

## **ORGANISED MANUFACTURING SECTOR OF PUNJAB: A STUDY OF TEXTILE INDUSTRY**

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### **INTRODUCTION**

Economic theory states that the development pattern of any economic set up is dominated by agricultural sector in the initial stages of its development and gradually when the process of growth starts rising, the manufacturing and service sector attain the greater share (Kuznet, 1973).

Textile industry occupies a unique position in India being one of the earliest to come into existence in the country. It is country's second largest industry after agriculture. This industry is making significant contribution to state's economy and to national foreign exchange earnings. Textile is the only industry which is self-reliant and complete in value addition i.e. from raw material to the highest value added product-garment / made ups. Therefore growth and development of this industry has a significant bearing on the overall development of the economy.

With the dismantling of the quota regime, the top textile importing countries like U.S.A. and European Union are looking towards India for meeting their import requirement. Indian manufacturers and exporters now have to compete with global player and also face emerging tariff and non-tariff barriers. Yet with its speed of operation, skill, quality and low cost labour, the industry is growing up to reap rich rewards in the new period.

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## NEED AND SIGNIFICANCE

Analysis of different studies available for manufacturing sector of Punjab e.g. Gill (1988,1994), Dhesi and Ghuman (1982), Singh (1992,2005), Singh (2001), Raikhy and Sethi (2001), Singh and Singh (2002), Kumar (2005, 2006) and Singh and Jain (2007) revealed that textile industry was not discussed in detailed. In this context, an analysis of textile industry has been attempted to understand the contours of industrial growth of the state.

The textile industry is also one of the largest provider of employment and accounts of almost twenty per cent of industrial employment and output in the state of Punjab throughout the period of study. It has been noted that even with the high level of mechanization, the chances of machine replacing human are minimum in the sector due to essential skill requirements. It provides employment opportunity to semi literates and lower section of the society where the incidents of unemployment are most glaring. Most importantly the textile sector is one of the biggest employment-providing sector to women, highly neglected section of society. Hence, any boost to textile industry will definitely provide and offer opportunity of large number of employment to the masses in the state of Punjab.

The textile industry in Punjab is being looked as a very high quality conscious industry. Our textile industry is one of the few in the world that passes from the raw material to finished product stage. The state has decided to go hi-tech to tap the world market. Hence, foregoing discussion triggers our concern with such dominant industry. Can they be able to face the competitive pressure of liberalisation, privatisation and globalisation ? Did they witness structural changes? Whether share of employment, output, value added has undergone a dynamic changes or not in this area?

## REVIEW OF LITERATURE

Kuznet (1973) concluded that the share of metal product had risen substantially and those of food and textile groups had declined in many developed countries. One is tempted to interpret the changes as shift in structure of manufacturing sector from consumer to producer goods.

Gill (1981) observed that unregistered manufacturing sector played an important role in the economy of Punjab. The industrial sector of Punjab was dominated by consumer good industries. Even in these industries agro-based industries accounted for the major share. Kaur (1982) examined that cotton textile sector remained single most important industry from the point of view of employment industry in Haryana.

Kumar (2005) revealed that Punjab's manufacturing sector was dominated by industrial group of food and beverages, textile and wearing apparels, basic metal, machinery and

equipment, motor vehicles and chemicals and overtime this product mix pattern didn't experience much change.

### Scope, Data sources and prices

The scope of study is confined to textile industry and organised manufacturing sectors of Punjab. Major source of data for the study is Annual Survey of Industries (ASI). Various issues of annual survey of industries and statistical abstract of Punjab are used to get the detailed information on industrial characteristics such as value of output, value added, employment, capital assets, emoluments, etc. For making price corrections in the reported data on value of output, gross value added, wholesale price index of corresponding industry for manufactured commodities has been used. Wholesale price index for transport and machinery has been used to adjust the data on fixed capital. Consumer price index has been used to deflate the emoluments. Every deflator has 1993-94 as a base year.

### Period of study

This study covers the period of 1980-81 to 2002-03; it has also been divided into two phases, pre-reform period (1980-81 to 1990-91) and post-reform period (1991-92 to 2002-03) to capture the impact of change in policy regimes.

### Methodology

Factor intensity and partial productivities are calculated and their growth rate has been presented. Capital deepening i.e. capital intensity has been calculated by dividing the fixed capital with employment level. Labour productivity is calculated by dividing the gross value added with employment level and capital productivity is calculated by dividing the gross value added with fixed capital.

But still a more comprehensive measure of productivity is the total factor productivity, which takes into account all factors of production is calculated with the help of translog index.

Translog Index can be calculated as under.

$$\frac{\Delta V_t}{V_t} = \log V_{t+1} - \log V_t = \Delta \log V_t$$

$$\frac{\Delta L_t}{L_t} = \log L_{t+1} - \log L_t = \Delta \log L_t$$

$$\frac{\Delta K_t}{K_t} = \log K_{t+1} - \log K_t = \Delta \log K_t$$

Where V is value added, L- labour employed K – capital

$$\bar{W} = \frac{1}{2}(W_{t+1} + W_t)$$

$$\text{Where } W = \text{Wage} = \frac{\text{Emoluments}}{\text{GrossValueAdded}}$$

$$\bar{r}_t = (1 - \bar{w}_t),$$

$$\bar{r}_t = \frac{1}{2}(r_{t+1} + r_t)$$

Now

$$\frac{\Delta A}{A} = \frac{\Delta V_t}{V_t} - \left( \bar{w}_t \frac{\Delta L_t}{L_t} + \bar{r}_t \frac{\Delta K_t}{K_t} \right)$$

Translog Index of total factor productivity

The index for base year, A (0) is taken as 1 then the index for subsequent years is computed using the following equation

$$A_{t+1} = A_t \left( 1 + \frac{\Delta A_t}{A_t} \right)$$

Regression technique has been applied to get the determinants of employment and significant level is calculated at one per cent and five per cent levels of significance. Statistical package SPSS has been used to get the results.

Present study has been divided into four sections. In the first section, growth rate of factor intensity and partial productivities have been calculated. In the second section, total factor productivity has been calculated and its growth rates are shown. In the third section, regression model of employment has been presented. Besides it, selected technical ratios are calculated. In the last section, concluding remarks and policy implications are given.

## SECTION 1

### Factor Intensity and Partial Productivity

Capital intensity increases the productivity of an employee through better utilisation of labour time as well as through improved skill of labour and in turn through demand; it increases the upward pressure on emoluments. So we must examine the changes in capital intensity. Labour productivity in any manufacturing set up can be changed by the combined role of capital deepening and capital productivity (Ghose, 2005). Capital deepening provides per unit

of labour with more capital. Capital productivity traces per unit of value addition done by capital stock.

The trend growth rates in labour productivity, capital productivity and factor intensity are calculated and the results are presented in the table 1. It has been already established in the foregoing discussion that the manufacturing sector of Punjab has followed the acceleration in capital (during post-reform period) has been further strengthened by results of trend growth rate of capital labour ratio. The state of Punjab was under political turmoil and lack of popular government during the pre-reform period hence the state could not gain on the capital investment front, rather the resources of state were invested in the neighboring states. This is clearly visible from the data that the capital assets have negligible growth and capital labour ratio has recorded a significant negative growth rate -4.66 per cent per annum. However, during post-reform period the situation has reversed and the capital labour ratio has been recorded growth rate of 15.34 per cent per annum. Growth rate of capital-labour ratio is also positive and significant during the post-reform period for textile sector.

**TABLE - 1**

**Trend Growth Rate of Capital Labour Ratio, Labour Productivity and Capital Productivity of Selected Industries**

Percent per annum

Manufacturing Group	Capital Intensity			Labour Productivity			Capital Productivity		
	1980-81	1991-92	1980-81	1980-81	1991-92	1980-81	1980-81	1991-92	1980-81
	to 1990-91	to 2002-03	to 2002-03	to 1990-91	to 2002-03	to 2002-03	to 1990-91	to 2002-03	to 2002-03
<b>Textile industry</b>	1.80 (1.15)	9.12** (2.27)	8.41* (6.80)	8.91* (11.3)	2.96* (2.61)	4.62* (9.75)	6.97* (3.81)	-5.64* (-1.36)	-3.49** (2.52)
<b>Organised Manufacturing Sector</b>	-4.66* (-5.98)	15.34* (7.03)	3.55* (2.88)	3.93* (3.43)	5.62* (7.48)	4.39* (15.09)	9.03* (6.03)	-8.43* (-4.23)	1.33 (1.12)

Source: Calculations have been done from ASI data

Note: Figures within brackets are the t- ratios

\*1% level of significance.

\*\*5 level of significance.

Labour productivity for the manufacturing sector has witnessed 3.93 and 5.62 per cent per annum in pre-reform and post-reform period respectively, which was positive and significant. Positive impact of capital intensity on labour productivity signifies the degree of mechanisation. Labour productivity has either improved by the capital deepening or/ and improvement in capital productivity. As for as the growth in capital productivity is concerned it was negative and significant in post-reform period. However, growth rate of capital intensity witnessed positive and significant in post-reform period which is a contributing factor in the performance of labour productivity.

Labour productivity growth in textile industry followed deceleration in the post-reform period. The capital labour ratio has witnessed the improvement; hence we can not find this answer in performance of capital labour ratio. There must be deceleration in capital productivity in post-reform period. The information given in the table shows that capital productivity growth that was highly significant in pre-reform period has become negative and insignificant in the post-reform period. Hence, fall in labour productivity in post-reform period is explained by fall in capital productivity. It can also be inferred that the capital invested in the post-reform period is devoid of improved technology element.

## **SECTION II**

### **Translog Index and Total Factor Productivity Growth**

Economic growth depends upon an increase in output. The output increase depends upon either the increase in accumulation of varying quantities of factor inputs or an increase in productive efficiency of factor inputs or both. The development experience of developing economies like India suggests that growth in output has been achieved mainly due to the accumulation of factor inputs and not from efficient use of factor inputs. The total factor productivity of this sector has increased at the rate of less than one per cent per annum. This shows that the output growth of the industrial sector was facilitated mainly by the accumulation of factor inputs and the contribution of total factor productivity growth was meagre.

The notion of efficiency and productivity lies at the core of economics and improvement in such variable is considered an important source of growth in output (Leibenstein, 1966). Higher productivity growth has significant role in accelerating the pace of industrialisation, for these help to reduce the cost of production and help the industrial concerns to earn reasonable profit, which motivate them to invest more in subsequent rounds. Increased productivity growth enables the industrial sector to reduce its dependence on scarce resources

and thereby help the industry to mitigate supply constraints and avail the products at reduced prices. These days competition is a global phenomenon and to stay for long in the market, manufacturing sector is supposed to improve its productivity and technical efficiency and make some continues research to experience technical change through creation of new processes and products and so on (Schumpeter, 1934).

Translog index and total factor productivity are presented in table 2. It is clear from the table that growth rate of total factor productivity is positive and significant for organised manufacturing sector and textile industry in pre-reform period, However, this momentum has not been maintained in post-reform period, where same growth rates have turned to negative. Growth rate of total factor productivity was higher in pre-reform period but declined in post-reform period, on the pattern of state level (Kumar, 2005) and national level studies [Srivastava (2000), Balakrishna et. al. (2000) , Trivedi et. al (2000) ,Goldar (2000,2002), Goldar and Kumari (2003), Das (2003), Banga (2003)]. So, either the market did not favour the manufacturing sector of Punjab or in the globalised competitive scenario it failed to fetch higher prices, or could not keep its costs low. Punjab had to depend on other states for raw material and other intermediate products for its chemical based and metal-based industries. This forces it to bear additional transportation costs. The question of why the total factor productivity growth in the manufacturing sector and textile industry declined in 1990s, assumes significance, as it was an important objective of reforms. To make Indian industries competitive in international markets and enhancing the productivity growth constituted a means to that end. There could be several possible inferences. First, the failure of total factor productivity growth to accelerate with economic liberalisation is perhaps indicative of harmful lag effects of previous interventionist regime. Second, since there was a spurt in investment activity in 1990s in response to economic reforms, there could be an immediate adverse effect due to gestation lags. Another possible reason is that the discretionary controls on domestic and foreign dimensions of manufacturing sector are largely responsible for the lower growth rate of total factor productivity.

**TABLE 2**  
**Translog index and Growth Rates of Total Factor Productivity**  
**of Selected Industries**

YEAR	Textile industry	Organised manufacturing sector
1980-81	1	1
1981-82	1.00	1
1982-83	0.92	1
1983-84	0.91	1.03
1984-85	1.03	1.04
1985-86	1.03	1.11
1986-87	1.07	1.05
1987-88	1.15	1.13
1988-89	1.22	1.13
1989-90	1.26	1.36
1990-91	1.26	1.24
1991-92	1.19	1.20
1992-93	1.16	1.33
1993-94	0.98	1.25
1994-95	0.94	1.31
1995-96	1.01	1.30
1996-97	0.85	1.39
1997-98	0.77	1.34
1998-99	0.68	1.23
1999-2000	0.73	1.55
2000-01	1.00	1.05
20001-02	0.97	1.01
20002-03	0.97	0.96
Trend Growth Rate( TGR)		per cent per annum
1980-81 to 90-91	3.18* (5.77)	2.67* (5.29)
1991-92 to 2002-03	-2.19 (-1.66)	-2.39* (-3.4)
1980-81 to 2002-03	-0.92 (-.19)	0.57 (1.58)

Note: Figures within brackets are the t- ratios

\* 1% level of significance.

\*\* 5% level of significance

Textile industry that enjoyed the captive market from the erstwhile Union of Soviet Russia (USSR) could not pick up in the productivity growth in the post-reform period. Higher productivity growth rate was recorded by textile sector vis a vis organized manufacturing



sector during the study period. In the nutshell we can say that organised manufacturing sector of Punjab and textile industry could not perform on productivity front in post-reform period. Deceleration in output in the post-reform period has its origin in the slow capacity growth and failure to keep the momentum of productivity growth.

### **SECTION III**

#### **Determinants of Employment**

The exercise here is aimed at identifying a functional form, which describes the employment level in the industrial group. The choice of variables from such a functional relationship is determined initially on axiomatic consideration. Under this, the variables, fixed capital and output are considered to indicate the growth of the industry. The underlying implication here is that more investment in plant and machinery will open up opportunities for expansion of employment avenues in the sector, while axiomatically changing level of fixed capital could be independently viewed as a factor having strong potential to influence the employment level. It is also logical to expect that the effect of capital infusion would also be ultimately reflected in the output level of industry. In view of this, the determination of employment function is initially attempted in terms of basic variables (fixed capital and output).

The table 3 shows that the exercise of regression for the determination of an employment function has yielded results of acceptable level for organised manufacturing sector in terms of output in pre-reform as well as in post-reform period. Technology and fixed capital failed to capture the fruits of new economic policies during both the periods. Rather fixed capital variable reported negative significant value, which implies that fixed capital played adverse role in employment generation. Technology did not yield significant values during the study period.

Output and fixed capital i.e. investment in plant and machinery, generated more employment opportunities in textile sector in pre-reform period. Its value is very low (0.2) but statistically significant. However, fixed capital variable played negative role in generating employment opportunities in post-reform period. Output failed to generate more employment opportunities, rather output in post-reform and technology in pre-reform period bears negative values although insignificant.

TABLE - 3

**Regression Model of Employment of Textile industry and Organised Manufacturing  
Sector of Punjab**

**Dependent Variable Log Employment**

**(a) ORGANISED MANUFACTURING SECTOR**

Year	Intercept	FC	Output	T	Adj R <sup>2</sup>	F	DW
1980-81 to 1990-91	3.59 (3.11)	-0.06* (0.27)	0.29* (0.20)	0.01 (0.009)	0.95	(62.71)*	2.19
1991-92 to 2002-03	-0.55 (4.28)	-0.16* (0.20)	0.91* (0.43)	-0.02 (0.02)	0.48	(4.45)	1.03
1980-81 to 2002-03	1.32 (2.44)	-0.30* (0.10)	0.82* (0.24)	-0.009 (0.009)	0.85	(42.69)*	1.08
<b>(b) TEXTILE INDUSTRY</b>							
1980-81 to 1990.91	0.54 (1.52)	0.2* (0.09)	0.41* (0.22)	-0.005 (0.008)	0.85	(19.32)*	2.17
1991-92 to 2002- 03	7.38* (1.03)	-1.16 (0.04)	-0.24 (0.12)	0.006 (0.003)	0.42	(3.61)	1.41
1980-81 to 2002- 03	2.54 (1.10)	-0.02 (-0.06)	0.34 (0.13)	0.002 (0.004)	0.39	(5.61)	1.04

Note: Figure within bracket are standard error

\*1% level of significance.

\*\*5 level of significance.

Adjusted  $R^2$  gives best fit to the model and its value is close to one in organised manufacturing sector, and textile industry (except post-reform) during both the periods. F ratio is found to be insignificant in textile and organised manufacturing sector in post-reform period. Durbin Watson is taken to avoid the problem of autocorrelation. High value of Durbin Watson indicates that results can be relied without doubt.

### **Selected Technical Ratios**

Under the impact of new regime, it is expected that factor intensity would experience change, whether the factor intensity has tilted in favour of labour or capital, capital output ratio and emoluments output ratio have been calculated in real terms and presented in average for pre and post-reform period in table 4. Two efficiency-measuring ratios namely value added to output ratio and value added to capital ratio have been presented in averages.

Investment in fixed capital is made for (i) to build capacity for higher growth in output (ii) capital intensive innovation (iii) diversification or change in the composition of output. In all these cases, use of fixed capital is justified if it leads to higher growth in value of output along with increase in production efficiency. Hence change in capital output is one of the best ways to identify, whether investment in fixed capital is justifiable or not. Capital output ratio, measure of factor intensity is also a determinant of efficiency. It has followed a decreasing trend for organised manufacturing sector from pre-reform to post-reform period, which is a good indicator for economy. Declined ratio can be attributed to general improvement in the quality of investment. Declined ratio is also suggestive of shift in the composition of manufacturing sector i.e. towards less capital-intensive product or processes. However, this ratio has followed an increasing trend for textile sector from pre-reform to post-reform period, which indicates deteriorating condition of this sector. Declining trend in emoluments to output ratio is a negative trend for labour abundant economy of Punjab. This ratio remained same for textile sector in post-reform period.

TABLE – 4

**Selected Technical Ratios: An Inter-Industry Analysis**

(Average Value)

Industry	Ratios	1980-81 to 2002-03	1980-81 to 1990-91	1991-92 to 2002-03
Organised Manufacturing Sector	Value Added to Output	0.18	0.18	0.18
	GVA to Capital	0.29	0.25	0.32
	Capital to Output	0.70	0.79	0.63
	Emolument to Output	0.06	0.07	0.05
Textile Industry	Value Added to Output	0.18	0.17	0.19
	GVA to Capital	0.73	0.90	0.57
	Capital to Output	0.32	0.20	0.42
	Emolument to Output	0.06	0.06	0.06

Source: Calculated from various issues of ASI

Value added to output ratio highlights the importance of expenditure on basic raw material used in production process. Value added to output ratio has also remained the same for organised manufacturing sector, which indicates that output and value added have followed the same growth rate. This ratio followed increasing trend for textile sector which reflects that growth rate of value added is higher than that of output. Conclusion emerges that this may be possible either due to sale at higher prices or production at lower cost. Gross value added to capital ratio followed an increasing trend for organised manufacturing sector, whereas this ratio has followed the decreasing trend for textile industry.

**SECTION 1V****Summing up and Policy Implications**

Textile industry followed deceleration and organised manufacturing sector witnessed improvement in growth rate of labour productivity in the post-reform period as compared to pre-reform period. Capital output ratio followed a declining trend for organised manufacturing sector, from pre-reform to post-reform period, which is a good indicator for economy. Textile industry and organised manufacturing sector recorded positive and significant growth rate of total factor productivity in pre-reform period; however, this momentum could not be maintained in post-reform period. Textile industry that enjoyed the captive market from the erstwhile Union Socialist Soviet of Russia (USSR) couldn't raise the productivity growth in the post-reform period. In textile industry, fixed capital and output

generated more employment opportunities during pre-reform period but both the variables recorded negative insignificant values in the post-reform period.

Although industrial sector of state is dominated by small sized factories, yet a tendency towards the establishment of large sized units has set in. It is a well-known fact that Punjab's industry was and continues to be export based. The situation demands for the restructuring of industrial pattern and process, which can help to resolve the structural problems of the existing model of growth. In rural areas of Punjab, large sized labour intensive units of textile industry should be established so that production and expenditure linkages may be generated.

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