

RESEARCH PAPER

Export competitiveness and direction of trade of Indian cotton

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ABSTRACT

Cotton is an important fibre crop of India which plays a dominant role in the country's economy by meeting the domestic and export demands. It contributes significantly to both agriculture and industry in terms of farm income, employment and export earnings. India, despite being the second largest producer of cotton in the world, has not exploited its potential to emerge as a major player in the world raw cotton exports. Exports of yarns, textiles and clothing to the world market are increasingly important source of derived demand for Indian cotton. Although domestic demand accounts for most Indian cotton consumption, growth in textiles and clothing exports is outpacing domestic demand and is increasingly important determinant of overall cotton and fibre demand in India. India's exports have been rising sharply in the past few years. Export was highest in 2007-08 accounting 80 lakh bales. It declined in 2008-09 to 50 lakh bales due to recession led lower demand. In 2009-10, the export was 65 lakh bales within short period. Several factors have contributed to the variability in exports; these included large domestic consumption, fluctuations in production due to vagaries of weather, competition from other cotton growing countries and insufficient exportable surplus of cotton production during certain years and the absence of a steady export policy. Primarily, the export of cotton depends on domestic production and government's intervention in its export trade. Under such a scenario, it is appropriate to examine the export competitiveness and direction of exports to various markets with a suitable econometric model, which may help us to quantify the shifts in the shares to different markets as well as between the markets over a period of time. In the era of globalization, foreign trade policies have given high importance in boosting agricultural exports. This has resulted in cut-throat competition among nations in the trade scenario of various commodities and in this connection a country's exports will be decided by its efficiency in trade promotion and its price competitiveness. Therefore, the main objective of this study was to analyse the dynamics of changes in the export of cotton from India by estimating the probability of retention and switching pattern by employing Markov chain model.

KEY WORDS : Cotton, Export, Markov chain analysis, Trade

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Cotton (*Gossypium* spp.), "the King of fibres" is multipurpose crop grown under various agro-climatic conditions. It is primarily used by the textile industry to produce thread, fabrics, linen and apparel. Cotton, also known as 'white gold' enjoys a predominant position amongst all cash crops in India. The major producers of cotton are China, India, USA,

Pakistan, Uzbekistan, Argentina, Australia, Greece, Brazil, Mexico and Turkey. These countries contribute about 85 per cent to the global cotton production. It is an important agricultural commodity, heavily traded in more than 150 countries. In many developing and underdeveloped countries, cotton exports are not only a vital source for generating foreign exchange earnings, but also account for a significant proportion of their GDP and tax revenue, leading to significant economic and social development. Out of the 53 African countries, 37 countries are producing cotton and 30 of them are exporters.

India, the second-largest producer of cotton, cotton yarns and textiles, is poised to play an increasingly important role in global cotton and textile markets as a result of domestic and multilateral policy reforms. With large exportable surpluses and low prices, dramatic increase in cotton production after the introduction of Bt seeds, India has emerged as one of the world's leading cotton exporters. India's exports have been rising sharply in the past few years. Export was highest in 2007-08 accounting 80 lakh bales. It declined in 2008-09 to 50 lakh bales due to recession led lower demand. In 2009-10, the export was 65 lakh bales within short period. As the domestic price rose to new heights, the mills sought for banning the export. Growing concerns in the textile industry over rising cotton exports have caused the Government to initiate various cotton export control measures over the past three years including the abrupt March 5, 2012 ban on cotton exports.

While the Government of India announced a cotton ban on March 5, 2012, the government was reviewing export registration certificates and "let export orders" (cotton that had effectively been exported at the time the ban was announced) to determine how much additional cotton can be exported. No new additional export registrations were being approved and this report assumed that existing policy parameters would be in place through September 30, 2012.

METHODOLOGY

In the present study Nominal Protection co-efficients (NPCs) were worked out to analyse the export competitiveness of cotton from India and the structural changes in export proportion of Indian cotton to the major destinations such as China, Pakistan, Bangladesh, Indonesia, Vietnam and other countries were analysed

by employing first order Markov chain model. The transitional probability matrix was computed for export of cotton.

Nominal protection co-efficient :

Nominal protection co-efficient is a direct measure of competitiveness of a country towards a commodity in the context of free trade. The nominal protection Co-efficient (NPC) is defined as the ratio of the domestic price to the world reference price of the commodity under consideration.

Symbolically,

$$NPC = Pd / Pr$$

where,

NPC = Nominal protection co-efficient

Pd = Domestic price of the commodity in question

Pr = World reference price of the commodity in question *i.e.*, what the farmer would have received in case of free trade.

A decision criterion is, if NPC is less than one, then the commodity is competitive (under importable hypothesis it is considered a good import substitute and under exportable hypothesis, it is worth exporting). If NPC is greater than one, the commodity is not competitive (not a good import substitute or not worth exporting). The domestic price is normally the wholesale market price of commodity in the selected market. The reference price is the international price adjusted for transfer cost, marketing and trading margins including the processing charges necessary to make the commodity equivalent to the internationally traded commodity.

These co-efficients are estimated under two scenario *viz.*, import scenario and export scenario. Under importable scenario, the competition is deemed to take place at the domestic port and therefore international and domestic transportation cost accord a natural protection to the domestic commodity.

Under exportable scenario, the competition is assumed to take place at foreign port and therefore domestic commodity has to be extra efficient to the tune of international transportation costs at least. These two hypotheses, therefore, yield different estimates of protection. If the Nominal Protection co-efficient (NPC) is less than one then it is worth to export the commodity (Mahesh, 2012).

In the present study Nominal Protection Co-efficient (NPC) was estimated under the exportable hypothesis

for the year 2014. Based on opinion of exporters, marketing margin was taken at 5 per cent of wholesale price and insurance was taken at 2 per cent.

Markov chain model :

The major cotton importing countries from India are China, Pakistan, Bangladesh, Indonesia and Vietnam. Annual export data of raw cotton was used for analysing the direction of trade and changing pattern of Indian cotton export.

The trade directions of Indian cotton exports were analysed using the first order Markov chain approach. The lingo software was adopted to study the transition probability matrix. Central to Markov chain analysis is the estimation of the transitional probability matrix ‘P’ whose elements, P_{ij} indicate the probability of exports switching from country ‘i’ to country ‘j’ over time. The diagonal element P_{ij} where $i=j$, measures the probability of a country retaining its market share or in other words, the loyalty of an importing country to a particular country’s exports.

Annual export data for period 2000-01 to 2013-14 were used to analyse the direction of trade and changing pattern of Indian cotton export. The data from 2000-01 to 2011-12 were real time data and for the analysis point of view 2012-13 and 2013-14 were estimated and used in the analysis. In this context, major cotton importing countries viz., China, Pakistan, Bangladesh, Indonesia, Vietnam ; remaining countries clubbed as other countries. The average exports to a particular country was considered to be a random variable which depends only on the past exports to that country, which can be denoted algebraically as

$$E_{jt} = \sum_{i=1}^n [E_{i,t-1}] P_{ij} + e_{jt}$$

where,

E_{jt} = Exports from India to the j^{th} country in the year t

$E_{i,t-1}$ = Exports of i^{th} country during the year t-1

P_{ij} = The probability that exports will shift from i^{th} country to j^{th} country

e_{jt} = The error term which is statistically independent of $E_{i,t-1}$

n = The number of importing countries

The transitional probabilities P_{ij} , which can be arranged in a (c x n) matrix, have the following properties.

$$\sum_{i=1}^n P_{ij} = 1 \text{ and } 0 \leq P_{ij} \leq 1$$

Thus, the expected export share of each country during period ‘t’ is obtained by multiplying the exports to these countries in the previous period (t-1) with the transitional probability matrix. The probability matrix was estimated for the period 2000-01 to 2013-14.

Thus, transitional probability matrix (T) is estimated using linear programming (LP) framework by a method referred to as minimization of Mean Absolute Deviation (MAD).

$$\text{Min. } OP^* + I e$$

Subject to

$$X P^* + V = Y$$

$$GP^* = 1$$

$$P^* \geq 0$$

where

P^* is a vector of the probabilities P_{ij}

O is the vector of zeros

I is an appropriately dimensioned vector of area.

e is the vector of absolute errors

Y is the proportion of exports to each country.

X is a block diagonal matrix of lagged values of Y

V is the vector of errors

G is a grouping matrix to add the row elements of P arranged in P^* to unity.

Using the estimated transitional probabilities, the exports of cotton to various destinations were predicted by multiplying the same with the respective shares of base year. The export shares of Indian cotton to different countries was predicted for the years 2014-15 to 2018-19 by using 2 step, 3 step, 4 step and 5 step transitional probabilities.

ANALYSIS AND DISCUSSION

The nominal protection co-efficient cotton export to different destinations, under exportable hypothesis for year 2014-15 were computed and the results are presented in Table 1. The Nominal Protection Co-efficient (NPC) technique explains the comparative advantage enjoyed by the commodity in the context of free trade. The countries like China, United States and Pakistan are specialized in cotton cultivation on commercial scale and started exporting. Thus, comparatively high price enables Indian cotton to become competitive in international market as compared to other cotton exporting nations.

The estimated NPCs with respect to Bangladesh (Dhaka) and Indonesia (Semarang) suggested that they

were less competitive markets with NPC value of 0.98. This was followed by Vietnam (Hanoi) with NPC value of 0.95. Pakistan (Karachi) was found to be moderately competitive market with the NPC value of 0.82. The analysis of export competitiveness cotton in general, indicated that all countries considered for the study were found to be competitive for cotton export from India as it is evident from NPC values of less than unity and China was found to be highly competitive market with NPC value of 0.69. Hence, China (Beijing) is the most remunerative market among the studied ones to which cotton was exported during the study period.

The changing pattern of raw cotton exports were estimated by obtaining the transitional probability matrices for the annual export data of raw cotton (in terms of volume) for the period 2000-01 to 2013-14. The major cotton importers from India, *i.e.* China, Pakistan, Bangladesh, Indonesia and Vietnam were considered for analysis. The cotton trade with the remaining countries was pooled under 'other countries'. It is evident from the Table 2 that, China has been the only stable importer of Indian cotton, as reflected by the high probability of retention that 70 per cent during the study period. This implied that the share of import by China and also it was interesting to find that even though China is the largest

producer of cotton in the world, it imports medium and long staple cotton from India and exports its low quality cotton to other countries. Besides, China is a major competitor to India in the export of fabrics and readymade garments. Remaining 30 per cent of previous export share was diverted to Pakistan, Bangladesh, Indonesia and Vietnam to the extent of about 12, 10, 4 and 4 per cents, respectively. However, China gained about 30 per cent market share from Pakistan, 48 per cent from Bangladesh, 65 per cent from Indonesia, 53 per cent from Vietnam and 2 per cent from other countries during the study period.

Pakistan retained 29 per cent its previous year's export share. While, Pakistan lost its 30.29 per cent, 20.46 per cent, 20.29 per cent export shares to China, Bangladesh and Indonesia, respectively. Pakistan gained 12.03 per cent of export share from China, 9.65 per cent share from Bangladesh and 12.78 per cent export share from Indonesia. Bangladesh had lost 48.32 per cent of its previous export share to China, 9.65 per cent to Pakistan and 42 per cent of its share to other minor importing countries. Vietnam gained 3.5 per cent of market share of China, 21.9 per cent from Indonesia and 0.61 per cent from "other countries". Indonesia could not retain its previous share of Indian cotton export and

Table 1 : Nominal protection co-efficient (NPC) for export of cotton for the year 2014

Sr. No.	Particulars	Unit	Pakistan	Vietnam	Bangladesh	Indonesia	China
1.	Wholesale price (Mumbai)	Rs./q	5450.00	5450.00	5450.00	5450.00	5450.00
2.	Marketing margin (5%)	Rs./q	272.50	272.50	272.50	272.50	272.50
3.	Port clearing and handling charges	Rs./q	950.00	950.00	950.00	950.00	950.00
4.	FOB Price (1+2+3)	Rs./q	6672.50	6672.50	6672.50	6672.50	6672.50
5.	Freight charge	Rs./q	650.00	850.00	650.00	800.00	750.00
6.	Insurance at 2 % of price	Rs./q	109.00	109.00	109.00	109.00	109.00
7.	landed cost (4+5+6)	Rs./q	7431.50	7631.50	7431.50	7581.50	7531.50
8.	Exchange rate	1\$ = Rs.	61.64	61.64	61.64	61.64	61.64
9.	CIF price (row 7 / row 8)	US \$ / q	120.56	123.80	120.56	122.99	122.18
10.	Reference price	US \$ / q	145.00	130.00	123.00	125.00	175.00
11.	NPC of (row 9/row 10)		0.82	0.95	0.98	0.98	0.69

Table 2 : Transitional probability matrix for export of cotton from India to different destinations (1999-2000 to 2013-14)

Destinations	China	Pakistan	Bangladesh	Indonesia	Vietnam	Others
China	0.70069	0.12037	0.10137	0.04207	0.03549	0.00000
Pakistan	0.30293	0.28945	0.20468	0.20295	0.00000	0.00000
Bangladesh	0.48324	0.09650	0.00000	0.00000	0.00000	0.42026
Indonesia	0.65274	0.12789	0.00000	0.00000	0.21937	0.00000
Vietnam	0.53950	0.00000	0.33379	0.00000	0.12671	0.00000
Others	0.02683	0.00000	0.04190	0.02057	0.00613	0.90456

lost 65.27 per cent to China, 12.78 per cent to Pakistan and 21.93 per cent Vietnam. “Other countries” importing cotton from India were also stable in their trade, retaining their share to the extent of 90.45 per cent of their previous share.

The transition probabilities for the importing countries, *viz.* Bangladesh and Indonesia were found as zero in the study period, indicating instability in India’s exports to these countries. The sharp decline in the export of raw cotton from India reflects our inability to retain the share in the traditional markets and explore new markets. These call for appropriate policy measures and marketing efforts to sustain in these growing markets. We need to improve our export competitiveness by decreasing costs and improving yield and quality. Also, we need to move away from the present policy regime of controlled exports through export quota so as to enable our exporters to enter into long-term contract with the buyers in the international markets and achieve growth.

Using the transitional probability matrix, estimation of Indian cotton export to major importing countries upto the year 2018-19 were projected. The projections of cotton exports to the major importing countries were computed upto 2018-19 and the actual and projected export quantities are presented in Table 3.

The estimates of exports indicate that cotton exports

to China may reach 1074893.00 tons during 2014-15 which may constitute 53.64 per cent of total Indian cotton exports. It is expected that cotton export may go down to 949964.70 tons by the year 2018-19 which will be around 47.40 per cent of total export from India. Regarding Pakistan, the actual export share showed an increasing trend from 2000-01 to 2013-14 but after that export share will be on a decreasing trend from 11.32 per cent to 10.48 per cent from 2013-14 to 2018-19. The proportion of cotton export to Pakistan in relative terms would decline to 10.48 per cent (2,09,963.8 tons) of the total export of the cotton during 2018-19 against actual proportion of 11.32 per cent during 2013-14. In the case of Bangladesh, the actual quantum of export share showed an erratic trend during study period. The actual export of cotton was 1,90,394 tons during 2013-14 which was around 9.50 per cent to the total Indian cotton exports. The trend shows a decline in cotton exports both in quantity and relative terms in future.

The proportion of exports showed an erratic trend in case of Indonesia also. But on the whole, the export share of Indonesia was 4.12 per cent to the total cotton export during 2013-14 (82,586.77 tons), which is expected to increase to 94,235.74 tons by 2018-19 which would constitute around 4.70 per cent of total cotton exports from India during the year. The estimates of export share

Year / Countries	China		Pakistan		Bangladesh		Indonesia		Vietnam		Others	
	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected
2000-01	1062.17 (3.52)		0.1 (0.00)		1602.6 (5.31)		110.87 (0.37)		183.34 (0.61)		27228.84 (90.20)	
2010-11	693310 (54.39)		137942 (10.82)		190378 (14.93)		42037 (3.30)		45752 (3.59)		165396 (12.97)	
2011-12	1589038 (79.30)		27014 (1.35)		189728 (9.47)		32926 (1.64)		39001 (1.95)		126246 (6.30)	
2012-13	1239841 (61.87)		221586.6 (11.06)		185047 (9.23)		75046.9 (3.74)		69307.97 (3.46)		213123.9 (10.64)	
2013-14	1163142 (58.04)		226836.3 (11.32)		190394.7 (9.50)		82586.77 (4.12)		70442.17 (3.52)		270551 (13.50)	
2014-15	10,74,893.00 (53.64)		2,34,604.70 (11.71)		1,99,187.70 (9.94)		1,00,539.00 (5.02)		69,984.14 (3.49)		324744.60 (16.21)	
2015-16	10,32,585.00 (51.53)		2,29,374.90 (11.45)		1,93,949.60 (9.68)		99,517.52 (4.97)		71,064.42 (3.55)		377461.40 (18.84)	
2016-17	10,00,156.00 (49.91)		2,22,132.30 (11.08)		1,91,159.90 (9.54)		97,760.62 (4.88)		69,798.91 (3.48)		422945.50 (21.11)	
2017-18	9,73,281.90 (49.85)		2,15,638.40 (10.76)		1,87,873.50 (9.38)		95,862.05 (4.78)		68,381.06 (3.41)		462916.30 (23.10)	
2018-19	9,49,964.70 (47.40)		2,09,963.80 (10.48)		1,85,021.70 (9.23)		94,235.74 (4.70)		67,076.20 (3.35)		497691.10 (24.84)	

Note: Figures in parenthesis indicated the per cent of export of cotton to the total export in respective years

indicated that the cotton exports to Vietnam is expected to decline to 67,076.20 tons during 2018-19 which may constitute 3.35 per cent of total export of cotton from India the period against the actual exports of 70,442.17 tons during 2013-14. Considering other countries imports, the predicted export shares increased during the study period. Estimated export share to minor countries would reach to 24.84 per cent of the total cotton exports from India during 2018-19 which would be around 4, 97,691.10 tons in real terms.

The export projections of cotton to major countries through 2018-19 indicate that China suppose to dominate the export basket of Indian cotton. However Pakistan and Bangladesh also going to share sizable proportion of cotton export scenario. Indonesia and Vietnam will be the next largest importers. Ashoka *et al.* (2013); Dilip (2008) and Koujalagi (2012) also worked on trade of chilli, soya and pomegranate, respectively

Conclusion :

Exports of cotton have significantly increased over the years. There is a need to encourage exports of cotton and reduce the government regulations on export quota allocations as well as improve upon the productivity in order to maintain India's position in the world cotton

exports. The results of Markov chain analysis have indicated that the exports of cotton are likely to be concentrated in China and Pakistan. A high dependence on one or two export markets would increase the trade risk in the long run. There is need to diversify the geographical concentration.

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