Indian silk in the international market. Efforts should be made to increase the production of quality raw silk in the country to become self-reliance in the production of raw silk and increase the silk exports.

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