Changing Efficiency Profile of Organized and Unorganized Segments of Indian Garment Producing Units: A Comparative Analysis in the Post-MFA Period[1]

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Abstract

National Textile Policy 2000 and interventions in the Indian textile sector around the turn of this century were designed to introduce efficiency-enhancing policy reforms through gradual withdrawal of restrictions on the organized and of protection for the unorganized segments of the industry. Such changes are expected to have affected the relative performance of the organized and unorganized segments of the Indian garment industry by influencing their conducts differentially. Removal of capacity restrictions was expected to initiate optimal restructuring of production. Unorganized firms generally enjoying scope economies and advantage of small batches production are supposed to deal with its problem of market access through complementary linkage with larger units. In this context, the present paper seeks to compare the change in efficiency profile of the concerned segments of selected Indian states between 2001 and 2011. Output-oriented data envelopment analysis indicated that majority of both organized and unorganized firms in most of the states were technically inefficient even at the end of the study period. Use of sub-optimal input-mix turned out to be the important cause of inefficiency in the organized segment while operating on a less than optimal scale-possibly due to typically limited access to market - contributed to the inefficiency for greater part of unorganized garment units. A meta-frontier analysis indicated that the scale-enhancing policy measures possibly favoured the organized sector more than its unorganized counterpart in all the states under consideration. This draws our attention to the need for recognizing the different requirements of these two segments of firms and for adopting a segment-specific support strategy.

Keywords: Garment Production in India, Organized & Unorganized Firms, Production Efficiency, Technology Closeness Ratio

JEL Classifications: L11, L52, L67, Y10

Introduction

The complete phasing out of Multi Fibre Agreement (MFA) quotas in 2005 has opened up new opportunities for garment firms in developing countries like India, in the markets previously restricted by MFA quotas. Stiff competition in the exports market from countries like China and Bangladesh in recent years and lack of comparative advantage technologically as well as in the input prices however, render realization of these gains difficult (Chandra 2005, ONICRA 2014). Indian garment producers are poised for greater challenges in the domestic market as well from increased imports in the era of trade-liberalization. Duty-free import from Bangladesh and entry of an increasing number of international brands from other countries (*ibid*) with fast adoption of Indian tradition and styles are likely to induce India's domestic garment enterprises to embrace efficiency-enhancing strategy even for mere survival.

Available research-works in this field have attributed the relatively moderate success of Indian garments' exports to the structural weaknesses such as fragmented production base and absence of scale economies emanating from her inward-oriented and pro-small scale

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industrial and textile policies (Kaplinsky 1997, Ganesh 2002, Verma 2002, Hashim 2005, NCAER 2009). Drastic restructuring of the techno-organizational aspects of production and marketing on one hand and a policy environment conducive to such restructuring on the other are necessary to improve production efficiency. There have been significant changes in policy sphere too, to deal with these challenges. Given that Indian garment value chain spreads across organized and unorganized segments increasing overall competitiveness requires simultaneous upgrading of units in both the sections. In addition to the withdrawal of capacity restriction on large producers and financial support for technology upgradation in the post-reforms years, the National Textile Policy 2000 has taken a number of important measures for this e.g. de-reservation of the garments sector previously earmarked only for small scale production, inclusion of garments in the list of industries for automatic approval of FDI, and so on. Removal of scale-related restrictions on organized segment alongside other policy-incentives is expected to unleash the growth potential of the large scale producers while unorganized producers are to benefit from this expansion through complementary channels e.g. subcontracting. These changes are expected to influence the production efficiency of the organized and unorganized producers while altering their relative performances by influencing their conducts differentially.

In this background it would be interesting to analyze change in the efficiency profile of these two competing as well as complementary segments in the post-2000 years characterized by both strengthened market-based competition in both domestic and international markets. Thus, objectives of this study are mainly twofold:

- To examine how the efficiency of garment firms in the organized and unorganized sectors of selected Indian states changed in the post 2000 period and to identify the causes restricting efficiency of the firms in the two sectors.
- To evaluate how the changes in the global and domestic policies have affected the relative efficiency performance of the two sectors. The Technology Closeness Ratio (TCR) of the two sectors at the state level is calculated for this to examine the proximity of the two sectors to the *Grand* technology frontier.

Using the non-parametric method of data envelopment analysis (DEA) on the collated industrial statistics from CSO and NSSO respectively for organized and unorganized units, the paper attempts this analysis for the period between 2001 and 2011. Given the diversity of Indian states and scope for state-specific policy interventions, this paper attempts a comparison of changing efficiency performance of these two sets of garment enterprises across states with major presence of both types of firms.

The paper is organized as below: following this introductory discussion, section II will review existing literature relevant for this study. Next, database used and methods followed to this end are delineated (section III). Primary findings of the study are discussed in the following section (section IV) entitled 'Data Analysis and Results' while section V concludes by summing up the theoretical contribution of this paper, and managerial implications of the findings. Based on a short assessment of research gaps in the current analysis, the last section will also comment on the possibilities of further research in this regard.

Review of Literature

In the changed global scenario the Indian garment firms need to improve their efficiency in order to compete effectively with other developing countries. It has to rationalize its structure of production cost as competitive pressure is expected to have intensified following the end of safeguard quotas on the PRC's shipments by end of 2009 (James 2008). According to NCAER 2009 the estimated number of factory and non-factory sector garment producers was near about 1.8 million, more than half of which are small and micro enterprises (NCAER 2009, Bedi & Verma 2011, ONICRA 2014). Bigger firms attempted to improve export performances through modernization in production and chain upgrading instead of lobbying for inefficient transfer of government benefits (D'Souza 2005). Barring a few intervening years, both capacity utilization and capital intensity in such firms registered an increasing trend during the period between 1994-95 and 2006-07 (NCAER *op cit*.) which enabled them to deliver to both domestic and international markets efficiently. Notwithstanding the consolidation of global value chain of garments as noted by Gereffi & Frederick (2010) and some tendencies of large producers' preference for in-house production, a sizeable proportion of garment production in India remains in the unorganized segment. Micro-level evidences indicate a voluminous presence of indirect exporters and high incidence of job-works (for Tiruppur cluster, see Banerjee & Munshi 2004, for Tiruppur and NCR see Singh & Sapra 2007, Roy 2009, for Tiruppur and Ludhiana see NCAER *op.cit*.) leading to predominance of unorganized firms in garment-making. Operating in the export market or catering orders in the

domestic market from big garment retailers independently and without the intermediation of large-scale producers or traders is however very difficult for the small and micro producers. On the other side, unorganized units have distinct advantage in small-batches production with shorter time-leads. The organized sector has been dependent on sub-contracting to the unorganized segment as a part of cost-cutting measure. Complementary or collaborative networks such as subcontracting seem to work as a channel through which market access problem of the unorganized units can be solved and operational efficiency of these units can be enhanced.

Search for increased competitiveness of Indian garment products in fact has necessitated such changes in domestic policies. Interventions in the post-reforms years generally sought to reap the benefits of scale economies by withdrawing restrictions on the large organized firms (Kathuria & Mamta 2012) while retaining its advantage in terms of scope economies and design-intensive customized production for high-value niches market arguably arising from the same set of domestic policies (Teewari 2005, Singh & Sapra *op. cit.*, Narayanan 2008, Gereffi & Frederick *op. cit.*, Banerjee et al 2016). While the removal of capacity restrictions is expected to favor the organized sector the unorganized section will have to face increased competition due to the removal of the protection it enjoyed under the old policy. The scale-improving policy interventions however, have the potential for increasing efficiency in both the segments through complementary networks. In fact, there are evidences of organizational improvement leading to greater efficiency of the unorganized garment firms derived from technology spillover associated with such outsourcing (Maiti 2008, Sahu 2011, Meagher 2013)[2]. Organized garment firms on the other hand may benefit from increased reliance on in-house production that gives greater control over product-quality and other qualitative aspects of a strict export schedule. Such a strategy, while improving the efficiency and competitiveness of the large units, may affect the efficiency of unorganized units adversely as the latter is typically unable to handle the requirements of export obligations and reap benefits of an expanding international market on its own. Hence, efforts of reorganization of production by individual garment firms in the post-2000 years as well as the growth-enhancing policies are expected to have influenced the efficiency performance of organized and unorganized garment producers albeit in a differentiated manner.

Data Source & Methodology

Data Source: In this paper Output oriented Data Envelopment Analysis [BCC model Banker, Charnes and Cooper 1984] is done using firm level data to evaluate efficiencies of the garment firms in the organized and unorganized sector in the years following Textile Policy 2000. Each observation in our data set collates information on a number of variables including those on input and output bundles for different individual industrial enterprises in both organized and unorganized segments. Unit level data on the registered factories are available from the Annual Survey of Industries (ASI) database and the information on unorganized manufacturing units are provided by the successive rounds of National Sample Survey (NSS). As common time points, we have matched NSS 56th Round Survey 2000-01 data on Unorganized Manufacturing Sector Enterprises (estimated number of firms: 274,182) with the 2001-02 ASI data, NSS 62nd Round Survey Data (both area and list frame of the Unorganized Manufacturing Sector) (estimated no. of firms being 298,915) with ASI 2005-06 data and finally, 2010-11 NSSO Round (Survey of Unincorporated Non-agricultural Enterprises) (estimated no. of firms are 298,898) with 2009-10 ASI data.[3] The choice of NSSO time points is obvious and that of ASI was constrained by our access and availability of unit level data. The selected time-points however serve to indicate the changing comparative performance of the concerned two segments of the garment industry in the immediate aftermath of announcement of National Textile Policy 2000 and complete abolition of MFA respectively.

[2] Studies e.g. Taymaz (2009), Yang & Chen (2009), Kathuria *et al* (2013) and Sen (2016) have found evidences of relatively low productivity and efficiency of unorganized units than their organized counterparts, the logical possibility of greater incremental gains in efficiency for the former cannot be denied.

[3] The time-points are referred as 2001, 2006 and 2011 respectively.

Table 1: Variables Used in the Combined Dataset and Their Definitional Compatibility

Variable	ASI data	NSS data
Output (Rs.)	**Y**: Annual ex-factory value of output	**Y**: Annual value of total receipt
Intermediate input (Rs.)	**INTER**: Expenses on materials and fuels consumed	**INTER**: Expenses on materials and fuels consumed = Annual value of (total expenses – other operating expenses + costs of electricity & fuel consumed)[4]
Capital (Rs.)	**K**: Book value of fixed asset on the opening date of the reference year	**K**: Market value of fixed assets (owned & hired) as on the closing date of the reference year – net addition to fixed assets during the reference year
Labour (number)	**L** = Total man-days worked (both manufacturing and non-manufacturing)	**L** = (Total number of FTE workers[5] * 30 * number of months operated * average hours worked[6])/8

Source: Authors' classification from the data used

To ensure comparability of data on the unorganized segment over time we concentrated only on the household section of the unorganized firms in all three rounds. We included the relatively mechanized part (units spending more than 1% of their outputs on electricity consumption) garment establishments (firms hiring at least one worker on a regular basis) operating throughout the year keeping in view the issue dealt here. By concentrating on relatively mechanized part of the unorganized garment establishments we expect to capture the performance of firms with a high probability of having some link to the globalized textile value chain. Necessary adjustments were made to ensure comparability of categories representing the same variables (see Table 1).

Methodology: For evaluating efficiency of the garment firms, we have applied the non-parametric method of deriving efficiency scores. The family of non-parametric methods such as DEA seems the most suitable method for analyzing the changing efficiency profile as it requires lesser number of restrictions on the technology of production for analysis. In Data Envelopment Analysis, Linear Programming technique is used to derive a benchmark technology from a sample of observed input output data. The Decision Making Units (DMUs) or firms performing best relative to its competing DMUs (peers) are assigned an efficiency score of 1 and they form the best practice envelope or frontier. The technical efficiency (TE) scores are derived as the ratio of the actual output to ideal output specified by the generated frontier. In this paper separate sector specific frontiers are derived for the selected states at selected time-points and the efficiency of the garment units in the organized and unorganized segments are evaluated with respect to their relevant frontiers. The TE scores of the individual units and the information on input slacks are then used to identify the causes of inefficiency in the two segments.

The first DEA model was proposed by Charnes et al 1978 also known as CRS DEA model. The CRS model finds overall technical efficiency and the model cannot be used to distinguish between pure technical efficiency and scale efficiency. The overall technical efficiency measures inefficiencies due to input output mix (pure technical efficiency) as well as scale of operation (scale efficiency). The CRS specification of the production technology implicitly assumes that the DMUs operate on an optimal scale. Since, this assumption might not hold in practice Banker et al 1984 developed a VRS DEA model that can be used to decompose overall technical efficiency into pure technical efficiency and scale efficiency. The measure corresponding to the VRS assumption represents pure technical efficiency. Overall technical efficiency (OTE) is the product of pure technical efficiency (PTE) and scale efficiency (SE). Thus, scale efficiency of a firm can be derived as:

$$\text{Scale Efficiency} = \frac{\theta_{CRS}^{*}}{\theta_{VRS}^{*}}$$

where θ^{*}_{CRS} is the TE (Technical Efficiency) score of the firm under the assumption of CRS technology and θ^{*}_{VRS} is the TE score of the firm under the assumption of VRS technology. In this paper the overall technical efficiency (OTE) is further decomposed into pure technical efficiency (PTE) and scale efficiency (SE)

[4] As in the data for 'value of products & by-products' there are a very large number of missing entries in the series on 'expenses on raw materials' thus making its direct use unreliable.

[5] To make the labour-data comparable to the ASI data, we convert all workers (both full-time and part-time) into full-time equivalents (FTEs), by treating 1 full-time worker = 2 part-time workers.

[6] In the 56th round data, average number of hours worked daily is not given. We assume here that each day consists of an 8-hour block.

to identify the causes of inefficiency of the inefficient firms. Pure technical efficiency is further subdivided into radial inefficiency and slacks. In the following paragraph the VRS DEA model used to obtain the output oriented technical efficiency scores is briefly explained.

Let (x_j, y_j) be the observed input-output bundle of an individual firm j in a sample of N firms in the data. Then given the assumptions of convexity of the production possibility set along with free disposability of both inputs and outputs, the production possibility set under the assumption of VRS technology can be empirically constructed as The output-oriented measure of technical efficiency of firm j is obtained from the solution of the following program:

$$T = \{(x,y): x \geq \sum_{j=1}^{N} \lambda_j x^j \; ; y \leq \sum_{j=1}^{N} \lambda_j y^j ; \sum_{j=1}^{N} \lambda_j = 1; \lambda_j \geq 0.(j = 1,2,.....N)\}$$

$$\max \varphi$$

$$\text{s.t.} \quad \sum_{j=1}^{N} \lambda_j x_{ij} \leq x_{ij} : \forall i = 1,2,.....n$$

$$\sum_{j=1}^{N} \lambda_j y_{rj} \geq \varphi \, y_{rj} \; ; \forall r = 1,2,....m$$

$$\sum_{j=1}^{N} \lambda_j = 1;$$

$$\lambda_j \geq 0 \; (j = 1,2,...,N).$$

The score $\theta^* = \frac{1}{\varphi}$ obtained by solving the above LPP gives the output oriented technical efficiency of the j th firm under VRS. The CRS DEA model can be derived simply by deleting the restriction $\sum_{j=1}^{N} \lambda_j = 1$.

The VRS DEA calculates only radial in (efficiency). For radial and slack calculation the following model which is an extension of the VRS DEA model is used:

$$\text{Max } \bar{\varphi} = \varphi + \varepsilon(\sum_{r=1}^{m} s^+_j + \sum_{i=1}^{n} s^-_i)$$

$$\text{Subject to } \sum_{j=1}^{N} \lambda_j y_{rj} - s^+_r = \varphi y_{rj} \quad \forall r = 1,2,.....m$$

$$\sum_{j=1}^{N} \lambda_j x_{ij} + s^-_i = x_{ij}; \forall i = 1,2,.....n$$

$$\lambda_j, s^+_r, s^-_i \geq 0; \forall j = 1,2,.....N, \forall r = 1,2,.....m;$$

$$\forall i = 1,2,.....n$$

where θ is free. s^+_r, s^-_i, indicates the output and input slack and ε is any pre assigned positive number, however small. Positive sign means output should be increased and negative sign means input should be decreased (Ray, 2004). In addition to the slack and surplus values this model provides a 'reference set' of efficient DMUs (also called 'peer group'). The peer DMUs are the efficient units that are observed to produce the same or higher level of outputs with same or lesser amounts of inputs in comparison to the inefficient DMUs. This enables the inefficient DMUs to know if there is excessive wastage of inputs and/or if there is any scope for improvement in outputs.

Firms that are falling on the VRS frontier but are not on CRS frontier are scale inefficient and are operating in either increasing returns to scale or decreasing returns to scale region. Hence, for these firms there is further scope for improvement in Overall Technical Efficiency Score through improvement in Scale Efficiency. Economies of scale is an important source of manufacturing efficiency for any manufacturing firm. The Indian garment firms were constrained by absence of scale economies due to the capacity restrictions imposed on the garment firms by the old textile Policy. The new textile policy is expected to have differential impact on the two sectors. While the organized sector will benefit due to the removal of the capacity restrictions it faced under the old policy the unorganized sector will lose the protection it enjoyed under the old regime. In this context it is interesting to find out the returns to scale of operation of the inefficient firms and find out whether there exist differences between the two sectors in this respect.

The firms which are not scale efficient are either operating at decreasing returns to scale or at increasing returns to scale. Following Zhu and Shen 1995 the returns to scale of units can be computed with the help of the CRS TE and VRS TE scores and the $\lambda_j s$ corresponding to their CRS TE scores:

i) If CRS TE score = VRS TE score then CRS prevails.

ii) If CRS TE score ≠ VRS TE score and $\sum_{j=1}^{N} \lambda_j \prec 1$ then increasing returns to scale prevail.

iii) If CRS TE score ≠ VRS TE score and $\sum_{j=1}^{N} \lambda_j \succ 1$ then decreasing returns to scale prevail.

Available literature on Indian T&G sector indicates that the organized and the unorganized sector operate under different technological conditions. Hence an interesting question to explore is how the technological gap between

the two sectors has changed over the period of our analysis. *Meta-frontier* approach to efficiency analysis (Rao, O'Donnell, Battese 2003; Ray 2004, Bhandari & Maiti 2007; Bhandari & Ray 2011) is used to address this question. In this study, we take organized and unorganized segments in each state at the selected time-points as the relevant groups and derive *group* frontiers for each of them for the selected states. In the next step, a grand-frontier for each state is derived by applying DEA on all the observations from the organized and unorganized units in the state. If for a firm, the group and meta frontier scores are close then at the corresponding data point the group frontier is close to the meta frontier. Instead of assessing the proximity of the state level organized (unorganized) frontier to the state level meta frontier at individual data points it is useful to construct an overall measure of proximity by considering the average TE scores of all the firms belonging to a particular sector in the selected state measured against the state level group frontier relative to their TE scores measured against the state level meta frontier. The average technical efficiency of the firms in the organized sector in state s relative to the state organized frontier (i.e. the frontier consisting of only the organized sector firms belonging to the state in question in any particular year) is given by the geometric average of their technical efficiencies w.r.t. the state frontier of the organized sector firms: $TE_{so} = \left(\prod_{k=1}^{n} TE_{so}{}^{k} \right)^{\frac{1}{n}}$, where $k = 1...n$, are the organized firms belonging to state s. Similarly, the average technical efficiency of the organized sector firms in the state relative to the meta frontier (i.e. the frontier constructed with the organized and unorganized sector firms in the state in the year under consideration) is given by the geometric average of their technical efficiencies w.r.t. the state grand frontier: $TE_{soM} = \left(\prod_{k=1}^{n} TE_{soM}{}^{k} \right)^{\frac{1}{n}}$. Hence, for state s an overall measure of the proximity of the state organized frontier to the state level meta frontier is given by the Technology Closeness Ratio (TCR) $TCR = \frac{TE_{soM}}{TE_{so}}$. Similarly TCR for the unorganized sector is also to be derived to find out the proximity of the state unorganized frontier to the state level *meta* frontier.

Data Analyses and Results

Before carrying out Data Envelopment Analysis summary statistics of the inputs and outputs in the states under consideration were analyzed. It was found that the average level of inputs used and output produced were higher in the organized segment than in its unorganized counterpart for all the selected years. Average values in individual segments in each state however rose during the study period.[7]

[7] The table however, containing selected descriptive statistics for two segments in ten major garment-producing states for all three selected time points is not presented in the paper.

Table 2: State-Wise Percentage of OTE, PTE and SE firms

States	Efficient Firms by Different Criteria	2001		2006		2011	
		ORG (%)	UN (%)	ORG (%)	UN (%)	ORG (%)	UN (%)
Delhi	OTE		2.92	8.82	10.00	11.22	4.00
	PTE	13.51	8.19	17.65	18.75	17.35	9.33
	SE	10.81	2.92	11.76	12.86	16.33	10.67
	Total Firms	**148**	**171**	**136**	**70**	**98**	**375**
Gujarat	OTE	45.45	6.34	11.11	8.70	14.89	4.78
	PTE	59.09	15.49	22.22	17.39	29.78	6.96
	SE	50.00	8.45	11.11	13.04	19.15	7.39
	Total Firms	**22**	**142**	**36**	**92**	**47**	**230**
Haryana	OTE	7.35	7.32	9.38	7.62	6.99	6.11
	PTE	25.00	17.07	23.44	20.00	9.79	12.98
	SE	22.06	31.71	11.72	7.62	11.19	13.74
	Total Firms	68	164	128	105	143	131
Karnataka	OTE	4.76	6.01	8.28	3.70	8.66	5.58
	PTE	10.88	9.01	14.65	10.37	17.32	11.68
	SE	6.12	17.60	12.74	4.44	12.60	12.18
	Total Firms	**147**	**233**	**157**	**135**	**127**	**197**

States	Efficient Firms by Different Criteria	2001		2006		2011	
		ORG (%)	UN (%)	ORG (%)	UN (%)	ORG (%)	UN (%)
Maharashtra	OTE	13.21	1.82	6.12	3.27	10.19	3.58
	PTE	28.30	3.47	12.24	6.55	17.59	7.16
	SE	13.21	6.94	7.14	4.73	15.74	8.35
	Total Firms	**53**	**605**	**98**	**275**	**108**	**419**
Punjab	OTE		3.70	17.24	5.37	4.05	7.25
	PTE		7.12	37.93	11.41	17.57	13.53
	SE		11.40	17.24	25.50	4.05	8.21
	Total Firms		**351**	**29**	**149**	**148**	**207**
Rajasthan	OTE	27.27	5.68	20.59	5.03	17.02	3.69
	PTE	50.00	10.04	41.18	11.95	46.81	7.38
	SE	27.27	10.92	20.59	6.92	17.02	6.38
	Total Firms	**22**	**229**	**34**	**159**	**47**	**298**
Tamil Nadu	OTE	3.45	2.30	3.88	3.48	2.93	2.48
	PTE	9.36	7.59	9.48	7.32	6.11	7.87
	SE	4.43	15.63	13.36	9.06	7.82	14.29
	Total Firms	**203**	**541**	**232**	**287**	**409**	**483**
Uttar Pradesh	OTE	12.00	2.22	7.69	1.52	8.72	1.52
	PTE	28.00	5.55	13.99	6.36	16.11	4.00
	SE	12.00	12.75	11.89	5.15	9.40	4.00
	Total Firms	**50**	**435**	**143**	**330**	**149**	**525**
West Bengal	OTE	71.43	2.73	50.00	6.90	24.13	2.25
	PTE	100.00	7.27	70.00	10.34	51.72	6.15
	SE	71.43	7.58	50.00	9.77	24.14	7.17
	Total Firms	**7**	**330**	**10**	**174**	**29**	**488**

Note: ORG: Organized; UN: Unorganized; OTE, PTE & SE refer to overall technical, pure technical and scale-efficiency respectively; Punjab ORG excluded due to insufficient no. of firms

Source: Authors' Calculation

In the next step, DEA was used to derive sector specific frontiers for the selected states. The percentage of OTE firms are found to be less than 15% in most states in both organized and unorganized sectors implying that a majority of the firms in the states are operating below the best performing frontier (see Table 2). In a number of states, the percentage of OTE firms in organized as well as the unorganized sector has dropped between 2001 and 2011. Gujarat, Haryana, UP and Rajasthan, for example, have recorded a decline in the percentage of OTE firms between 2001 and 2011 in both the organized and unorganized sectors. It is interesting to note that in all the years under consideration the percentage of OTE firms is lower in the unorganized sector than in the organized sector in most of the states. The only exceptions are Karnataka and Punjab. In Karnataka, the percentage of OTE firms is higher in the unorganized sector in all the years under consideration. In Punjab, the percentage of OTE firms in the organized sector exceeds that in the unorganized sector only in 2011.[8]

Several states also recorded a drop in average OTE scores as is evident from the findings summarized in Table 3. Gujarat, Haryana and Karnataka in unorganized segment, Maharashtra and West Bengal[9] in the organized segment, and Rajasthan in both segments have experienced a drop in average OTE scores between 2001 and 2011.

[8] There were only four organized firms in the sample on Punjab garment industry and we could not run DEA for the organized part in this state for the year 2001. As tables 2 through 5 involve comparison of firms over time in individual states separately, we had reported the findings without any result for Punjab organized garment units for this year.

[9] The sample for the organized garment units in West Bengal for the year 2001 included only seven firms. The technical efficiency scores and related findings for this time-point therefore needs cautious interpretation.

Overall Technical Efficiency (OTE) captures Pure Technical Efficiency (PTE) as well as Scale Efficiency (SE). Hence, firms which have an OTE score of less than one either have pure technical inefficiency or scale inefficiency or both. The average scale efficiency scores have improved[10] in most of the states in both the sub periods in both organized and unorganized sector (refer Table 3).

Earlier, reservation of the garments sector to small scale led to low level of operation and prevented technological upgradation (Hashim *op.cit.*). With the dereservation of the garment sector from small scale, the scale efficiency of the firms have improved.

[10]Between 2006 and 2011 the exceptions to this pattern in the organized sector are Haryana, Rajasthan and West Bengal. The only state which recorded a fall in average scale efficiency between 2006 and 2011 in the organized sector is Gujarat. In the unorganized sector the exceptions are Karnataka and UP between 2001 and 2006 and Tamil Nadu between 2006 and 2011.

Table 3: State-Wise Average OTE, PTE and SE Scores

States	Efficiency by Different Criteria	2001		2006		2011	
		ORG	UN	ORG	UN	ORG	UN
Delhi	OTE	0.56	0.48	0.62	0.62	0.69	0.60
	PTE	0.66	0.57	0.71	0.70	0.74	0.66
	SE	0.87	0.85	0.86	0.88	0.93	0.93
Gujarat	OTE	0.80	0.56	0.56	0.60	0.68	0.52
	PTE	0.85	0.62	0.69	0.65	0.78	0.56
	SE	0.94	0.92	0.83	0.93	0.86	0.95
Haryana	OTE	0.71	0.60	0.70	0.59	0.53	0.59
	PTE	0.80	0.68	0.79	0.67	0.60	0.66
	SE	0.90	0.90	0.86	0.88	0.88	0.92
Karnataka	OTE	0.59	0.62	0.56	0.58	0.63	0.49
	PTE	0.70	0.65	0.63	0.68	0.68	0.56
	SE	0.83	0.95	0.90	0.86	0.94	0.88
Maharashtra	OTE	0.70	0.36	0.43	0.37	0.51	0.56
	PTE	0.78	0.40	0.53	0.40	0.56	0.59
	SE	0.90	0.92	0.80	0.94	0.94	0.95
Punjab	OTE	--	0.53	0.82	0.56	0.64	0.59
	PTE	--	0.57	0.88	0.61	0.77	0.64
	SE	--	0.93	0.94	0.92	0.83	0.91
Rajasthan	OTE	0.81	0.53	0.64	0.46	0.74	0.43
	PTE	0.88	0.57	0.80	0.53	0.85	0.44
	SE	0.92	0.93	0.82	0.88	0.87	0.99
Tamil Nadu	OTE	0.43	0.44	0.40	0.55	0.51	0.52
	PTE	0.54	0.47	0.46	0.59	0.56	0.58
	SE	0.82	0.94	0.90	0.94	0.93	0.91
Uttar Pradesh	OTE	0.63	0.46	0.63	0.36	0.66	0.45
	PTE	0.75	0.51	0.68	0.43	0.74	0.50
	SE	0.86	0.92	0.94	0.88	0.89	0.91
West Bengal	OTE	0.96	0.48	0.89	0.52	0.87	0.49
	PTE	1.00	0.53	0.99	0.58	0.91	0.56
	SE	0.96	0.90	0.90	0.90	0.96	0.88

Note: ORG: Organized; UN: Unorganized; OTE, PTE & SE refer to overall technical efficiency, pure technical efficiency and scale-efficiency respectively

Source: Authors' Calculation

When increase in average scale efficiency is associated with significant rise in the percentage of scale-efficient firms it indicates increased homogeneity in terms of improvement in scale-efficiency performance of the concerned firms. Increase in average scale efficiency was found to be associated with increased percentage of scale-efficient firms in the organized segment in a number of states in both the sub-periods.[11] There was a substantial improvement in both for organized garment producers in Karnataka in 2006 and Gujarat, Haryana, Maharashtra between 2006 and 2011 (Tables 2 & 3). Similar positive associations were found among unorganized units too (Maharashtra by 2006, Haryana, Karnataka, and Punjab in 2011).

While scale efficiency has shown improvement, pure technical inefficiency remains a major cause of inefficiency in the organized sector (see Table 3). Hence, improper input mix seems to be an important source of inefficiency in the organized sector. The percentage of PTE firms has actually decreased in a number of states in the organized sector (refer Table 2). This has been accompanied with a decline in average PTE score during the entire period of analysis for most of the states except for Tamil Nadu and Delhi[12]. The decline however has been prominent in the first sub-period thereafter followed by slight improvement. The unorganized sector has performed better than the organized sector in terms of improvement in the average PTE scores. Average PTE score of the unorganized firms has improved in 50% of the states under consideration. States which recorded an increase in average PTE score between 2001 and 2011 in the unorganized sector are Delhi, Maharashtra, Punjab, Tamil Nadu and Uttar Pradesh. The percentage of PTE firms has also increased in a number of states in the unorganized sector (Delhi, Karnataka, Maharashtra, Punjab, and Tamil Nadu).

Firms which have PTE score of less than one are using inappropriate input-output mix. The input slacks reported by the Data Envelopment Analysis Program gives interesting insights regarding the changes in input mix that are required to improve an inefficient firm's efficiency. The efficiency score of a firm indicates the proportional or radial improvement in output that can be achieved without requiring extra inputs. However, even after the required proportional improvement (radial adjustment) in outputs the firm may not be Pareto efficient if it operates on the horizontal section of the efficient frontier. To project the firm to a Pareto efficient point further slack adjustments are necessary. The presence of non zero input slacks for a firm implies that the firm in question can improve beyond the level implied by the estimate of technical efficiency. Hence, both the efficiency scores and any non zero output or input slacks should be taken into account to obtain an accurate estimate of technical efficiency (Cooper et al 2000, Saranga 2009, Kumar and Gulati 2008).

In all the states the percentage of firms with slack in labour is generally[13] greater in the organized sector than in the unorganized sector (see Table 4). So, one of the major factors constraining the efficiency of the organized units seems to be underutilization of labour. Notably there are a substantial proportion of firms with capital slack in the organized section. At the beginning of the study period, greater percentage of firms was characterized by production in presence of capital slacks. By 2006 however slack in the use of labour input was the dominant factor leading to use of sub-optimal input-output mix and it remained the most significant reason behind overall poor technical efficiency performance at the end of the study period.[14] Huge investment in machineries and new technology in the segment probably started paying off after a gestation lag. The presence of extensive slack in labour in the organized sector seems to be due to rigid labour laws that do not allow organized firms to retrench labour (corroborates findings from other studies such as Bhandari and Ray *op. cit*., for example).

Since labour laws are less stringent in the unorganized sector the firms there have much lower incidence of slack in labour. Capital slack is the most important constraint on the technical efficiency performance of unorganized garment enterprises. This is somewhat striking given the received understanding that unorganized units typically face scarcity with respect to capital. Adoption of the Technology Upgradation Fund Scheme (TUFS) since 1999 may have eased these units' capital crunch to some extent. But the presence of capital slack indicates underutilization of capital possibility due to lack of skill to use such capital or due to mismatch between these firms' capital requirement and that was made available to them through TUFS and similar easy financing schemes.

[11] Organized firms in Uttar Pradesh, Gujarat, Haryana, Maharashtra, Rajasthan, West Bengal between 2001 and 2006, and Tamil Nadu, Rajasthan (and in Karnataka to some extent) in the latter period presented exceptions to this pattern.

[12] Between 2001 and 2006, in the organized sector the average PTE scores have fallen in all the states except Delhi. Between 2006 and 2011 also, the average PTE scores have fallen in all states except in Maharashtra, Punjab, UP and Delhi .

[13] The only exceptions are Maharastra in 2001, West Bengal in 2006 and UP in 2011.

[14] Delhi, Uttar Pradesh and West Bengal were important exceptions where capital slack characterized production in greater percentage of garment firms even at the end of the study-period.

Table 4: State-Wise Percentage of Firms with Input Slacks

State	Slack in Different Inputs	2001		2006		2011	
		ORG	UN	ORG	UN	ORG	UN
Delhi	Capital	53.38	22.81	24.26	12.86	18.37	24.53
	Labour	13.51	12.28	27.94	12.86	12.24	1.33
	Intermediate Input	0.00	1.17	0.00	0.00	1.02	0.00
Gujarat	Capital	31.82	10.56	38.89	27.17	25.53	17.39
	Labour	18.18	7.04	66.67	11.96	31.91	2.61
	Intermediate Input	0.00	0.70	0.00	2.17	0.00	0.43
Haryana	Capital	54.41	6.10	22.66	18.10	4.90	32.82
	Labour	11.76	9.15	32.81	0.00	27.27	10.69
	Intermediate Input	0.00	3.05	0.00	0.00	0.70	1.53
Karnataka	Capital	8.84	25.32	24.20	25.93	3.94	24.37
	Labour	36.73	1.72	30.57	9.63	21.26	14.21
	Intermediate Input	0.00	1.72	0.00	22.96	3.94	7.61
Maharashtra	Capital	5.66	34.71	35.71	44.73	25.93	19.33
	Labour	11.32	26.61	56.12	2.55	32.41	4.06
	Intermediate Input	1.89	0.00	1.02	5.45	0.00	16.95
Punjab	Capital	--	22.51	34.48	36.91	14.19	2.90
	Labour	--	7.98	17.24	5.37	25.68	7.25
	Intermediate Input	--	0.00	10.34	6.71	0.00	0.00
Rajasthan	Capital	45.45	21.83	20.59	27.04	25.53	44.30
	Labour	18.18	4.80	26.47	20.75	25.53	9.40
	Intermediate Input	0.00	0.44	0.00	33.33	2.13	2.01
Tamil Nadu	Capital	41.87	5.91	17.67	18.47	10.76	12.84
	Labour	63.05	0.55	15.52	13.59	19.32	4.76
	Intermediate Input	0.49	6.28	4.74	1.05	0.49	0.00
Uttar Pradesh	Capital	54.00	15.17	38.46	36.36	25.50	8.57
	Labour	36.00	10.34	44.06	33.33	5.37	12.00
	Intermediate Input	6.00	0.46	0.70	0.00	2.01	15.81
West Bengal	Capital	0.00	19.70	0.00	24.71	13.79	15.78
	Labour	14.29	20.00	0.00	4.02	13.79	11.27
	Intermediate Input	0.00	2.12	0.00	2.87	0.00	0.41

Note: ORG: Organized; UN: Unorganized; DRS and IRS refer to decreasing and increasing returns to scale respectively

Source: Authors' Calculation

Table 4 also indicates that a considerable percentage of unorganized garment firms recorded presence of slacks in the use of intermediate inputs in a few states such as Tamil Nadu in 2001, Karnataka in both 2006 and 2011, Rajasthan in 2006. This is somewhat unexpected and can be possibly explained by the heterogeneity in the product-profile of the unorganized production units and also by the diversity in the production frameworks they operate in Sen 2016. Certain section of producers may use relatively high quality and thus expensive raw materials but the realized value of their output may be comparatively low[15] due to lack of direct access to market and to the presence of typically exploitative intermediaries. This point however needs further verification.

A substantial percentage of the firms are operating at non-optimum scale in both the sectors in all the time points under consideration. For the scale inefficient firms, the

[15] It needs to be noted that all inputs and output are measured in monetary values.

returns to scale of operation are identified (Table 5). The percentage of DRS firms exceeds the percentage of IRS firms in the organized sector in most states during the selected time-points. In 2001, for example, the percentage of IRS firms exceeded the percentage of DRS firms in only three states: Gujarat, Haryana and Rajasthan. In 2006 only Gujarat and Haryana recorded higher percentage of IRS firms. The number of states where IRS firms exceeded percentage of DRS firms has increased to four in 2011: Karnataka, Maharashtra, Rajasthan and West Bengal. However, in the organized sector the majority of the inefficient firms are still operating under DRS implying that these firms are over utilizing their existing capacity and increase in production for these firms will lead to lesser returns per unit of production. These firms need a capacity expansion to retain profitability. In contrast, in the unorganized sector, the percentage of IRS firms exceeds the percentage of DRS firms in most cases.[16] The higher percentage of IRS firms means that the sector has excess capacity and the IRS firms there can save costs by increasing production volume through improved access to final consumers' market.

[16] States where percentage of DRS firms exceeded the percentage of IRS firms in the unorganized sector were: Karnataka and Tamil Nadu in 2001, and Haryana, Karnataka and Punjab in 2006. While in 2011 the only state which reported a higher percentage of DRS firms in the unorganized sector is Delhi.

Table 5: State-Wise Percentage of DRS and IRS Firms

State	DRS & IRS Firms	2001		2006		2011	
		ORG	UN	ORG	UN	ORG	UN
Delhi	DRS	53.38	12.87	72.79	30.00	61.22	61.60
	IRS	35.81	84.21	15.44	57.14	22.45	27.73
Gujarat	DRS	9.09	11.27	69.44	43.48	46.81	44.35
	IRS	40.91	80.28	19.44	43.48	34.04	48.26
Haryana	DRS	29.41	52.44	66.41	54.29	54.55	17.56
	IRS	48.53	15.85	21.88	38.10	34.27	68.70
Karnataka	DRS	87.07	48.93	41.40	63.70	42.52	19.29
	IRS	6.80	33.48	45.86	31.85	44.88	68.53
Maharashtra	DRS	58.49	32.73	77.55	10.18	28.70	35.32
	IRS	28.30	60.33	15.31	85.09	55.56	56.32
Punjab	DRS	--	35.33	72.41	53.69	83.11	26.09
	IRS	--	53.28	10.34	20.81	12.84	65.70
Rajasthan	DRS	31.82	27.51	44.12	32.08	57.45	28.86
	IRS	40.91	61.57	35.29	61.01	25.53	64.77
Tamil Nadu	DRS	65.52	44.14	59.05	32.40	48.41	39.96
	IRS	30.05	40.23	27.59	58.54	43.77	45.76
Uttar Pradesh	DRS	54.00	36.41	44.06	44.55	79.87	31.43
	IRS	34.00	50.83	44.06	50.30	10.74	64.57
West Bengal	DRS	28.57	33.64	20.00	16.67	34.48	30.33
	IRS	0.00	58.79	30.00	73.56	41.38	62.50

Note: IRS: Increasing Returns to Scale; DRS: Decreasing Returns to Scale

Source: Authors' Calculation

A *meta*-frontier analysis was conducted for the selected states separately[17] – involving both organized and unorganized units in each, to examine how the technology gap between these two segments under consideration has evolved over time in each state.[18]

[17] We could not run a meta frontier analysis at all India level as total number of sample firms of both organized and unorganized segments would be too large to carry out any data envelopment analysis.

[18] Punjab was excluded from this analysis as there was no group frontier analysis for the organized segment there for the year 2001 due to insufficiency of data.

Table 6: Segment-wise TCR for Selected States

States/Segments by Year	Criteria	2001		2006		2011	
		ORG	UN	ORG	UN	ORG	UN
Delhi	Average Group TE Score	0.63	0.54	0.63	0.66	0.72	0.62
	Average *Grand* TE Score	0.50	0.52	0.61	0.51	0.71	0.55
	TCR	0.79	0.96	0.97	0.77	0.98	0.88
	Frontier firms	13	13	21	8	14	28
	No. of Firms	148	171	136	70	97	375
Gujarat	Average Group TE Score	0.83	0.59	0.61	0.61	0.79	0.52
	Average *Grand* TE Score	0.63	0.58	0.57	0.51	0.75	0.47
	TCR	0.77	1.00	0.94	0.82	0.94	0.91
	Frontier firms	8	19	6	11	11	13
	No. of Firms	22	142	36	91	45	230
Haryana	Average Group TE Score	0.78	0.63	0.75	0.64	0.58	0.62
	Average *Grand* TE Score	0.72	0.60	0.71	0.61	0.57	0.46
	TCR	0.92	0.95	0.96	0.95	0.98	0.74
	Frontier firms	10	21	21	17	14	9
	No. of Firms	68	164	128	105	135	131
Karnataka	Average Group TE Score	0.67	0.62	0.51	0.66	0.68	0.51
	Average *Grand* TE Score	0.65	0.61	0.46	0.61	0.66	0.44
	TCR	0.96	0.99	0.90	0.93	0.97	0.86
	Frontier firms	12	18	14	11	19	16
	No. of Firms	147	233	157	135	116	197
Maharashtra	Average Group TE Score	0.76	0.34	0.39	0.35	0.59	0.55
	Average *Grand* TE Score	0.53	0.34	0.39	0.35	0.54	0.47
	TCR	0.70	1.00	0.98	0.98	0.91	0.86
	Frontier firms	7	20	10	9	20	20
	No. of Firms	53	605	98	275	93	419
Rajasthan	Average Group TE Score	0.86	0.53	0.75	0.47	0.85	0.61
	Average *Grand* TE Score	0.74	0.53	0.61	0.43	0.81	0.58
	TCR	0.86	0.99	0.82	0.91	0.95	0.96
	Frontier firms	8	21	10	17	15	13
	No. of Firms	22	229	34	159	45	298
Tamil Nadu	Average Group TE Score	0.49	0.47	0.36	0.56	0.54	0.54
	Average *Grand* TE Score	0.45	0.46	0.35	0.34	0.53	0.36
	TCR	0.93	0.98	0.97	0.61	0.97	0.67
	Frontier firms	14	27	19	8	19	17
	No. of Firms	204	435	232	287	386	483
Uttar Pradesh	Average Group TE Score	0.71	0.42	0.62	0.37	0.74	0.45
	Average *Grand* TE Score	0.62	0.42	0.61	0.35	0.73	0.41
	TCR	0.87	1.00	0.98	0.93	0.98	0.91
	Frontier firms	8	29	10	10	17	18
	No. of Firms	50	541	143	329	134	525
West Bengal	Average Group TE Score	1.00	0.48	0.99	0.53	0.91	0.51
	Average *Grand* TE Score	0.89	0.48	0.92	0.52	0.89	0.50
	TCR	0.89	1.00	0.94	0.98	0.98	0.97
	Frontier firms	5	21	7	16	12	26
	No. of Firms	7	330	10	174	29	488

Note: ORG: Organized; UN: Unorganized; frontier firms refer to the best-performing units of each segment in the *Grand* frontier; All average scores and the TCR indicate respective geometric means

Source: Authors' Calculation

It is interesting to note that the TCR of the organized sector firms have improved across all the states between 2001 and 2011 while the TCR of the unorganized sector has worsened across all the states in the unorganized sector (see Table 6). In 2001, all the states recorded higher TCR in the unorganized sector than the organized sector. In 2011, on the other hand the picture is reversed and the TCR in the organized sector exceeds that in the unorganized sector in all states. The improvement for the organized segment however was mainly concentrated in the first sub-period in most of the states (except in Karnataka, Maharashtra and Rajasthan). Deterioration in terms of TCR of unorganized firms was more prominent in the post-2005 period.

The decline in the unorganized sector was either concentrated in the second sub-period (Haryana, Maharashtra) or continued throughout the period (Karnataka, UP and West Bengal). In Delhi, Gujarat, Rajasthan, Tamil Nadu the declining trend however reversed somewhat in the second sub-period. Thus, the recent policy changes seem to have favoured the organized sector. Our earlier analysis indicated that the removal of restrictions on capacity had probably improved efficiency profile of both the organized and unorganized segments separately in most of the states. But considering both the segments together, scale-enhancing policies may have benefitted the organized sector more than its unorganized counterpart.

Discussion

National Textile Policy 2000 and other government interventions in the textile sector in the post-reforms years sought to increase the international competitiveness of Indian textile and especially garment products by dealing with various structural bottlenecks facing the industry. The policy strategy focused on two aspects: (a) enhancing production efficiency of the organized segment through allowing technology upgrading as well as optimum scale-adjustment, and (b) utilizing the comparative advantage in terms of small and flexible production by at least a section of the unorganized units through encouraging mutually beneficial connectivity between organized and unorganized segments. Organized segment is expected to benefit from operating in a liberalized policy environment while unorganized enterprises are supposed to derive strength from various networking such as those among small-small (clustering for example) or large-small firms (like subcontracting).

Theoretical Contributions

India's comparative advantage in garments is largely sustained by the interconnectedness of the organized and unorganized segments through a complex subcontracting network (see ILO, 2017). The subcontracting arrangements help firms to cut down production cost while maintaining the quality of the product. Increased integration of India with the global supply chain in the post MFA period has further strengthened the interconnectedness of the organized and unorganized garment units. Thus improvement in overall efficiency of the garment sector cannot be achieved in the absence of coordinated efforts from both the segments. Hence, studies evaluating the efficiency of the garment sector should take into account the interrelationship between the two segments. Most previous studies on textile or garment sector however have focused on a single segment (see Bhandari and Maiti 2007, Bhandari and Ray 2011 op. cit. and Chattopadhyay 2015). The present study makes an important contribution in this respect by analyzing the changing efficiency profile of the two competing as well as collaborating segments in the post-2000 years. The analysis also makes an important contribution by pointing out to the apparently diverse constraints facing the two segments and therefore also to the need for adopting a differentiated policy effort towards overcoming the respective constraints.

Managerial Implications

Serving the globalized domestic and exports market for garments successfully requires shorter length of supply chain characterized by operational flexibility while ensuring controlled quality and minimum lead times. This calls for identifying efficient nodes as well as weeding out slacks. Differences in the impact of the post-2000 policy changes on the two sectors as identified by the present study have important managerial implications. As differential policy responses have uncovered structural weaknesses and production-inefficiencies specific to the two segments. Thus, the entire supply chain can be managed more efficiently through segment specific policy designs. Flexibility of labour laws, for example, might be necessary to address the problem of widespread labour slack in the organized sector in the post-2000 and especially post-MFA years, while existence of slack in capital and raw materials in the unorganized sector also requires some serious introspection**.** The slack

in capital possibly indicates some form of mismatch between the capital needed in the changed scenario and capital actually made available through different input-based policy supports to the unorganized garment firms. The slack in raw material on the other hand may point out to the limited scope of realizing the value-added by unorganized units within the same segment on account of constraints related with access to the distant markets or with capability to handle orders from such markets. There is a possibility that efficiency-enhancing policy interventions both in the production and distribution spheres of the unorganized units' operation would take care of the slacks. The removal of capacity constraints under the new policy however, seemed to be a step in the right direction as it had a favourable effect on both the segments especially in the post-2005 period when the average scale efficiency scores have improved in most of the states in both the organized and unorganized sector.

In the organized sector, the majority of the inefficient firms were observed to be operating under DRS implying that these firms need switching to larger plants to become efficient. Given considerable presence of capital slacks in this sector, further probe is necessary to locate the exact combination of factors inhibiting such scale expansion. In contrast, in the unorganized sector the percentage of IRS firms exceeded the percentage of DRS firms in most cases[19] implying again that the sector can improve its production efficiency with increasing access to final consumers' market.

Meta-frontier analysis of both the segments together in each state however clearly indicated that post-reforms policy interventions may have affected the organized segment more favourably than the unorganized firms. The diverging efficiency performance was more prominent in the period between 2001 and 2006 after which closeness to the *grand* frontier did not improve much in either sector for most of the states. This draws our attention to the different capability of these two complementary segments and suggests again the need for adopting a segment-specific support strategy. In particular, it indicates the need for paying greater attention to the choice of optimal input combination in the organized segment and to the improvement in the aspects related with market access and distribution as well as to the input bundles in the production framework for the unorganized enterprises while recognizing the heterogeneity in their need.

[19] States where percentage of DRS firms exceeded the percentage of IRS firms in the unorganized sector were: Karnataka and Tamil Nadu in 2001, and Haryana, Karnataka and Punjab in 2006.

Limitations and Direction of Future Research

Ideally, analysis of efficiency should be attempted with panel data. However, a panel data analysis could not be attempted in the present study as NSSO does not reveal the identity of the firm at the unit level data. The panel data for the organized sector is also not available for all the years under consideration. The inability to conduct a panel data analysis remains a major drawback of our study. Another point to note is that there exists substantial heterogeneity among the firms even within each segment in terms of the type and quality of products produced and inputs used. Due to the nature of data available, the study could not pay attention to efficiency associated with fast and new developments of product and design, improvement in product quality and standard of delivery and such factors as have become more relevant in determining market success of garment units than the mere cost calculations. In order to fine tune segment specific policies, the present study needs to be supplemented with primary survey based analyses incorporating these aspects and designed to capture both inter as well as intra sector specific peculiarities.

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