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MEASURING LABOUR AND CAPITAL PRODUCTIVITY IN ORGANIZED TEXTILE SECTOR OF INDIA IN POST-REFORM PERIOD

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ABSTRACT

The paper examines the issue related to the measurement of labour productivity in the organized textile sector of India. The study using ASI data between 1991- 92 to 2014-15, estimated the trends in labour productivity, capital productivity. The paper also explores the relationship between capital intensity and labour productivity. Analysis reveals that in the post-reform period, there is substantial acceleration in labour productivity in the post-reform period. The results also reveal that capital productivity has shown dwindling trends in the organized textile sector of India. Moreover, capital intensity has been found as a significant factor influencing labour productivity. The relationship between capital intensity and capital productivity was found negative. The growing capital intensity in the textile sector, suggests that the sector is getting modernize.

Key words: Textile, Reforms, Productivity, Labour, Capital, Capital intensity

JEL Codes: JO1, JO8, J21

INTRODUCTION

In a labour-abundant country like India, the productivity issue has received significant deliberation from the economic and political communities. It is largely due to positive contribution of labour productivity in economic growth and development, particularly in underdeveloped countries. There is enormous substantiation in theory and empirical literature about the nexus between productivity and economic growth. Eminent studies have shown that economic growth accomplished through a sustained increase in labour productivity can raise per capita income (Bandophadhya, 2008). Higher productivity is considered as a conceivable route to support competitiveness and place the country on a strong growth path. Labour productivity - wage rate link stimulates workers to be productive by influencing their willingness and ability to work.

Although labour productivity play a multidimensional role, empirical literature shows that no concrete attempt was made to estimate labour productivity in India. Most of the studies preferred total factor productivity concept over labour productivity. Several arguments were put forward for justifying the estimation of total factor productivity rather than labour productivity. Researcher argued that the labour productivity measured by partial productivity index does not hypothesise the influences of productivity in its respective capacity, but assimilates the cumulative influence of other inputs. Again, an aggregation of all inputs does not bring a direct effect of the technical

turnaround in the production technique. It is well endorsed that increase in output is accompanied by embodied technical progress, and revamped quality of labour and capital. When capital increases, there is a high possibility that labour productivity may show increasing trends. Such a rise in labour productivity could be a reflection of the rising capital-labour ratio rather than, the effect of pure technical progress. Another limitation of partial measure pointed is the assumption of equi-proportionate changes in input coefficients in production function (Rao, 1996).

Notwithstanding, Balakrishnan (2004), appropriately advised that the measurement of total factor productivity cannot be supplanted for labour productivity. He suggested that investigations of labour productivity require its recognition. It has to be stated that, labour productivity is perceived as a measure of probable consumption (Kathuria, 2010). The surge in labour productivity is indispensable for enhancing the standard of living (ibid). Importantly, labour productivity is a better measure of scrutinising the trends in long run due to given biases in obtaining the capital stock. Labour productivity is also useful in investigating the causes of stagnation and the slowdown of economic growth, especially in developing countries (Ahluwalia, 1991). Further, higher labour productivity reveals a better utilisation of capital. The per capita income and profitability in the economy are determined by labour productivity. Also, labour input forms a comparatively large share of labour costs and easily computed, due to the availability of statistics in terms of the total number of labour engaged, hours of works, etc. (Heshmati, 2009).

The arrangement of the remaining paper is as follows. The profile of the textile sector is detailed in section II. Section III highlights the methodology utilised in the study. Section IV brings details of data and variables adopted in the study. Section V provides results and trends in labour productivity and draws a comparative account of labour productivity. Section VI discusses the major interpretation and policy implication, while the last section VII deal with the conclusion.

II. PROFILE OF TEXTILE SECTOR

The trends in labour productivity will give us a clear understanding of the productivity performance of specific sector manufacturing. In the Indian context, we have not come across studies that have estimated labour productivity in the textile sector. The textile industry, eminently being labour intensive, exquisitely suits our framework for evaluating the performance of labour productivity in the post-reform period. Most notably, it is the single largest industry in the economy and form the backbone of the socio-economic structure of India (Tondan, 2013). Also, this industry is regarded as typical 'starter' industry for nations that have initiated an exports-orientated industrialization (Gereffi, 2001). Besides these, its contribution to industrial production and the gross domestic product is highly noteworthy. It contributes around 14 % of industrial production and 4 % to gross domestic product respectively. In terms of employment, it is the second-largest employer after agriculture, providing a livelihood for 45 million people directly (Ministry of Textile, Government of India, 2014).

III. METHODOLOGY

With this background in mind, we propose to rely on partial productivity measures to compute productivity. According to this measure, productivity is expressed as the relationship of the output of a producing economic unit viz: firm, industry, or economy to one type of inputs via, labour or capital (Bandophdaya, 2008). The partial productivity index have been derived using following methodology.

Labour Productivity

Labour productivity is derived by dividing the gross value added to the number of people engaged. Symbolically

$$P_l = \frac{V}{L}$$

Where, P_l is partial productivity of labour, V is gross value added and L is a number of labours engaged.

Capital Productivity

Capital Productivity is derived by dividing gross value added with derived gross fixed capital stock. Symbolically

$$P_k = \frac{V}{K}$$

Where P_k partial productivity of labour, V is is gross value added and $\boldsymbol{L}$ is a numbers of labour engaged.

IV. DATA AND VARIABLES

1. Data

In the present work, labour productivity is estimated by adopting secondary data drawn from the Annual Survey of Industries (ASI). The ASI collects data annually under the statutory provisions of the Collection of Statistics (COS) Act, 1953. Since the specific objective of our investigation is to compute trends in labour productivity, time-series data fit accurately for the analysis. The data on relevant variables for 02 and 03 digit textile sectors is obtained for the period 1991-92 to 2015-16. Further, we have used the National Industrial Classification (NIC) 2004. NIC codes are changing constantly over time; hence, a different year has been concorded to arrive at consistent series before being utilised in empirical work. We have adjusted pre-2004 and post-2004 data to reflect the appropriate adoption of industries. Also, ASI data are reported at current prices. To make the value of different variables comparable, the single deflation method is used for deflating data. The splicing method of index number has been employed to evolve arithmetically price index series. Gross value-added data has been deflated using wholesale price index obtained from Economic Advisors, Minister of Commerce and Industry, Government of India for the base year 1993-94=100. Total emoluments were deflated by using the consumer price index (General) for industrial workers published by Labour Bureau, Government of India (base year 1993-94=100). Furthermore, nominal data of fixed investment was deflated using the wholesale price index for machinery and tools published by the Reserve Bank of India (base year 1993-94=100).

V. MEASUREMENT AND TRENDS IN LABOUR PRODUCTIVITY

The effective growth per worker is possible only when there is an increase in labour productivity. This necessitates a clear and better understanding of labour productivity in terms of structure and pattern of growth. The evaluation of labour productivity will provide a clear road map for the formulation of policies and improvement in productivity level. Add to this, such measurement and analyses provide a tool for assessing the contribution of the individual sector in a dynamic economy (Kumar, 2000). Below we analyse in greater detail the trends in labour productivity in the 02 digit and 03 digit textile industry of India. The growth of labour productivity in 02-digit is presented in table 1.

Table 1. Average Labour Productivity in the 02-digit Textile Industry

Year	Average Labour Productivity(in Crore)
1990-1991	3.45
1995-1996	4.62
2000-2001	7.51

2005-2006	7.46
2005-2010	6.91
2010-2015	9.35

Source*: Authors calculations are based on ASI data*

In table 1, we have presented average labour productivity in the organised manufacturing sector during the periods 1995 -2015, delineating into five distinct periods: 1995-1996, 2000-2001, 2005-2006 and 2010-2015. During these periods, we can observe that labour productivity has shown fluctuating trends. The highest labour productivity was achieved in the period 2010-2015. In this period, average labour productivity has increased to ₹ 9.35 crore in 2010-2015 from ₹ 6.91 crore in 2010 - 2011. However, average labour productivity is substantially lower for the period 2004 - 2005 to 2010- 2011. These period witness average labour productivity of around ₹ 6.91 cores. Though the economy maintains a higher growth rate, especially for the 7 years from 2004-05 to 2011-12 with a growth rate of around 8 % (Thorat and Dubey, 2012) and shows a tremendous level of stability (Panagriya, 2004), the labour productivity could not uphold its increasing trend in these period. Two possible reasons could be attributed for such decline. This period was marked by numerous changes in textile sector, with the implementation of the Agreement on Textiles and Clothing. There was phased liberalisation and elimination of quotas on textiles and apparel imported from WTO member countries. The decline in labour productivity could be attributed to the 2008-2009 subprime mortgage crises resulting in financial instability in the world economy.

Next, we turn to discuss the trends in labour productivity at 03 digit industries. A greater insight into the relative contribution of various sub-sectors of the textile industry to labour productivity can be judged from Fig 1.

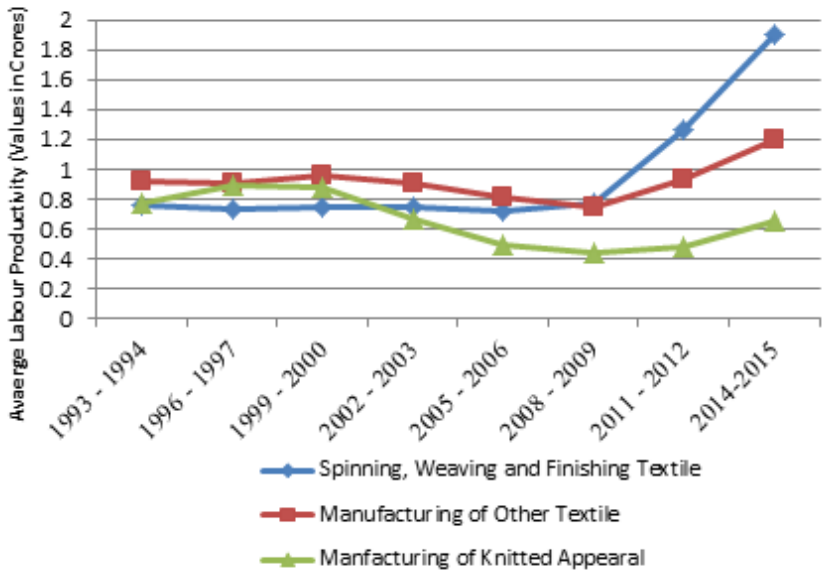

Fig.1 Average labour productivity in 03-digit industries of textile (per annum). Source: Authors' Calculation from ASI Data (2004-2005 prices)

Evident from Fig 1, shows a considerable turnaround in labour productivity in spinning, weaving and finishing textile, particularly after 2008-2009 onwards. Interestingly, this sector has shown almost stagnant growth from 1993-1994 to 2008 -2009. Closer observation exhibits that in the initial

year of economic reforms, it was manufacturing of other textiles, manufacture of knitted and crocheted fabrics which have reported higher labour productivity. The mean labour productivity has decreased from ₹ 90 lakhs to ₹ 81 lakhs between 1996- 1997 to 2005-2006. During the same period, labour productivity in spinning, weaving and finishing textile was around ₹ 73 lakhs to ₹ 72 lakhs respectively. The manufacturing of knitted and crocheted fabrics logged sluggish labour productivity. The mean labour productivity in this sector was around ₹ 77 lakhs in 1995-96 which decelerated to ₹ 43 lakhs in 2005-06. From 2008-2009 to 2014-2015, the 6 years period, the proportionate contribution of various sub-sectors reveals that it is spinning, weaving and finishing textile sector which manifests higher labour productivity. This was followed by the contribution of manufacturing of other textile sectors. Although Fig 1 shows marginal improvement in labour productivity in knitted and crocheted fabrics, labour productivity lagged far behind when compared to the other two sub sectors of the textile.

Further, any meaningful investigation of labour productivity requires a comparative analysis of labour and capital productivity. There is a well-entrenched view that the organised sector is highly capital intensive when compared to the unorganized sector (Mananomi, 2013; Vinish Kathuria, 2013). We have computed the labour and capital productivity in 02 digit textile sectors, and Fig. 2 provided insight into the detail of comparative trends.

Fig. 2 Comparison between labour and capital productivity in the textile industry

At first glance, Fig 2 distinctly affirms that labour productivity in the textile sector of India has exceeded capital productivity over the entire reform period. First one and half decade of reforms, labour productivity has shown steady trends (for the period 1991 to 2005) and accelerated continuously from 2008-2009. Contradictory to labour productivity, capital productivity shows declining trends from 2005-06 onwards. The more disturbing picture emerges from analysis is that capital productivity has shown negative growth. For instance, for the 6 year period from 2008-2009 to 2011-2012, capital productivity has shown a continuously receding trend by registering negative capital productivity. Notably, such negative trends in capital productivity could be largely attributed to a decline in investment capital goods. The organized sector of textile being capital intensive, it was expected that capital productivity would contribute largely to output in textile sector.

It will be further insightful to examine the behaviour of capital productivity in the 03-digit industry of the textile sector. Such examination will provide a deeper understanding of trends in capital productivity. Since labour and capital are prime factor inputs; the realization of increasing capital productivity is significant for achieving higher output in the textile sector.

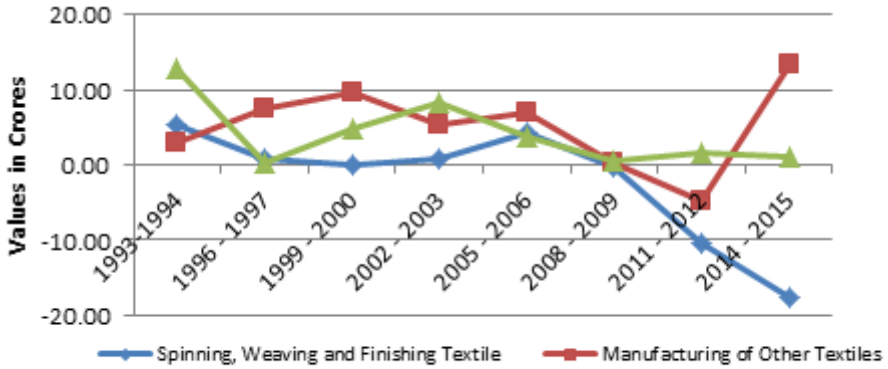

Fig 3: Capital Productivity in 03-digit industries of textile (per annum).

It is worth reiterating that the spinning, weaving and finishing textile sector predominantly viewed as modern sector of the textile industry. However, the trends highlight that it is spinning, weaving and finishing textile which is contributing to negative capital productivity. During 1993-94, this sector recorded ₹ 5.32 crore of mean capital productivity, however, the mean capital productivity declined to ₹ 4.21 crore and turned negative after 2008-09. Lower capital productivity is a cause of concern, as this sector underwent modernisation since 1990s due to lowering of customs duties, removal of restrictions on imports of raw cotton, yarn and machinery (NCAER Report, 2010). Further, the estimate reveals that lowest average capital productivity was recorded in knitted and crocheted fabrics. In initial year of reforms, the manufacturing of knitted and crocheted fabrics recorded highest capital productivity. During 1993-1994, this sector has shown highest capital productivity with average capital productivity of ₹ 12.74 crore. However, mean capital productivity declined to ₹ 1.10 crore in 2014-15. Although capital productivity showed the highest fluctuation in the manufacture of other textiles, it is this sub-sector that is driving capital productivity in the textile sector of India. In 1993-94, capital productivity was ₹ 2.81 crore, which increased to ₹13.45 crore in 2014-15.

Empirical literature also shows that capital intensity acts as a driver of labour productivity. There are substantial empirical shred of evidence that support a positive correlation between capital intensity and labour productivity (Vinish Kathuria, 2013). Several studies shows that nearly one-third of labour productivity growth is owed to capital intensity (see Ahluwalia, 1999; Englander and Gurney 1994). By taking note of this, we have estimated the trend in capital intensity in the 03-digit of textile and the result are presented in Fig 4.

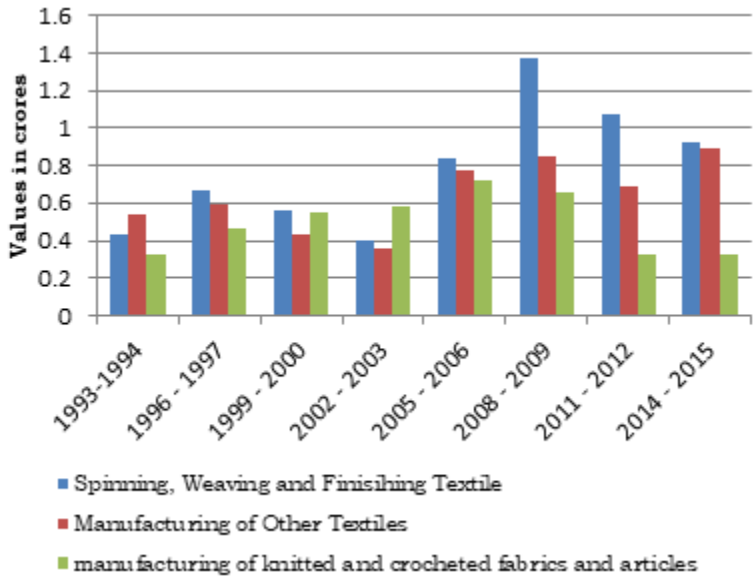

Figure 4. Growth of capital intensity in the 03-digit of textile industry

The result in Fig 4 demonstrates that spinning, weaving and finishing textile recorded highest capital intensity throughout the reform period. Thus this sector exhibits higher labour productivity, lower capital productivity and higher capital intensity. These results are similar to the findings of Ahluwalia (1991) where increase in capital intensity was accompanied by falling capital productivity and rising labour productivity. Further, increase in capital intensity in spinning, weaving and finishing textile have not accelerated the capital productivity. Our result corroborates with Bhatnagar (1988) where he found a negative relationship between capital intensity and productivity of capital. The mean capital intensity in spinning, weaving and finishing textile increased from ₹ 43 lakhs in 1993-94 to ₹ 1.32 crore in 2008. However, after recording highest capital intensity in 2008-09, the capital intensity has shown receding trends with ₹ 1.02 crore in 2012-13 and decline further to ₹ 92 lakhs in 2014-15. Manufacturing of other textiles shows gradual increase in capital intensity. For instance, the mean capital intensity in 1993-1994 was around ₹ 54 lakhs in this sector. However, it increased continuously and was around ₹ 89 lakhs in 2014-15. The manufacturing of other textiles sector has displayed splendid growth in capital intensity. This sector recorded continuous and much faster growth rate of capital intensity as compared to spinning, weaving and finishing textile. On the other hand, manufacturing of knitted and crocheted fabrics has shown continuous deceleration in capital intensity. .

VI. DISCUSSION

The result manifests that labour productivity has exhibited an accelerating trend in post-reform period. On the other hand, capital productivity is substantially lower when compared to labour productivity. Equivalently, capital intensity in spinning, weaving and finishing textiles reveals that higher capital intensity does not result in higher capital productivity. The results clearly show that the process of capital deepening positively influences labour productivity. The finding corroborates with the findings of Bhatnagar (1988) and Ahluwalia (1991), where they found a positive relationship between capital intensity and labour productivity. It suggests that when per unit of capital increases, it results in higher labour productivity. Even though there is an increase in capital intensity, less efficient use of capital has led to a decrease in capital productivity. Certainly, these changes indicate that the manufacturing of other textile industries is getting a mechanized and technological advance.

To get an understanding of such emerging trends, it is imperative to examine the factors which are influencing labor productivity, capital productivity and capital intensity. High growth in labour productivity is linked to increased investment and modernization in the spinning sector (Oberoi, 2012). A positive impact of rise in capital intensity is playing a significant role in increasing labour productivity. The capital intensity has increased in the textile sector, after the implementation of the Technological Upgradation Fund Scheme (TUFS) in 1999. Under this scheme, a massive increase in credit allocation was done for modernizing the textile sector. For the period 1999-2000 to 2017-18, Rs 155406.29 crore of credit was disbursed benefitting 49679 units in the textile sector (Ministry of Textile, 2018). Government measures to revamp skills have expedited in the post-reforms period. For instance, the Ministry of Textiles, Government of India, has introduced an ambitious scheme entitled "Integrated Skill Development Scheme for the Textile and Apparel sector, including Jute and Handicrafts," to address the trained manpower obligations of the textile and relevant segments. During 2010-2017, 11.14 lakhs persons were provided with skill development, out of which 8.43 lakhs were given employment in the textile industry (Ministry of Textile, 2017). Currently, out of the total 4971, it is, 1243 ITIs that offer training in textiles with a yearly intake of 33372 enrollments (NCAER, 2010). Again, large units hire formally trained skilled labour to supervise the sophisticated spinning, weaving, dyeing and other processing operations. Currently, SITRA, ATIRA and SIMA are the major organizations that offer formal training programs related to textile products.

In addition to this, the installation of labour wielding technology, lowering of industrial dispute and low absenteeism has spurred labour productivity in the textile sector. Between 2003 and 2014, the number of strikes and lockouts has fallen by nearly three-fourth, from 552 strikes and lockouts in 2003 to 143 in 2014. In the same period, the number of person-days of work lost has dwindled from 30.25 million in 2003, to 3.63 million in 2014 (Ministry of Textile).

On the other hand, the study found declining capital productivity in the post-reforms period. The downturn in capital productivity could be associated with a decline in capacity utilisation. The textile mills in the organised sector have an unutilised capacity between 30 to 35 percent, while disguised underutilisation of 3 to 6 percent. The capacity utilisation in the organised sector is considerably lower than its potential. For instance, the capacity utilisation in 1992-93 was 51 percent, which moderately strengthened to 61 percent in 2006-07, but again slumped to 58 percent in 2015-16 (Minister of Textile, Officer of Textile commission, Mumbai).

VII. CONCLUSION

The present study focused on the measurement of productivity, utilising time series data retrieves from ASI for the period 1995-96 to 2015-16. A partial productivity measure was engaged, to assess the direction in labour productivity and capital productivity. The conclusion emerging from the study is that, labour productivity has transcended the capital productivity in post-reform period. Further, capital intensity is growing in the textile sector, pinpointing that the sector is getting modernized with technological advances. The textile sector is witnessing capital deepening, even when the investment in capital good not yielding productive outcome, signaled by lower capital productivity.

Although the result is estimated by approving the relevant methodology, certain limitations are natural in our research endeavor. Firstly, we firmly recognize that even though ASI data are eminently reliable and far-reach in coverage, the possibility of divergence cannot be ruled out, due to variation in input price, oversight in reporting of data, etc. Secondly, the controversy of measurement of gross capital stock, is still undetermined and there are no scientific mechanisms in determining the appropriate depreciation rate. The presumption of subjective deprecation rate, may bring legitimate weaknesses in outcomes. Accordingly, the recommendation of the study should be treated as exploratory exercise and our results should be treated as a comprehensive trend emerging in labor productivity. Notwithstanding, our study has examined labour productivity trends in recent

years. We firmly perceive that results of this study will give an insight into labour productivity issues for planners and policymakers to come up with potent strategies and policy measures for intensifying labour productivity.

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