

A FIRM-LEVEL EXPLORATION OF TEXTILE INDUSTRY IN INDIA: EMPLOYMENT, WAGES AND PRODUCTIVITY ANALYSIS

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In this study, we have been undertaken to explore the evolution of the inter-industry firm-level analysis of Textile industry of employment and wages in India over the period 1989-90 to 2013-14. This study analyses the profitability ratio and concentration ratio trends in India's textile organised sector over the last 25 years. This section analyses the trend in the profitability and concentration ratio. The study found that all explanatory variables except profitability ratio and technical change costs positive impact on the employment level. On the other hand, out of eight variables, four variables i.e., net of foreign equity capital, investment intensity, TFPC and technical efficiency change have a positive impact on wages & salary ratio and rest of the four variables i.e., openness intensity, technology acquisition index, profitability ratio and technical change have negative impact on wages & salary ratio. In this context, profit ratio should be distributed as per the marginal rule of economics i.e., marginal productivity of labour and capital. Thus, the government should work in this direction that how should it will possible.

Keywords: Employment, Productivity Index, Scale-efficiency, Technical-change, Profitability and Concentration.

JEL: L1, L25, O14, O33

INTRODUCTION

“Profitability is positively associated with a seller's own market share, but there is little evidence, at least in recent richly disaggregate data, of a positive association between profitability and indices of seller concentration independent of the profit-market share correlation”.

(Scherer and Ross 1990, p. 446)

The Indian economy adopted a liberalised economic policy regime after 1990-91, in an attempt to ensure greater integration of the domestic economy with global competitive markets. In a bid to remain globally competitive, firms have targeted reduction of labour costs as a tool to ensure a reduction in production costs. This is evident in firms denying payment of minimum wages, social security, or fringe benefits to its workforce and increasingly resorting to informal employment contracts that ensure flexibility to businesses in terms of labour costs (Ganguly, A., 2013). Gurusamy et al., (2012) discussed the development of women entrepreneurs' in Indian Textile Industry that entrepreneurial development was one of the significant factors for sustainable socio-economic development. Technical efficiency consists of maximizing the level of production that can be obtained from a given combination of factors. In the Indian context, number of studies examined the technical efficiency of the manufacturing industry, e.g., Baliyan, S.K., (2016), Baliyan, S.K., et al.

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(2015), Patibandla (1992), Mitra (1998), Agarwal (2001), and Mitra et al. (2002 & 2011), Bhandari et al. (2012) and many others. Krishna and Mitra (1998) investigate the effects on competition and productivity on the dramatic 1991 trade liberalization in case of Indian manufacturing

The profitability ratio in manufacturing sector has received a strong position in the development of Indian economy. The study aims to find out the impact of innovation techniques in production (in terms of profitability) and economic performance at firm level using a larger sample of Indian firms operating in eighteen sub sectors. A large number of empirical literatures have grown to test if and to what extent innovative firms perform better than non-innovative ones in terms of different performance indicators, including profits and growth (C, Cozza, 2012).

The result shows that the rate of profit plays a vital role in the determination of economic development. At operational level, the firms are motivated by the desire to make profits which is an important determinant of the investment decision. This study analyses the profitability ratio and concentration ratio trends in India's organised manufacturing sector over the last 25 years.

This section analyses the trend in the profitability and concentration ratio. The economic profit indicates that resources are being employed in useful endeavors, while economic losses indicate that those resources would be better employed elsewhere. Profit is the money a business makes after accounting for all the expenses. Regard less of whether the business is a couple of kids running a lemonade stand or a publicly traded multinational company. Moreover consistently earning profit is every company's goal.

$$\text{Profitability ratio}_{it} = \frac{\text{Profit After Tax}_{it}}{\text{Total Salse (Output)}_{it}} \times 100 \dots \dots \dots (1)$$

$$\text{Concentration ratio CR4}_{it} = \frac{\text{Total Output of Top 4 Firms}_{it}}{\text{Total Salse (Output) of all Firms or total Industry}_{it}} \times 100 \dots (2)$$

In this paper we have focuses on the measurement the firm level performance of the profitability and concentration ration in the Indian textile industry with reference to the employment and wages. According to Hicks (1935), firms with higher market power can survive in the economy even if they have higher costs since they can charge prices above the marginal cost. Although, the relationship between firm performances have measured by profits and market structure is obvious (H. Dudu and Y. Kılıçaslan, 2009).

Individually or group wise, the most significant measure of a company's success are its profitability ratio. However, individual figures shown in the income/profit and loss description for gross profit and net profit mean little. When these proformance figures are expressed as a percentage of sales by CR4 or CR8, they are more useful. This per centage can then be compared with previous years, or with the percentages of the other next period of CR4 and CR8.

METHODOLOGY AND DATA COLLECTION

We will be estimating selected industries groups of firms performance (Productivity and Profitability) and its various components i.e. Concentration ratio, technical change, technical efficiency, openness (export-import), investment intensity, raw material intensity and FDI in Indian manufacturing sector over the period of 1989-90 to 2013-14. The study will draw data from two different sources, i.e., The Annual Survey of industries (ASI), which is published by the Central Statistical Organization, Government of India and Prowess, Centre for Monitoring Indian Economy Pvt. Ltd (CMIE) that contains a database on over eleven thousand registered manufacturing companies. The study will make use of secondary data from the various government publications such as, Central Statistical Organization (CSO), Government of India, and Economic Survey, Hand Book of Statistics on Indian Economy, RBI and National Account Statistics. The Data Envelopment Analysis (DEA) based Malmquist Productivity Index approach will be used to measure total factor productivity. The trends of productivity and its components, namely technical efficiency and technical change, will be analyzed. The effects of economic reforms related policy measures such as FDI, the openness of the firm, R&D and import raw material & capital goods are proposed to be analyzed on total factor productivity, technical efficiency and technical change in terms of a multiple regression model.

This study analyses the profitability ratio and concentration ratio trends in India's textile organised sector over the last 25 years. This section analyses the trend in the profitability and concentration ratio. The economic profit indicates that resources are being employed in useful endeavors, while economic losses indicate that those resources would be better employed elsewhere. Profit is the money a business makes after accounting for all the expenses. Regard less of whether the business is a couple of kids running a lemonade stand or a publicly traded multinational company. Moreover consistently earning profit is every company's goal.

RESULTS AND FINDING

Textile Products Industry

The perusal of Table 1 shows the concentration ratio during TE 1992, 2001 & 2014 of the textile products firms in India. During the TE 1992, 2001 and 2014, as per out of 72 firms CR4 is 32.5 per cent, 30.4 per cent & 40.7 per cent respectively, while as per the CR8 is 45.1 per cent, 42.7 per cent & 56.2 per cent respectively. It can be concluded that, these firms have taken the position as a main supplier as per market demand. The results in Table 1 suggest that the Raymond Ltd, R S W M Ltd, Welspun India Ltd and Vardhman Textiles Ltd firms with higher market shares are not more profitability equally firms that operate in industries which are more concentrated also appear to have not higher profits in the textile industry.

Therefore, as per out of a total output of whole industry the textile products firms during the TE 1992, 2001 and 2014, as per the CR4 is 4.92 per cent, 4.05 per cent & 4.31 per cent respectively, on the other hand, CR8 is 6.83 per cent, 5.68 per cent and 5.95 per cent respectively. The concentration ratio and profitability ratio constructed the ratios, using specific elements from the performance statements which identify the strengths and weaknesses of the firm. As per the CR4 during the entire period 1990-14 namely Raymond Ltd, R S W M Ltd, Welspun India Ltd and Vardhman Textiles Ltd firms are showing the highest concentration ratio, but when we compare the profitability ratio Raymond Ltd, R S W M Ltd and Welspun India Ltd firms shows low profitability ratio, while only Vardhman Textiles Ltd firm have achieved medium profit ratio.

**Table 1: Concentration Ratio (CR4 & CR8) during TE-1992, 2001 & 2014
of Textile Products Firms**

TE	Name of Firms	Name of Firms	Concentration Ratio	
1990-92	Parasrampuriah Synthetics Ltd.	D C M Ltd.	As per out of 72 Firms	
	Vardhman Textiles Ltd.	R S W M Ltd.		
	Digjam Ltd.	Lakshmi Mills Co. Ltd.	CR 4	CR 8
	Raymond Ltd.	Malwa Cotton Spg. Mills Ltd.	32.48	45.10
		Parasrampuriah Synthetics Ltd.	As per out of Total Industry	
		Vardhman Textiles Ltd.	CR 4	CR 8
		Digjam Ltd.	4.92	6.83
		Raymond Ltd.		
1999-01	R S W M Ltd.	Parasrampuriah Synthetics Ltd.	As per out of 72 Firms	
	Eskay K'N'It (India) Ltd.	Digjam Ltd.		
	Vardhman Textiles Ltd.	Nahar Industrial Enterprises Ltd.	CR 4	CR 8
	Raymond Ltd.	Malwa Cotton Spg. Mills Ltd.	30.41	42.68
		R S W M Ltd.	As per out of Total Industry	
		Eskay K'N'It (India) Ltd.	CR 4	CR 8
		Vardhman Textiles Ltd.	4.05	5.68
		Raymond Ltd.		
2012-14	Raymond Ltd.	Himatsingka Seide Ltd.	As per out of 72 Firms	
	R S W M Ltd.	Banswara Syntex Ltd.		
	Welspun India Ltd.	Loyal Textile Mills Ltd.	CR 4	CR 8
	Vardhman Textiles Ltd.	Nahar Industrial Enterprises Ltd.	40.67	56.17
		Raymond Ltd.	As per out of Total Industry	
		R S W M Ltd.	CR 4	CR 8
		Welspun India Ltd.	4.31	5.95
		Vardhman Textiles Ltd.		

Table 2: Profitability Ratio of Textile Product Firms during 1990 to 2014

Profitability Ratio (%)	1990-2000	2001-2014	1990-2014
Negative	Modern Threads (India) Ltd. Birla Transasia Carpets Ltd. Premier Synthetics Ltd. Uniworth Ltd. Digjam Ltd. Dumraon Textiles Ltd. Himachal Fibres Ltd. Madras Spinners Ltd. Parasrampuriah Synthetics Ltd. A I Champdany Inds. Ltd.	Modern Threads (India) Ltd. Digjam Ltd. Fiberweb (India) Ltd. Eskay K'N'It (India) Ltd. Malwa Cotton Spg. Mills Ltd. Birla Transasia Carpets Ltd. S T I India Ltd. Uniworth Ltd. Kakatiya Textiles Ltd. Gupta Synthetics Ltd.	Birla Transasia Carpets Ltd. Modern Threads (India) Ltd. Digjam Ltd. Fiberweb (India) Ltd. Premier Synthetics Ltd. S T I India Ltd. Gupta Synthetics Ltd. Kakatiya Textiles Ltd. Uniworth Ltd. Parasrampuriah Synthetics Ltd.
Low	Bengal Tea & Fabrics Ltd. Fiberweb (India) Ltd. Ludlow Jute & Specialities Ltd. Sri Kannapiran Mills Ltd. Pasupati Spinning & Wvg. Mills Ltd. Naffar Chandra Jute Mills Ltd. Banswara Syntex Ltd. Howrah Mills Co. Ltd. Naihati Jute Mills Co. Ltd. Lakshmi Mills Co. Ltd.	Rai Saheb Rekhchand Mohota Spg. & Wvg. Mills Ltd. Ginni Filaments Ltd. Himachal Fibres Ltd. Naihati Jute Mills Co. Ltd. A I Champdany Inds. Ltd. Jamshri Ranjitsinghji Spg. & Wvg. Mills Co. Ltd. Super Spinning Mills Ltd. H P Cotton Textile Mills Ltd. T T Ltd. Mahalakshmi Fibres & Inds. Ltd.	Shree Rajasthan Syntex Ltd. R S W M Ltd. Rai Saheb Rekhchand Mohota Spg. & Wvg. Mills Ltd. J J Exporters Ltd. Naihati Jute Mills Co. Ltd. Ginni Filaments Ltd. Vardhman Polytex Ltd., T T Ltd. Mahalakshmi Fibres & Inds. Welspun India Ltd G T N Industries Ltd. Pasupati Spinning & Wvg. Mills Ltd., Raymond Ltd
Medium	Precot Meridian Ltd. Wires & Fabriks (S.A.) Ltd. Eurotex Industries & Exports Rajapalayam Mills Ltd. G T N Industries Ltd. Raymond Ltd. Himatsingka Seide Ltd. Vardhman Polytex Ltd. Vardhman Textiles Ltd. Eskay K'N'It (India) Ltd.	D C M Ltd. Rajapalayam Mills Ltd. Madras Spinners Ltd. Super Sales India Ltd. Himatsingka Seide Ltd. Shri Dinesh Mills Ltd. Vardhman Textiles Ltd. Sree Satyanarayana Spg. Mills Ltd. Dumraon Textiles Ltd.	Garware-Wall Ropes Ltd. Rajapalayam Mills Ltd. Super Sales India Ltd. Shri Dinesh Mills Ltd. Sree Satyanarayana Spg. Mills Ltd. Vardhman Textiles Ltd. Cheviot Co. Ltd. Himatsingka Seide Ltd.
High	Indian Card Clothing Co. Ltd. J J Exporters Ltd. Voith Paper Fabrics India Ltd.	Cheviot Co. Ltd. Indian Card Clothing Co. Ltd. Maharaja Shree Umaid Mills Voith Paper Fabrics India Ltd.	Indian Card Clothing Co. Ltd. Maharaja Shree Umaid Mills Ltd Voith Paper Fabrics India Ltd
No. of Firms	1990-2000	2001-2014	1990-2014
Negative	21 (29.2%)	22 (30.5%)	23 (31.9%)
Low	36 (50.0%)	37 (51.4%)	37 (51.4%)
Medium	12 (16.7%)	9 (12.5%)	9 (12.5%)
High	3 (4.1%)	4 (5.6%)	3 (4.2%)
Min.	-9.30	-10.97	-11.44
Max.	12.89	17.06	15.75
Total	1.87 (72)	1.94 (72)	1.92 (72)

Note: 0.01-4.99 = Low, 5.00-9.99 = Medium and Above to 10 = High.

Table 2 describes the firm level profit ratio of the textile product firms and explores their relationship with the firm's concentration ratio. The result reveals that the firm wise triennium Ending (TE) of 72 firms of the textile product sector firms have recorded profitability ratio change over the 25 years. The profitability ratio during the reference period 1990-00, shows that out of 72 firms 29.2 per cent have a negative profit ratio, but one of them, namely the Modern Threads (India) Ltd has (-9.3 per cent). Fifty per cent firms show low profit rate and 16.7 per cent firms depict moderate and only 4.1 per cent firm's show high profitability ratio, but one of them, namely the Voith Paper Fabrics India Ltd has 12.89 per cent.

On the other hand, during the period 2001-14, out of 72 firms, 30.5 per cent firms have a negative profit ratio, and one of them, namely the Modern Threads (India) Ltd further has a negative profit ratio (-10.97 per cent). While 51.4 per cent firms show low profitability ratio, 12.5 per cent firms show moderate profit ratio whereas, only 5.6 per cent firms show high growing profit ratio, but one of them, namely the Voith Paper Fabrics India Ltd has 17.1 per cent. Further, during the entire period 1990-2014, out of 72 firms, 31.9 per cent have negative profitability ratio, and one of them, namely the Birla Transasia Carpets Ltd has a negative profit rate (-11.4 per cent). 51.4 per cent firms show low profitability ratio, 12.5 per cent firms show a moderate profit ratio whereas only 4.2 per cent firms show high profit ratio, but one of them, namely the Voith Paper Fabrics India Ltd has 15.75 per cent profit ratio.

Table 2 presents the aggregate level profitability ratio of the textile products firms during 1990 to 2014. It may be noted that the profitability ratio in the aggregate average ration of the first phase, during 1990-00, was 1.87 per cent, and during the second period (2001-14) the profitability ratio was 1.94 per cent while in the entire period (1990-14), the profitability ration was only 1.92 per cent. So it can be concluded that on an average, the profitability ratio of the textile product firms is very low.

In this section, we have describes the firm level profitability ratio of the eighteen sub-sectors and explore their relationships to the firm's concentration ratio. The concentration indices are employed to measure the level of competition within an industry of firm wise, often to examine whether concerns for dominant position creation exist in the case of mergers and acquisitions. In this study, we have analyzed firm level relation for the purpose of measuring the association between profitability ratio and concentration ratio of in organized manufacturing sector in India; because the facts that the CR4 and CR8 are based entirely on the usage of the product are to some extent of a restriction, since the economic concept of the total output shares. The value of the CR4 and CR8 provides an indication of the level of concentration, with the maximum value corresponding to the case of the monopoly, and the minimum corresponding to perfect competition. Hence, the higher the value of the CR4 will be indicating the higher the concentration of the market in the hands of a few firms or sub-sectors.

Technical Efficiency

The firm level results regarding the technical efficiency estimates of the textile products industry are presented in Table 3. Under the constant returns to scale production technology, the average technical efficiency score of textile industry during 1990-00, 2001-14 and entire period 1990-2014 is 0.703, 0.459 and 0.752 respectively.

This implies that the textile products industry needed only 70.3 per cent of the inputs during the first period, 45.9 per cent during 2001-14 and 75.2 per cent during the entire period of the inputs. Due to *technical inefficiency*, on an average 29.7 per cent, 44.1 per cent and 24.8 per cent of production is forgone respectively. In terms of average inefficiency, more inputs are required to produce the same output, which meant wastes of resources to the extent mentioned in the textile products industry in India. During 1990-00, out of 72 firms 5.6 per cent have low TE but one of them namely the Kamadgiri Fashion Ltd has lowest TE (45.4 per cent). 62.5 per cent firms show moderate TE rate and only 31.9 per cent firm's show high growth. During the 2001-14, out of 72 firms 65.3 per cent have low TE but one of them namely the R S W M Ltd has lowest TE (24.2 per cent). 22.2 per cent firms show moderate TE rate and only 12.5 per cent firm's show high growth. Further, with reference to entire period i.e. from 1990-2014, out of 72 firms 59.7 per cent firms show moderate TE rate and 40.3 per cent firms show high growth. Thus, it can be concluded that though the technical efficiency of the textile product firms varied considerably on account of the various reasons mentioned, all the firms were estimated to be on the production function. In other words, under CRS technology the number of technical efficiency scores during 1990-2014, is indicative of the fact that technical efficiency of textile firms is not strongly influenced by the size of production (output) in second period as well as first period.

Scale Efficiency

The estimated results of firm level regarding the scale efficiency (SE) of the textile product industry are presented in Table 4. Under the constant returns to scale production technology, the average scale efficiency score of textile product industry during 1990-00, 2001-14 and entire period 1990-2014 is 0.951, 0.544 and 0.948 respectively. DEA results applied to know the SE of textile products firms were not operating at optimum scale efficiency in second period. This implies that during all periods, during 1990-00, 2001-14 and entire period 1990-2014 the textile products firms the average scale efficiency is 95.1 per cent, 54.4 per cent and 94.8 per cent respectively. In terms of average scale inefficiency, it could increase additional output or production to the extent of only around 5.0 per cent, by taking advantage of their scale characteristics. DEA allows assessing whether a firm lies in the range of increasing, constant and decreasing returns to scale.

During 1990-00, out of 72 firms 75.0 per cent have decreasing return to scale but one of them namely the Reliance Chemotex Inds. Ltd has lowest SE (61.0 per cent). While, 11.1 per cent firms show constant return to scale and only 13.9 per cent firms have increasing return to scale. During the 2001-14, out of 72 firms 89.0 per cent have decreasing return to scale but one of them namely the Premier Synthetics Ltd has lowest SE (32.8 per cent). While 5.5 per cent firms show CRS SE rate and 5.5 per cent firms also have IRS SE. Further, with reference to entire period i.e. from 1990-2014, out of 72 firms 40.3 per cent show decreasing return to scale but one of them namely the P B M Polytex Ltd has low SE (71.1 per cent). While 45.8 per cent firms show IRS SE rate, only 13.9 per cent firms have CRS SE. In other words, it revealed the scale efficiency of firms. If market contains firms scale market efficiency can be increased but if firms attain CRS, fewer resources are wasted. A firm may be scale inefficient, if it experiences DRS or if it has not taken full advantages of IRS.

Table 3: Technical Efficiency (TE) of Textile Product Firms at CRS

TECHNICAL EFFICIENCY	1st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
Lowest	Kamadgiri Fashion Ltd. Palani Andavar Cotton & Synthetic Spinners Ltd. Kandagiri Spinning Mills Ltd. Kakatiya Textiles Ltd.	R S W M Ltd. Maharaja Shree Umaid Mills Madras Spinners Ltd. Mahalakshmi Fibres & Inds. Malwa Cotton Spg. Mills Ltd. Modern Threads (India) Ltd. Premier Synthetics Ltd. Reliance Chemotex Inds. Ltd. Nellimarla Jute Mills Co. Ltd. Sambandam Spinning Mills Ltd.	
Moderate	Shri Dinesh Mills Ltd. Vardhman Textiles Ltd. G T N Industries Ltd. Himachal Fibres Ltd. P B M Polytex Ltd. Himatsingka Seide Ltd. Super Sales India Ltd. Shree Rajasthan Syntex Ltd. Garware-Wall Ropes Ltd. Ginni Filaments Ltd.	Birla Transasia Carpets Ltd. D C M Ltd. Eskay K'N'It (India) Ltd. Cheviot Co. Ltd. Welspun India Ltd. Dumraon Textiles Ltd. Vardhman Textiles Ltd. Sri Ramakrishna Mills (Coimbatore) Ltd. Digjam Ltd. Voith Paper Fabrics India Ltd.	R S W M Ltd. Eurotex Industries & Exports Shri Dinesh Mills Ltd. Uniworth Ltd. Precot Meridian Ltd. Jamshri Ranjitsinghji Spg. & Wvg. Mills Co. Ltd. D C M Ltd. Super Spinning Mills Ltd. Super Sales India Ltd. Bengal Tea & Fabrics Ltd.
Highly	Rai Saheb Rekhchand Mohota Spg. & Wvg. Mills Ltd. R S W M Ltd. Banswara Syntex Ltd. Modern Threads (India) Ltd. Malwa Cotton Spg. Mills Ltd. Oswal Spinning & Wvg. Mills Pasupati Spinning & Wvg. Mills Ltd. Precot Meridian Ltd. Raymond Ltd. Welspun India Ltd.	Eurotex Industries & Exports Ltd. Vardhman Polytex Ltd. Shri Dinesh Mills Ltd. T T Ltd. Super Sales India Ltd. Super Spinning Mills Ltd. Thanjavur Spinning Mill Ltd. Uniworth Ltd. Shree Rajasthan Syntex Ltd.	Modern Threads (India) Ltd. Madras Spinners Ltd. Ginni Filaments Ltd. NaffarChandraJute Mills Ltd. Mahalakshmi Fibres & Inds. Ltd. Himachal Fibres Ltd. Banswara Syntex Ltd. Loyal Textile Mills Ltd. Indian Card Clothing Co. Ltd. Ludlow Jute & Specialities Ltd.
No. of Firms	1st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
Lowest	4 (5.6%)	47 (65.3%)	
Moderate	45 (62.5%)	16 (22.2%)	43 (59.7%)
Highly	23 (31.9%)	9 (12.5%)	29 (40.3%)
Min.	0.454	0.242	0.587
Max.	1.000	1.000	1.000
Mean	0.703 (72)	0.459 (72)	0.752 (72)

Note: 0.001 to 0.500 = Lowest, 0.501 to 0.750 = Moderate and 0.751 to 1.000 = Highly.

Table 4: Scale Efficiency (SE) of Textile Product Firms

Returns to Scale	1 st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
Lowest		Premier Synthetics Ltd. J J Exporters Ltd. R S W M Ltd. Rajapalayam Mills Ltd. Raymond Ltd. Indian Card Clothing Co. Ltd. Reliance Chemotex Inds. Ltd. Jamshri Ranjitsinghji Spg. & Wvg. Mills Co. Ltd. Precot Meridian Ltd.	
Moderate	Reliance Chemotex Inds. Ltd. Voith Paper Fabrics India Ltd.	A I Champdany Inds. Ltd. D C M Ltd. Blue Chip Tex Inds. Ltd. Fiberweb (India) Ltd. Garware-Wall Ropes Ltd. Cheviot Co. Ltd. Digjam Ltd. G T N Industries Ltd. Dumraon Textiles Ltd. Eskay K'N'It (India) Ltd.	P B M Polytex Ltd. R S W M Ltd. Pasupati Spinning & Wvg. Mills Ltd. Parasrampuria Synthetics Ltd., Precot Meridian Ltd. Palani Andavar Cotton & Synthetic Spinners Ltd. Oswal Spinning & Wvg. Mills Ltd.
Highly	Hada Textile Inds. Ltd. Rajapalayam Mills Ltd. R S W M Ltd. Pasupati Spinning & Wvg. Mills Ltd., Precot Meridian Ltd. Premier Synthetics Ltd. Rai Saheb Rekhchand Mohota Spg. & Wvg. Mills Ltd. Raymond Ltd., Dumraon Textiles Ltd., Welspun India Ltd.	Sri Ramakrishna Mills (Coimbatore) Ltd. Voith Paper Fabrics India Ltd. Vardhman Textiles Ltd. Vardhman Polytex Ltd. Thanjavur Spinning Mill Ltd. T T Ltd., Super Sales India Ltd. Super Spinning Mills Ltd. Shree Rajasthan Syntex Ltd. Uniworth Ltd.	Eurotex Industries & Exports Ltd., SuperSpinningMills Ltd Indian Card Clothing Co. Ltd. Kandagiri Spinning Mills Ltd., Lakshmi Mills Co. Ltd. Ludlow Jute & Specialities Ltd., Himatsingka Seide Ltd. L S Mills Ltd. H P Cotton Textile Mills Ltd. Welspun India Ltd.
No. of Firms	1st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
DRS	54 (75.0%)	64 (89.0%)	29 (40.3%)
CRS	8 (11.1%)	4 (5.5%)	10 (13.9%)
IRS	10 (13.9%)	4 (5.5%)	33 (45.8%)
Min.	0.610	0.328	0.711
Max.	1.000	1.000	1.000
Mean	0.951 (72)	0.544 (72)	0.948 (72)

Note: 0.001 to 0.500 = Lowest, 0.501 to 0.750 = Moderate, 0.751 to 0.990 = Highly.

DRS = Decreasing return to scale, CRS = Constant return to scale and IRS = Increasing return to scale.

Table 5: Malmquist TFP, Efficiency and Technical change Index Summary of Annual Means of Textile Products Firms during 1990-2014

Years	1st Period 1990-2000			IInd Period 2001-2014			Entire Period 1990-2014		
	EFFCH	TECHCH	TFPCH	EFFCH	TECHCH	TFPCH	EFFCH	TECHCH	TFPCH
1989-90									
1990-91	0.625	1.172	0.733				0.691	1.834	1.267
1991-92	1.374	0.476	0.653				1.274	0.622	0.792
1992-93	1.178	0.931	1.096				0.615	1.499	0.922
1993-94	1.074	0.813	0.873				1.673	0.250	0.418
1994-95	0.607	1.795	1.089				1.013	0.984	0.996
1995-96	1.263	0.740	0.934				0.707	0.637	0.450
1996-97	0.619	1.844	1.141				0.128	0.846	0.108
1997-98	1.804	0.435	0.785				1.150	0.553	0.636
1998-99	0.739	1.322	0.977				0.839	1.522	1.276
1999-00	1.034	1.312	1.357				1.058	0.773	0.818
2000-01							0.872	1.103	0.961
2001-02				1.254	0.776	1.128	1.160	0.939	1.089
2002-03				1.272	0.774	0.985	0.731	1.062	1.507
2003-04				0.707	0.637	0.450	1.092	0.548	0.763
2004-05				0.128	0.846	0.108	0.776	1.418	1.100
2005-06				0.896	1.149	1.629	0.613	1.154	1.321
2006-07				1.088	0.830	0.903	1.306	0.352	0.813
2007-08				0.769	1.582	1.216	0.912	1.318	1.202
2008-09				1.578	0.520	0.924	1.110	0.849	1.943
2009-10				0.957	1.182	1.131	1.012	0.926	0.937
2010-11				1.005	0.960	0.965	0.714	1.485	1.060
2011-12				0.920	0.950	0.875	0.541	1.907	1.032
2012-13				0.365	1.418	1.246	1.699	0.403	0.685
2013-14				1.673	0.405	0.678	0.662	1.603	1.061
Mean	1.032	1.084	1.118	0.970	0.925	0.898	0.948	1.074	1.020

Total Factor Productivity: This analysis applies Malmquist Productivity Index (MPI) to measure Total Factor Productivity Growth (TFPG) and its sources using DEA Approach. Table 5 demonstrates the over all result shows the Firm level TFPCH of textile product industry in organized manufacturing sector in India is growing with 2.0 per cent per annum growth of Total Factor Productivity (TFP) during the entire study period. This TFPCH is due to improvement through technical changes or innovations effect rather than technical efficiency of catching up. Table 5; also presented that the annual estimates of aggregate level TFPG/TFPCH of textile products industry during 1990 to 2014. It may be noted that the TFPCH in the aggregate of during first phase 1990-00, the TFPCH was increased 11.8 per cent, its means that during this period technical changes or innovations effect and technical efficiency of catching up both are improved and second period during 2001-14 the TFPCH was decreased -10.2 per cent on an average this change is due to both technical changes or innovations effect and technical efficiency of catching up, it means that during this period textile industry firms was not attract more investment and innovation technology. Thus, it can be concluded that on an average the productivity change of all food processing sector is due to decline through technical changes or innovations effect rather than technical efficiency of catching up.

Turning to over all analysis of textile industry, the perusal of Table 6 depicts the average mean value of TFPG/TFPCH of firm-wise of textile product firms. The result reveals that the aggregate level of 72 firms of textile industries has recorded productivity change over the 25 years, but during the second period the productivity change or rate of growth is low. As per the decomposition of TFPCH, during 1990-00, out of 72 firms 36.1 per cent have negative TFPCH but one of them namely the Precot Meridian Ltd has (-10.2 per cent). While 58.3 per cent firms show low TFPCH rate and only 5.6 per cent firm's depicted high growth but one of them namely the Voith Paper Fabrics India Ltd has 13.5 per cent per annum. During the 2001-14, out of 72 firms 31.9 per cent firms have negative TFPCH but one of them namely the Gupta Synthetics Ltd has lowest TFPCH (-5.8 per cent). While 63.9 per cent firms show Low TFPCH rate and only 4.2 per cent firms show high growth but one of them namely the Reliance Chemotex Inds. Ltd has 16.3 per cent per annum. Further, with reference to entire period 1990-2014, out of 72 firms 36.1 per cent have negative TFPCH but one of them namely the AI Champdany Inds. Ltd has negative TFPCH (-6.3 per cent). While 58.3 per cent firms show low TFPCH rate and only 5.6 per cent firm's depicted high growth but one of them namely the Synthetic Spinners Ltd has 16.6 per cent per annum.

Table 6: Malmquist TFP Index Summary of Textile Products Firm Means

TFPCH	1st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
Negative	Precot Meridian Ltd. Banswara Syntex Ltd. Pasupati Spinning & Wvg. Mills Ltd. A I Champdany Inds. Ltd. Bengal Tea & Fabrics Ltd. Sree Satyanarayana Spg. Mills Ltd. D C M Ltd. Sri Kannapiran Mills Ltd. Shri Dinesh Mills Ltd. Digjam Ltd.	Gupta Synthetics Ltd. Voith Paper Fabrics India Ltd. Shree Rajasthan Syntex Ltd. Garware-Wall Ropes Ltd. Super Sales India Ltd. Premier Synthetics Ltd. Naihati Jute Mills Co. Ltd. Shri Dinesh Mills Ltd. G T N Industries Ltd. Precot Meridian Ltd.	A I Champdany Inds. Ltd. Kandagiri Spinning Mills Ltd. Gupta Synthetics Ltd. Fiberweb (India) Ltd. Garware-Wall Ropes Ltd. Indian Card Clothing Co. Ltd. Kamadgiri Fashion Ltd. Banswara Syntex Ltd. H P Cotton Textile Mills Ltd. Kadri Mills (Cbe) Ltd.
Low	Sambandam Spinning Mills Ltd Naffar Chandra Jute Mills Ltd. Malwa Cotton Spg. Mills Ltd. Indian Card Clothing Co. Ltd. Mahalakshmi Fibres & Inds. Welspun India Ltd. Winsome Textile Inds. Ltd. Howrah Mills Co. Ltd. Kandagiri Spinning Mills Ltd. Eurotex Industries & Exports	Naffar Chandra Jute Mills Ltd. Sri Ramakrishna Mills (Coimbatore) Ltd. Dumraon Textiles Ltd. Eskay K'N'It (India) Ltd. H P Cotton Textile Mills Ltd. Mahalakshmi Fibres & Inds. Ltd. D C M Ltd. Madras Spinners Ltd. S T I India Ltd. L S Mills Ltd.	D C M Ltd. Cheviot Co. Ltd. Naffar Chandra Jute Mills Ltd. Sree Satyanarayana Spg. Mills Nagreeka Exports Ltd. Shri Dinesh Mills Ltd. Nahar Industrial Entreprises Modern Threads (India) Ltd. Naihati Jute Mills Co. Ltd. Sri Kannapiran Mills Ltd.
High	Palani Andavar Cotton & Synthetic Spinners Ltd. Naihati Jute Mills Co. Ltd. Nellimarla Jute Mills Co. Ltd. Voith PaperFabrics India Ltd.	Rajapalayam Mills Ltd. P B M Polytex Ltd. Raymond Ltd. Reliance Chemotex Inds. Ltd.	Voith Paper Fabrics India Ltd. Welspun India Ltd. P B M Polytex Ltd. Palani Andavar Cotton & Synthetic Spinners Ltd.
No. of Firms	1st Period 1990-2000	IInd Period 2001-2014	Entire Period 1990-2014
Negative	26 (36.1%)	23 (31.9%)	26 (36.1%)
Low	42 (58.3%)	46 (63.9%)	42 (58.3%)
High	4 (5.6%)	3 (4.2%)	4 (5.6%)
Min.	0.898	0.942	0.937
Max.	1.135	1.163	1.166
Mean	1.118 (72)	0.898 (72)	1.020 (72)

Note: 0.001-0.999 = Negative TFP and 1.001-1.099 = Low TFP and Above to 1.100 = High TFP.

Textile Products Industry

The perusal of Table 7; demonstrates the outcomes in OLS estimation are estimated and are highlighted of textile industry. If we look at the results of regression estimation for model I in textile products industry, it is observed that the coefficients of NFECI and technology acquisition are statistically significant at 1 per cent and 9 per cent level of significance with the negative sign. Therefore, the NFECI and technology acquisition are negative influence the level of employment than it can be concluded that with the increase the NFECI and technology acquisition are decrease the employment level of textile firms but openness intensity is statistically significant at 8 per cent level of significance with the positive sign. Further, the openness is positively influence the employment of the textile firms and it can be concluded that with the increase in the openness intensity the employment level of firms will be increased. While, profitability and Investment Intensity (II) do not seems to affect the level of employment in textiles industry. The value of R-square has been found high (76 per cent) in case value of employment level, which implies that the regression model explain a high significant level of variation to the total variations during the study period. The magnitude of F-value indicates that the given model is a good fit. The value of variance inflation factor (VIF) between independent variables is 2.79 (<10), which implies that there is absence of multicollinearity in the regression model I & II.

In model II, the coefficient of investment intensity (II) is found to be statistically significant at 7 per cent level of significance with the positive sign. Further, the investment intensity (II) is positively influence the wages & salary of the textile products industry and it can be concluded that with the increase in the investment level, the wages & salary of firms will be increased, but, the profitability ratio is found to be statistically significant at 10 per cent level of significance with the negative sign. Therefore, the profitability is negatively influences the wages & salary than it can be concluded that with the increase in the profit ratio the wages ratio of the firms will be decreased. While, NFEC, openness and technology acquisition do not seems to affect the level of wages & salary ratio in textile industry. The value of R-square has been found medium (50 per cent) in case value of wages & salary ratio, which implies that the regression model explain a high significant level of variation to the total variations during the study period.

While measuring the determinants of employment level in model III, the coefficients of all explanatory variables are statistically significant at 7 per cent and 10 per cent level of significance but TFPCH is found to be statistically significant at 10 per cent level of significance with the negative sign. Further, the TFPCH is negative impact on the employment level on the textile product firms. In case of technical efficiency and technical change coefficients are statistically significant with the positive sign than which suggests that TEECH and TECH of the firms will be increased the employment level. Lastly for model IV, the coefficients of all explanatory variables are statistically insignificant. Further, the TEECH, TECH and TFPCH are not statistically significant on the wages & salary in textile product industry. The magnitude of F-value indicates that the given model is a good fit. The value of variance inflation factor (VIF) between independent variables is 2.38 (<10), which implies that there is absence of multicollinearity in the regression model III & IV.

Table 7: Results of Regression Models Estimation of Textile Products Industry

Variables	Model-I				Model-II			
	Coef.	SE	t	P>t	Coef.	SE	t	P>t
Net of Foreign Equity Capital	-15.86	3.15	-5.04	0.00	-9.88	1.59	-0.68	0.51
Openness Intensity	1.51	0.79	1.91	0.08	2.48	2.45	1.01	0.32
Technology Acquisition Index	-28.40	15.55	-1.83	0.09	70.80	2.82	1.04	0.31
Profitability Ratio	0.00	0.01	-0.15	0.89	-0.08	0.05	-1.69	0.10
Investment Intensity	2.21	9.91	0.22	0.83	7.40	3.34	1.91	0.07
Constant	9.82	0.46	21.13	0.00	7.59	1.50	5.06	0.00
No. of obs	F(8, 15)	Prob > F	R-squared	Mean VIF	F(8, 15)	Prob > F	R-squared	Mean VIF
24	5.85	0.00	0.76	2.79	3.14	0.04	0.50	2.79
Variables	Model-III				Model-IV			
	Coef.	SE	t	P>t	Coef.	SE	t	P>t
TFPCH	-0.20	0.12	-1.79	0.10	0.52	0.58	0.90	0.38
Technical Change	0.28	0.14	1.97	0.07	0.47	0.64	0.74	0.47
Technical Efficiency Change	0.23	0.15	1.85	0.10	0.45	0.69	0.65	0.53
Constant	8.71	0.44	19.91	0.00	6.07	1.32	4.61	0.00
No. of obs	F(8, 15)	Prob > F	R-squared	Mean VIF	F(8, 15)	Prob > F	R-squared	Mean VIF
24	0.81	0.01	0.53	2.38	2.38	0.09	0.33	2.38

Note: Employment Level (Dependent variable) Model I-A & Model I-B and Wages & Salary ratio (Dependent variable) Model II-A & Model II-B.

VIF = Variance Inflation Factor (identify multicollinearty diagnostic factors).

Regression analysis further confirms the findings in Table 8. The technology acquisition (R&D, Royalty intensity, & Import of capital goods) have a strong positive impact on wages & salary ratio with statistically insignificant, but the profitability ratio negative impact and investment intensity has a positive impact on wages & salary ratio with statistically significant. On the other hand, net of foreign equity capital negative impact and openness intensity have a positive impact on wages & salary ratio with statistically insignificant. Further, the Net of foreign equity capital and technology acquisition (R&D, Royalty intensity, & Import of capital goods) have a strong negative impact on employment with statistically significant, but the openness intensity has an expected positive impact on employment level with positive significant coefficients, while the profitability ratio and investment intensity has a positive impact on employment with statistically insignificant.

Table 8: Hypotheses Testing Results of Textile Products Industry

Variables	Employment Level	Regression Coefficients of Independent Variables with Employment	Wages & Salary Ratio	Regression Coefficients of Independent Variables with Wages & Salary
	Hypotheses Relationship		Hypotheses Relationship	
Net of Foreign Equity Capital	+	R (-)***	+	R (-) NS
Openness Intensity	+	A (+)*	+	A (+) NS
Technology Acquisition Index	+	R (-)*	+	A (+) NS
Profitability Ratio	+	R (-) NS	-	A (-)*
Investment Intensity	+	A (+) NS	+	A (+)*
TFPCH	+	R (-)*	+	A (+) NS
Technical Change	-	R (+)*	+	A (+) NS
Technical Efficiency Change	+	A (+)*	+	A (+) NS

Note: (+) is Positive and (-) is Negative relationship. * 10 percent level of significant, ** 5 percent level of significant and *** 1 percent level of significant. A=Accepted & R= Rejected and NS= Not significant.

Thus, after multiple regression results, as per the hypothetical relationship with the association of employment the NFEC, technology acquisition, profitability, TFPCH and technical change variables are rejected our hypothesis, but the openness, investment and technical efficiency is accepted. On the other hand, as per the hypothetical relationship with the associated the wages & salary the openness, technology acquisition, profitability, investment, TFPCH, technical change and technical efficiency change variables are accepted with the statistically significant but only Net of Foreign Equity Capital is rejected.

CONCLUSIONS

- The results explain of the concentration ratio Out of 72 firms, during the TE 1992, 2001 and 2014; CR4 is 32.5 per cent, 30.4 per cent & 40.7 per cent respectively. It can be concluded that, these firms have taken the position as main supplier as per market demand. The results suggest that the Raymond Ltd, R S W M Ltd, Welspun India Ltd and Vardhman Textiles Ltd firms with higher market shares are not more profitability equally firms that operate in industries and are more concentrated also appear to have not higher profits in the textile industry. As per CR4

during the entire period i.e., from 1990-14, Raymond Ltd, R S W M Ltd, Welspun India Ltd and Vardhman Textiles Ltd firms showed the highest concentration ratio, but when we compare the profitability ratio Raymond Ltd, R S W M Ltd and Welspun India Ltd firms shows low profitability ratio, only Vardhman Textiles Ltd firm have achieved medium profit ratio.

- Under the constant returns to scale production technology, the average technical efficiency score of textile industry during 1990-00, 2001-14 and entire period 1990-2014 is 0.703, 0.459 and 0.752 respectively. It implies that the textile products industry needed only 70.3 per cent of the inputs during the first period, 45.9 per cent during 2001-14 and 75.2 per cent during the entire period of the inputs. Due to *technical inefficiency*, on an average 29.7 per cent, 44.1 per cent and 24.8 per cent of production is forgone respectively. In terms of average inefficiency, more inputs are required to produce the same output, which meant wastes of resources to the extent mentioned in the textile products industry in India.
- The results shows that the growth of firm level TFPCH of textile product industry in organized manufacturing sector in India is growing with 2.0 per cent per annum growth of Total Factor Productivity (TFP) during the entire study period. This TFPCH is due to improvement through technical changes or innovations effect rather than technical efficiency of catching up.
- Regression analysis further confirms the findings that the technology acquisition (R&D, Royalty intensity, & Import of capital goods) have a strong positive impact on wages & salary ratio with statistically insignificant, but the profitability ratio negative impact and investment intensity had a positive impact on wages & salary ratio with statistically significant.
- Lastly, multiple regression results have rejected the hypothesis i.e., the hypothetical relationship with the association of employment with the NFEC, technology acquisition, profitability, TFPCH and technical change variables. It is to be noted that variables i.e., openness, investment and technical efficiency have accepted. On the other hand, as per the hypothetical relationship with the associated the wages & salary the openness, technology acquisition, profitability, investment, TFPCH, technical change and technical efficiency change variables have accepted with the statistically significant. It is to be noted that only one variable i.e., Net of Foreign Equity Capital is rejected.

To sum up, the study found that all explanatory variables except profitability ratio and technical change costs positive impact on the employment level. On the other hand, out of eight variables, four variables i.e., net of foreign equity capital, investment intensity, TFPCH and technical efficiency change have a positive impact on wages & salary ratio and rest of the four variables i.e., openness intensity, technology acquisition index, profitability ratio and technical change have negative impact on wages & salary ratio. In this context, profit ratio should be distributed as per the marginal rule of economics i.e., marginal productivity of labour and capital. Thus, the government should work in this direction that how should it will possible.

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