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Impact of Trade Liberalisation on the Efficiency of Textile Firms in India

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Abstract

This study attempts to empirically investigate the implications of unshackling of the global textile trade, following the complete phasing out of the Multi-Fibre Agreement (MFA) in 2005, on the efficiency of firms operating in the Indian textiles industry. By employing the Stochastic Coefficients Frontier Approach, it estimates the overall and input specific efficiency values for 215 sample firms during 1993-94 to 2005-06. Results of the study show that the average efficiency declined over the years, indicating the presence of inefficiency in using inputs. We argue that the Indian textile firms failed to utilise their inputs efficiently during the phase of liberalisation which, if done, would have helped them to withstand and overcome the intense competition from other players like China. Given that there is a paucity of empirical studies dealing with efficiency of the Indian textile industry in the light of phasing out of the MFA, this study seeks to fill such gaps in the available literature.

JEL Classification: F13, F14

Keywords: Multi-Fibre Agreement, Technical Efficiency, Stochastic Coefficients Frontier Approach, Panel Data.

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1. Introduction

The relationship between trade liberalisation and firm's productivity has been a topic of great interest in both international and development economics literature. Studies on the topic have examined whether firms achieve higher productivity/efficiency by becoming exporters or by being forced to improve as a result of more intense competition from foreign rivals. Earlier studies such as Bernard and Jensen (1999) for USA, Aw et al., (2000) for Taiwan and Clerides et al., (1998) for Colombia, Mexico and Morocco showed that more productive firms self select into export markets while Aw et al., (2000) provided evidence that exposure to trade eventually forces the least productive firms to exit.

Melitz (2003) and Bernard et al. (2003) provide a dynamic industry model with heterogeneous firms to analyse the intra-industry effects of international trade. It demonstrates that that the existence of trade costs induces only the most productive firms to self-select into export markets. When trade costs fall, the most productive non-exporters begin to export and the current exporters who already represent the high productivity firms expand their foreign sales. As a result the industry productivity will rise.[2] Thus, both theoretical and empirical studies demonstrate that exporting firms are the most efficient firms and a fall in trade costs will induce firms to become more efficient.

This study attempts to investigate the efficiency implications of textile trade liberalisation in India. The system of bilateral quotas thanks to the Multi Fibre Agreement (MFA) regulated global trade in apparel and textiles industry for many decades. In the Uruguay Round of trade talks (1995), the WTO members agreed to phase out the MFA quotas not later than 1 January 2005. The MFA was replaced by the Agreement on Textiles and Clothing (ATC), which incorporated a series of stages of phasing out quantitative restrictions, occurring at the beginning of 1995, 1998, 2002 and 2005.

The Indian textile industry displays "a very complex sectoral dispersal matrix with hand-spun and hand-woven sector on one end of the spectrum and the capital-intensive sophisticated mill sector on the other, with the decentralised power loom and knitting sectors coming in between" (Ministry of Textiles, India, 2005).[3] It is one of the largest sectors in the economy in terms of output, foreign exchange earnings and employment in India.[4] India has about 25 percent share in the world trade of cotton yarn and is the world's second-largest producer of cotton yarn and textiles. The Indian textile industry has the highest number of looms (including handlooms) in the world and contributes about 60 percent of the world looms. It also contributes 12 percent to the world production of textile fibre and yarn (Ministry of Textiles, India, 2006).

The growing importance and significance of the textile industry to both the domestic and the world apparel market on the one hand, coupled with the dismantling of the quota system on the other hand, has fuelled our interest to focus our attention on the efficiency issues concerned with the Indian textile industry. Although various studies such as

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2 Protection from trade is often considered to shelter inefficient firms (Melitz, 2003).

3 India's textile industry comprises mostly small-scale, non-integrated spinning, weaving, finishing and apparel making enterprises.

4 It contributes 20 percent of industrial production, 9 percent of excise collections, 18 percent of employment in the industrial sector, nearly 20 percent to the country's total export earnings and 4 percent to the GDP. This sector employs nearly 35 million people directly and another 56 million people indirectly who are engaged in allied activities, thus making it the second highest employer in the country (IBEF, 2006).

Balakrishnan et al. (2000) Srinivasan (2001), Tendulkar (2000) and Goldar and Kumari (2002) and Kalirajan and Bhide (2004) dealt with the efficiency of the manufacturing industry in India, none of the studies specifically examine the impact of trade liberalisation brought about by the phasing out of quotas on the efficiency of the textile industry in India. Therefore, this study attempts to analyse this issue.

This study first employs the varying (random) coefficients stochastic frontier production approach and firm level panel data from 1993-94 to 2005-06 to measure the efficiency of textile firms producing products for which the quota restrictions have been phased out. Then, in the second stage of analysis, it empirically tests whether gradual elimination of quantitative restrictions has helped the firms to increase their efficiency or not.

This study proceeds as follows. Section 2 explains the model, data and estimation methods employed in this study. The empirical results are presented and discussed in Section 3 and the main conclusions are summarised in Section 4.

2. Model, Data and Estimation

In this study, we employ the stochastic (varying) coefficients frontier production function methodology to measure technical efficiency of textile firms in India. The frontier production function can be defined as the maximum possible or potential output that a firm can produce with a given level of inputs and technology. The actual production function of a textile firm can be written as:

$$Q_{it} \leq f(x_{it}; \beta) \quad ; i=1,2,\ldots,n \text{ and } t = 1,2,\ldots\ldots,T \qquad (1)$$

where Q_{it} represents the actual output for the i^{th} sample firm in period t; x_{it} is a vector of inputs and β is a vector of parameters that describe the transformation process; f (.) is the frontier production function, or potential outputs of a firm. If the operation of firm is inefficient (efficient) the actual output produced by the firm is less than (equal to) its potential output. Therefore, one can consider the ratio of the actual output and the potential output of a firm as a measure of the technical efficiency (TE) of that firm.

Although Farrell (1957) carried out the first empirical study to measure technical efficiency for a cross-section of firms by using a deterministic/non-parametric frontier approach, Aigner et al. (1977) and Meeusen and Broeck (1977) independently developed a stochastic frontier approach in which the error term was modelled as a composite variable, consisting of a random noise component and a one-sided residual component (which follows a half normal distribution). This approach has been extended in many ways, both in terms of the specification of the error term (through the use of truncated normal, exponential and gamma distributions), as well as in the consideration of panel data. Broadly, the panel data methodologies are grouped as time invariant and time varying TE models. A number of comprehensive literature reviews on these methodologies are available in Bauer (1990), Greene (1993), Kalirajan and Shand (1994) and Kumbhakar et al, (1997). [5]

In these conventional stochastic frontier production function approaches, the underlying assumption is that the frontier is a neutral shift from the realised production

[5] All these extensions require the functional form of the frontier and distribution of the one-sided residual term to be specified. This can result in errors of mis-specification if the above specifications are incorrect.

function. This constant slope-varying intercepts approach raises a fundamental question about the concept of TE. Where does the TE come from and how can a firm achieve its TE?

The literature suggests that a firm obtains its full TE by following the "best practice" techniques, given technology. Stated differently, the method of application of inputs determines the TE regardless of level of inputs (i.e., scale operation). This implies that different methods of applying various inputs will influence the outputs differently. In that case, the slope coefficient will vary from firm to firm and the constant slope approach is not consistent with the theoretical definition of TE. Therefore, a varying parameters (or coefficients) model is appropriate.

Following Kalirajan and Bhide (2004), the general formulation of the Cobb-Douglas Stochastic Coefficients Frontier function for panel data is written as:

$$\ln Q_{it} = \beta_{0it} + \sum_{j=1}^{k} \beta_{jit} \ln X_{jit} + u_{it}; i = 1,2,....n; t = 1,2,.....,T \qquad (2)$$

where, X_{jit} is the j^{th} input used by i^{th} firm in t^{th} period and u_{it} is the usual random error term; β_{oit} is the intercept term for i^{th} firm in period t and β_{jit} is the actual response of the output to method of application of k^{th} input by i^{th} firm.

Each firm's actual coefficient vector β_{jit} (and β_{0it}) at a particular time is allowed to vary from the mean response coefficient vector $\overline{\beta_j}$ ($\overline{\beta_0}$) by some V_{jit} (W_{it}). That is, $\beta_{jit} = \overline{\beta_j} + V_{jit}$ and $\beta_{0it} = \overline{\beta_0} + W_{jit}$, where, V_{jit} and W_{it} are considered as random disturbances. Further we assume the following: $E(\beta_{jit}) = \overline{\beta_j}$; $V(\overline{\beta_j}) = \sigma^2_j > 0$; Cov ($\beta_{jit}$, β_{kit}) = 0 for $j‡k$ (this implies that β_{jit} are i.i.d. with fixed mean $\overline{\beta_j}$); and = E (V_{jit}) = E (W_{it}) = 0; E ($v_i v_j^{'}$) = α_k for $i = j$ and E ($v_i v_j^{'}$) = 0 for $i \neq j$.

With these assumptions, the equation (2) can be written as:

$$\ln Q_{it} = \overline{\beta_0} + \Sigma \overline{\beta_j} \ln X_{jit} + (\Sigma V_{jit} \ln X_{it} + W_{it} + u_{it}) \qquad (3)$$

This is a linear model with mean response coefficients, but has heteroscedastic disturbances. Therefore, the OLS estimation of (3) will yield unbiased but inefficient estimates of $\overline{\beta_j}$. However using the iterative procedure suggested in Swamy (1970), one can obtain the feasible GLS estimates of $\overline{\beta_j}$ and using the procedure suggested in Griffiths (1972), one can estimate the individual response coefficients.

The assumptions underlying the model (3) are:

(1) TE is achieved by adopting the best practice techniques that involve the efficient use of inputs.

The TE stems from two sources: (i) efficient use of each input that contributes individually to TE and can be measured by the magnitude of varying slope coefficients; and (ii) any other firm specific intrinsic characteristics that are not directly included may produce a combined contribution over and above the individual contribution. This lump sum contribution can be achieved by the varying intercept; and

(2) The highest magnitude of each response coefficient (i.e., $\hat{\beta}_{jt}* = Max(\hat{\beta}_{jit})$ and the intercept ($\hat{\beta}_0* = Max(\hat{\beta}_{0it})$ form the production coefficients of the potential frontier production function (Kalirajan et al. 1996).[6]

The production frontier model used here can be viewed as a disequilibrium model of endogenous technological progress in which the accumulation of the best practice knowledge by firms drives the long-run growth. Therefore, using the endogenous growth models by Romar (1986), one may argue that production as a function of the stock of knowledge of best practice techniques and other inputs will exhibit increasing returns to scale. However, using Arrow (1962), we can argue that increasing returns arise because new (best practice) technique is discovered as investment and production takes place. Therefore, $\sum \hat{\beta}_j^* > 1$ does not pose any problem to the measurement of efficiency theoretically. In addition, our model assumes that all firms within an industry use more or less similar technology and have equal access to the best practice techniques of the given technology (Kalirajan and Bhide, 2004).

Using the frontier coefficients, $\hat{\beta}^*$ one can compute the potential output of each firm in period t as:

$$\ln Q_{it}^* = \hat{\beta}_0^* + \Sigma \hat{\beta}_{jt}^* \ln X_{jit} \qquad (4)$$

The TE of the i^{th} firm in t[th] period can be calculated as:

$$(TE)_{it} = \frac{Q_{it}}{\exp(\ln Q_{it}^*)} \qquad (5)$$

Input-specific efficiency of the i^{th} firm in the t^{th} period, which is given by the ratio between actual response and potential response coefficient, can be computed as:

$$\pi_{jit} = \frac{\hat{\beta}_{jit}}{\hat{\beta}_{jt}^*} \qquad (6)$$

where, $\hat{\beta}_{jit}$ is the actual response coefficient of the j^{th} input of the i^{th} manufacturing firm in the t^{th} period and $\hat{\beta}_j *$ is the frontier coefficient of the j^{th} input in the t^{th} period.

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[6] In special cases of the production process in which constant returns to scale are imposed on the individual response coefficients, β_{ijt}, the estimation of $\hat{\beta}_{jt}^*$'s would be complicated and intractable. Even when the condition of constant returns to scale is imposed on the mean response coefficients, $\bar{\beta}_j$'s, the possibility that $\sum \hat{\beta}_j^* > 1$ cannot be ruled out. In either case, the problem that remains is that the best practice production outcome might not be feasible if all production processes had to have constant returns to scale by some strict technical rule.

The study utilises the firm level data on output, inputs, and other characteristics drawn from the Capitaline database. Although the Capitaline database furnishes the annual accounting information of a large number of firms operating in the Indian industrial sector, including textile sector, we use the data relating to textile firms producing those products for which the quota restrictions phased out from 1995.[7] We have identified 215 firms, spreading over 6 different sub-groups of the textiles industry from the total sample. The data on inputs and output have been compiled for these 215 firms during 1993-94 to 2005-06. Due to missing information, the final data set is an unbalanced panel of observations (a total of 983).

The following Cobb-Douglas varying coefficients frontier production function was employed in the empirical estimation:

$$\ln Q_{it} = \beta_{0it} + \beta_{1it} \ln L_{it} + \beta_{2it} \ln R_{it} + \beta_{3it} \ln E_{it} + \beta_{4it} \ln C_{it} + u_{it} \qquad (7)$$

where, Q = real value of manufactured output at the 1993-94 prices for the concerned firm using the relevant wholesale price index (WPI) deflators;[8]

L = real value of wages and salaries paid to workers at the 1993-94 prices using the consumer price index for industrial workers;
R = real value of material inputs used in the production measured in 1993-94 prices (using WPI deflator);
E = the real value of energy used in the production (in 1993-94 prices); and
C = real value of capital employed in 1993-94 prices (using WPI deflators).[9]

All the β_{jit} 's are input specific response coefficients for i^{th} firm in t^{th} period.

After estimating the equation (7), we have computed the firm specific and the time specific TE using the equation (5). The estimated TE can then be used in the second stage of our analysis to test specifically whether gradual elimination of quantitative restrictions (in four stages) has helped the firms to increase their efficiency or not.

Obviously, not all firms do operate on their frontiers. If those factors associated with high technical inefficiencies can be determined, improvements in technical efficiencies could be achieved through facilitating the effective functioning of those factors. Particularly relevant in our case are factors, which could improve the competitiveness of the textile firms. Appropriate policy measures can then be tailored and implemented to influence those factors to effectively reduce the gaps between the most efficient and least efficient firms.

We examine the significance of such determinants by regressing the firm-specific technical efficiency over time on variables like firm size-Z_1 (measured by real sales), export intensity of the firm-Z_2 (ratio of exports to sales value), raw material import intensity-Z_3 (ratio of the value of import of raw material to the total raw material used in production) and

7 We have identified the products for which the quantitative restrictions are removed using the legal text of the ATC.

8 The value of output of each firm is computed by summing up the sales of the firm and the changes in the stocks of final commodities.

9 Capital variable is not reported directly in the database. Following earlier studies on the topic, we have used the Gross Fixed Assets (GFA) of each firm depreciated at 6 percent per annum as the proxy for capital stock series.

time specific (structural shift) dummies (D_is) to account for the phasing out of quotas. Thus, the technical efficiency equation is specified as:

$$TE_{it} = \alpha_0 + \alpha_1 Z_{1it} + \alpha_2 Z_{2it} + \alpha_3 Z_{3it} + \gamma_1 D_1 + \gamma_2 D_2 + \gamma_3 D_3 + \gamma_4 D_4 + m_{it} \qquad (8)$$

where, m_{it} – is the error term; and D_1 = 1 if t=1995-96 to 1997-98 (from the starting year of the first phase to till the second phase starts); D_2 = 1 if t = 1998-99 to 2001-02 (second phase starting year to till start of the third phase), 0 otherwise; D_3 = 1 if t = 2002-03 to 2004-05 (third phase period), 0 others wise; and D_4 = 1 if t=2005-06 (the last but completing phasing out year), 0 otherwise. As the TE measures vary from 0 to 1, they are also transformed into ln (1 / 1-TE) to obtain the OLS estimates that are BLUE in the alternative specification of equation (8).

Table 1 provides the means and standard deviations of the study variables. The mean value of output (real) during study period was Rs.67.38 core. The average cost of raw material was Rs. 42.38 crore. The average export and raw material intensities were about 40 percent and 12 percent respectively.

Table 1: Descriptive Statistics

Variables	Units of Measurements	Mean	Standard Deviation
Output Value (Q)	Rs. Crore	67.380	88.45
Wages and Salaries (L)	Rs. Crore	0.910	1.15
Costs of Raw Materials (R)	Rs. Crore	42.380	61.64
Energy Expenses (E)	Rs. Crore	4.120	6.23
Capital Stock (C)	Rs. Crore	100.390	134.08
Size (=Sales Value, Z_1)	Rs. Crore	66.897	87.47
Export Intensity (Z_2)	Percent	40.259	37.96
Raw Material Import Intensity (Z_3)	Percent	11.717	28.28
D_1=1 if t=1995-96 to 1997-98; 0 otherwise	Number	0.190	0.39
D_2=1 if t=1998-99 to 2001-02; 0 otherwise	Number	0.390	0.49
D_3=1 if t=2002-03 to 2004-05; 0 otherwise	Number	0.258	0.44
D_4=1 if t=2005-06; 0 otherwise	Number	0.069	0.25

Notes: Total Sample size is 983. All monetary values are in 1993-94 prices.

3. Empirical Results

3.1. Frontier Production Function Estimation Results: Table 2 provides the iterative GLS estimation results of the equation (7).[10] As expected, all input parameters are positive. All of them are statistically significant at one percent level except the energy parameter, which is statistically significant only at 10 percent level. The raw material is the major determinant with an elasticity value of 0.48. The capital variable has emerged as the second major determinant with an elasticity value of 0.34. The labour elasticity is 0.12. Table 2 also shows the minimum and the maximum values of the individual response coefficients of the model.[11]

[10] In the preliminary analysis, we tried trans-log functional form and found that Cobb-Douglas form provided the best fit. We also included a trend variable but that was not significant even at 10 percent level.

[11] For the sake of brevity, we report only the overall frontier parameters of the study period. Year Specific frontier coefficients are show shown here, but available with authors on request.

The range of the parameters clearly shows that the individual specific response parameters vary widely across firms except in the case of raw material.

Table 2: Mean and the Range of Response Coefficients Estimates of Frontier Production Functions for Textile Industry, India

Variable	Mean Response Coefficients	Maximum Response Coefficients	Minimum Response Coefficients
Intercept	0.8727 (6.417)	1.2000	- 0.5000
Ln L	0.1197 (4.224)	0.2050	0.0450
Ln R	0.4767 (13.649)	0.4760	0.4760
Ln E	0.0455 (1.674)	0.4210	0.0001
Ln C	0.3392(9.422)	0.4360	0.1440
Sample	983		

Source: Authors' estimation; Figures in brackets are t values.

3.2. Technical Efficiency and Input Efficiency Results: Using the frontier (maximum response) coefficients for each sample year, the potential (frontier) outputs for each period t for the sample firms are calculated. These frontier output estimates show the maximum possible contribution of core inputs to output when the inputs are applied in accordance to the best practice techniques of the given technology. The overall TE and input specific efficiency of the i^{th} firm in the t^{th} period are computed using equations (5) and (6).

Table 3 reports the year wise the mean values for overall efficiency and the input specific efficiency. The overall mean TE value is estimated at about 54 percent. This means that on an average, the sample firms were able to reap out only 54 percent of their potential outputs during the study period. Another 46 percent of their technical potentials were not yet utilised properly.

Table 3: Estimates of Overall TE and Input-Specific Efficiency Measures

Year	Overall TE	Intercept	Labour Efficiency	Raw Material Efficiency	Energy Efficiency	Capital Efficiency
1993-94	60.13	69.04	61.14	99.90	15.26	89.14
1994-95	66.80	72.24	66.21	99.90	21.63	88.32
1995-96	65.26	70.60	77.17	99.90	28.84	87.66
1996-97	60.73	70.69	75.49	99.90	17.61	85.15
1997-98	61.45	73.50	81.00	99.90	45.73	84.55
1998-99	54.43	70.70	77.00	99.90	17.48	81.16
1999-00	50.53	66.71	58.16	99.90	12.39	78.41
2000-01	49.32	66.48	62.63	99.90	19.25	79.09
2001-02	48.61	63.71	73.84	99.90	25.03	81.41
2002-03	47.82	63.42	72.23	99.90	25.50	80.40
2003-04	45.54	61.81	59.90	99.90	15.81	78.85
2004-05	49.58	64.32	77.29	99.90	33.42	82.10
2005-06	54.05	68.83	72.06	99.90	28.90	85.78
All Years	53.63	67.30	69.99	99.90	22.88	82.41

Source: Author's calculations.

By fully exploiting existing technology and input resources, the sample firms would have increased their outputs by 46 percent. Alternatively, the sample firms on an average could have decreased proportionately all inputs by about 46 percent in order to produce the same level of output. In effect, we argue that the sample firms are not operating on their frontiers and they can realise their potential output if they use their inputs more efficiently or cut their inputs proportionately in order to produce the given level of outputs. The year wise overall mean TE ranges between 45.5 percent in 2003-04 and 66.8 percent in 1994-95. It initially registered an increasing trend up to 1994-95 and then continuously declined.

The overall mean value of labour efficiency was 70 percent during the study period. This would mean that on an average, the firms could potentially decrease labour use by about 30 percent to produce the same level of output. The average overall efficiency of raw materials was almost 100 percent. The average input efficiency of capital was 82.4 percent indicating that the firms could still efficiently use this input in the production process to achieve the maximum possible output. The average energy efficiency was only about 23 percent. Firms should make their attentions on this input in order to improve the efficiency.

Frequency distributions of both overall and input specific efficiency values are shown in Table 4. In about 56 percent of the sample firms, the TE is less than 50 percent. This result needs policy attention. In about 45 percent of the sample firms, the labour input efficiency is less than 70 percent and in about 32 percent of firms, the capita efficiency is less than 80 percent. In about 94 percent of firms, the energy efficiency is less than 50 percent. These firms require policy attention.

Table 4: Frequency Distribution of Efficiency Values

Class Interval	Overall TE	Intercept	Labour Efficiency	Raw Material Efficiency	Energy Efficiency	Capital Efficiency
0-10	3 (0.3)	16 (1.6)	-	-	181(18.4)	-
10-20	57 (5.8)	13(1.3)	-	-	337(34.3)	-
20-30	150 (15.3)	23(2.3)	2(0.2)	-	222(22.6)	-
30-40	184 (18.7)	18(1.8)	5(0.5)	-	120(12.2)	1(0.1)
40-50	158 (16.1)	63(6.4)	24(2.4)	-	62(6.3)	-
50-60	110 (11.2)	99(10.1)	195(19.8)	-	21(2.1)	10(1.0)
60-70	61 (6.2)	354(36.0)	217(22.1)	-	14(1.4)	37(3.8)
70-80	38 (3.9)	190(19.3)	396(40.3)	-	9(0.9)	272(27.7)
80-90	25 (2.5)	80(8.1)	108(11.0)	-	1(0.1)	534(54.3)
90-100	197 (20.0)	127(12.9)	36(3.7)	983(100.0)	16(1.6)	129(13.1)
Total	983 (100.0)	983(100.0)	983 (100.0)	983(100.0)	983(100.0)	983(100.0)

Source: Author's calculations.

3.3. Impact of Trade Liberalisation on Efficiency: The above results clearly indicate that TE varied widely across firms and years and the mean TE started declining after 1994-95. Now we can empirically assess whether the trade liberalisation has really worsen the situation or not by regressing TE variable on various determinants including the structural shift dummies relating to quota phasing out periods. Table 5 shows the OLS estimation results of TE equation specified in equation (8). In the first specification, the firm and time specific TE computed in our first stage analysis is used as the dependant variable. In alternative specification, log of (1/1-TE) is used as the dependant variable.

In both cases, firm size has a negative and significant impact on efficiency, indicating that small firms are more efficient than the large firms. The export intensity influences efficiency positively and significantly at one percent level, implying that the firms having high proportion of exports in total sales are more efficient. This result is consistent with theoretical results highlighted in the literature. The raw material intensity variable is not significant in first specification but it is significant in the second specification. Its negative impact on efficiency indicates that firm having high proportion of imported raw materials are less efficient.

Table 5: Determinants of TE

	Dependent Variable=TE		Dependent Variable= ln (1/1-TE)	
Variables	**Coefficient**	**t value**	**Coefficient**	**t value**
Intercept	64.8520	22.846	1.9132	11.428
Size (Z_1)	-0.0696	-7.172	-0.0032	-5.636
Export Intensity (Z_2)	0.0841	3.608	0.0040	2.901
Raw Material Intensity (Z_3)	-0.0431	-1.391	-0.0043	-2.336
D_1	-1.2419	-0.368	-0.0801	-0.403
D_2	-12.3775	-3.990	-0.4725	-2.583
D_3	-14.9749	-4.623	-0.7321	-3.832
D_4	-7.5274	-1.765	-0.5431	-2.160
R^2 [F]	0.1121	[17.5806]	0.0740	[11.1384]

Source: Author's Estimation

All dummies that are included to capture the impact of trade liberalisation through phasing out quota restrictions have negative coefficients. All of them except D_1 are statistically significant at five percent (in second specification). These results imply that the removal of quota restrictions had worsened the situation instead of increasing the efficiency of sample firms in India. This result deserves policy attention.

It is theoretically possible that with enhanced trade liberalisation, more and more non-exporting firms could enter the exporting zone in an attempt to reap efficiency gains through increased exports. But then in such a situation the new firms would certainly require adequate time to adapt to the new (technology) environment in order to prove to be efficient and competitive. Such analogous reasoning could be drawn to our case as well where the phasing out of quota restrictions could have initiated more non-exporting firms to become exporters. Since those firms would have needed time to adapt to the new environment, there could have been a fall in their overall efficiency, especially during those years marked by accelerated removal of quota restrictions, as vindicated by our empirical results. The sample data in our paper also shows a visible entry of a substantial number of firms during the different phases of quota removal. Thus the movement of non-exporting firms into the exporting zone can be offered as a possible explanation for the deceleration of overall efficiency of the textile firms during the years of trade liberalisation.

4. Policy Implications and Concluding Remarks

The results of the study quite significant and interesting as we see the average efficiency levels the textile firms declining over the years. This is particularly contrary to conventional wisdom which holds that players like India would fare much better in the quota free regime since they were supposedly constrained by the MFA. Even though it is agreed that the complete dismantling of the MFA took place only in 2005 and that during the ten year period, the phasing out was heavily back loaded in terms of the inclusion of the products in the process, one would not generally expect the efficiency levels to go down during this period especially factoring in the competitive advantages that the firms in the Indian textile industry were endowed with.

Our results clearly establish that the process of liberalisation through the phasing out of quotas has had a negative impact on the overall efficiency levels of the firms. The falling efficiency levels of the firms during the phasing out period indicate the failure of these firms to match the competitive pressures from countries like China in terms of producing their real potential. Considering the fact that China is the world leader in terms of the market share it holds in the textiles and apparel sector and that India is lagging far behind China even though it stands at number two in the world, it may be argued that the firms in the Indian textiles industry consciously chose to operate below the frontier realising that no amount of production would help them earn an edge over the Chinese firms. Still, the efficiency calculations reflect that India missed the bus in terms of cutting down their inputs use to an efficient level (without any increase in the current level of output) to withstand and overcome this intense competition from China.

To put it differently, we believe that even if the Indian firms had been reluctant to increase their level of output, there was an opportunity for them to reduce their level of inputs usage which would have translated in to lower costs of inputs, which in turn would have lowered the export prices in the world market giving the needed competitive edge over china in those textile products.

The results of our study also have important policy suggestions as far as the use of inputs in the textile industry is concerned. Owing to rigidities in the form of stringent domestic regulations, the firms in the textile industry suffer from the lack of flexibility to cut down their inputs to an efficient level that would allow these firms to attain higher efficiency in terms of operating at the frontier. Given that the Indian firms lack competitiveness in terms of the export price of textile products when compared to China, the only way out to gain a competitive edge over China is by cutting down the cost of inputs in an optimal way such that the lowered cost of inputs would translate into cheaper and competitive prices of Indian textile products in the world market. This would be possible only with more flexible labour laws that could be brought about by a well designed labour market reform with the right dose of incentives and compensation packages.

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