

# PERFORMANCE OF NON-RESEARCH INTENSIVE INDUSTRIES IN INDIA

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*Estimation of the long run production function may help a manager in understanding and taking decisions of long term nature such as capital expenditure. Estimation of cost curves will help production manager in understanding the nature and shape of cost curves and taking useful decisions. Both short run cost function and the long run cost function must be estimated, since both sets of information will be required for some vital decisions. Knowledge of the short run cost functions allows the decision makers to judge the optimality of present output levels and to solve decision problems of production manager. Knowledge of long run cost functions is important when considering the expansion or contraction of plant size, and for confirming that the present plant size is optimal for the output level that is being produced.*

*This study has focus on a type of industries, which, according to the usual socio- scientific indicators, is referred to as non-research intensive and which mostly comprises "traditional" industries.*

**Keywords :** Traditional Industries, Marginal rate of Technical Substitution.

## INTRODUCTION

A growing industrial sector is crucial to greater economic development and takes in a number of areas as a country develops. Ensuring steady industrial growth helps to compliment and sustain continued economic development. A well-developed industrial sector, covering various different areas is vital to the economic development of a country. With a variety of different industrial sectors that feed off each other, a well-balanced industrial sector is at the centre of economic development. With a strong industrial base, economic planning becomes less risky, being able to plan ahead also assists industrial growth with profits re-invested into infrastructure development which in turn helps to boost and attract industry. Without a vibrant, strong industrial base, economic development is much more risky and can be effected by external factors that are difficult to control. Providing encouragement and support to industry is essential if it is to grow and develop, supporting start-up industries and encouraging diversity all contribute towards a positive economic climate. Any economic development plan must have industry at the core. By encouraging and providing for industry, an economy will grow in tandem which in turn encourages further industrial development.

In the process of decision-making, a manager should understand clearly the relationship between the inputs and output on one hand and output and costs on the other. The short run production estimates are helpful to production managers in arriving at the optimal mix of inputs to achieve a particular output target of a firm. This is referred to as the 'least cost combination of inputs' in production analysis. Also, for a given cost, optimum level of output can be found if the production function of a firm is known.

The Cobb-Douglas production function is still today the most ubiquitous form in theoretical and empirical analyses of growth and productivity. The estimation of the parameters of aggregate production functions is central too much of today's work on growth, technological change,

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productivity, and labour. Empirical estimates of aggregate production functions are a tool of analysis essential in macroeconomics, and important theoretical constructs, such as potential output, technical change, or the demand for labour, are based on them.

The interest in this industry is motivated by the contradictory situation that, on the one hand, the debate about the perspectives of modern societies focuses on the rapidly growing importance of technological innovations, knowledge and research intensive economic sectors while, on the other hand, traditional industries make up a considerable fraction of employment and production, especially also in emerging economies. Low-technology industry is still commonly regarded as unusual suspects in the modern process of innovation and economic change.

Hence an attempt in this article is made with the following objectives. They are to:

1. Analyse different types of elasticities -output, employment and wage
2. Estimate marginal and marginal rate of technical substitution indices(between factors)
3. Examine the returns to scale and factor intensity

## METHODOLOGY AND TOOLS USED

Net Value Added (NVA) was taken as output, since trends are not affected significantly by the use of net value added. Also ambiguity in the calculation of depreciation can be overcome if net value added is taken as a measure of output. Labour input consisted workers directly involved in production. The fixed capital was taken into account as capital input. Wages included remuneration paid to workers. The basic data source of the study was Annual Survey of Industries (ASI) published by Central Statistical Organization (CSO), Government of India covering the period from 2002-03 to 2011-12. All the refereed variables were normalized by applying Gross Domestic Product (GDP) deflator. The GDP at current and constant prices were obtained by referring to Economic Survey, published by Government of India, Ministry of Finance and Economic Division Delhi.

## Cobb-Douglas Production Function

Production function approach to productivity measurement is more advantageous because it can handle the problems arising due to non-separability of inputs and output, non-neutral technical change, non-constant returns to scale and non-proportionality of input prices of their respective marginal productivity in an explicit manner. A production function shows the technological relationship between the maximum out-put obtainable from a given set of inputs and the relationship between the inputs themselves in the existing state of relationship between the inputs themselves in the existing state of technological change. In this approach to productivity measurement the various components of productivity can be estimated directly by econometric estimation. The production function can be used to measure the efficiency of production technology, returns to scale, the degree of economies to scale, the degree of capital intensity of technology and the degree of substitution between factors of production.

One of the most commonly estimated functional forms in the Cobb-Douglas production (C-D) function written as:

$$V=A(t) K^{\alpha} L^{\beta} e^{u}$$

Where  $\alpha$  and  $\beta$  are coefficient of labour and capital,  $A(t)$  is the efficiency parameter and  $u$  is the stochastic disturbance term following usual properties. Before the production function can be estimated some functional form has to be given to the term  $A(t)$ . The most commonly used in practice has been  $A(t) = Ae^{\lambda t}$  where  $\lambda$  is the measure of technical change in output per period

[ $\lambda$  measures the proportionate change in output per period when input level are held constant]. It is very important here to point out the limitations of this representation of technical change. It assumes neutral technical progress and that the technical progress is exogenous and disembodied (this neglects the usefulness of investment for technical progress).

This function is linear in the logarithmic of the inputs, output and time. Thus, we have:

$$\ln V = a + \alpha \ln L + \beta \ln K + \lambda t + \mu i$$

The estimation of this equation yields values of  $\alpha$ ,  $\beta$ , and  $\lambda$ ,  $\lambda$  provides estimates of Total Factor Productivity Growth (TFPG) and is the rate of exponential technological change. Sum of the partial elasticity ( $\alpha + \beta$ ) indicates the extent of economies or diseconomies to scale. The returns to scale are constant, increasing or decreasing if the value of  $\alpha + \beta$  is equal to unity, more than unity or less than unity respectively.

Marginal product of labour ( $MP_L$ ) and capital ( $MP_K$ ) can be obtained by applying the following formula:

$$MP_L = \partial V / \partial L = \alpha V / L$$

$$MP_K = \partial V / \partial K = \beta V / K$$

Since profit maximization entails that marginal productivity of labour is equal to the real wage rate and marginal product of capital is the price per unit of capital, it would imply that:

$$MP_L = w/p = \alpha V/L.$$

Share of labour in total output is

$$\alpha = (w/p) \cdot (L/V).$$

Similarly,

$$MP_L = r/p = (K/L)$$

$$MP_K = r/p = (K/V)$$

And share of capital in total output is

$$\beta = (r/p) \cdot (K/V)$$

$$MRS_{LK} = MP_L / MP_K$$

## Regression Models

### a. Employment Elasticity

Employment elasticity was estimated using the following regression equation.

$$\ln L_t = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln K_t$$

Where,  $L_t$  = Number of person engaged in the current period

$Y_t$  = Net value added in the current period

$K_t$  = Fixed capital in the current period

$\alpha_0$  = Constant co-efficient

$\alpha_1$  = Elasticity of employment with respect to net value added

$\alpha_2$  = Elasticity of employment with respect to fixed capital

$\alpha_2 > 0$  = implies of employment and capital are complements

$\alpha_2 < 0$  = implies of employment and capital are substitutes.

### b. Output Elasticity

The elasticity of output with respect to employment of labour and fixed capital measures the change in output due to change in one unit of labour or change in one unit of capital. The output elasticity was estimated as follows:

$$\ln Y_t = \beta_0 + \beta_1 \ln L_t + \beta_2 \ln K_t$$

$L_t$  = Number of person engaged in the current period

$Y_t$  = Net value added in the current period

$K_t$  = Fixed capital in the current period

$\beta_0$  = Constant co-efficient

$\beta_1$  = Elasticity of employment with respect to labour

$\beta_2$  = Elasticity of employment with respect to capital

### c. Wage Elasticity

The wage elasticity with respect to labour productivity and net value added measures the change in wage rate due to change in one unit of the below mentioned variables.

This elasticity was estimated by testing the following regression equation:

$$W_t = b_0 + b_1 \ln L_{pt} + b_2 \ln Y_t$$

$W_t$  = Wage rate in the current period

$L_{pt}$  = Labour productivity in the current period

$Y_t$  = Net value added in the current period

$b_0$  = Constant co-efficient

$b_1$  = Elasticity of wage with respect to labour productivity

$b_2$  = Elasticity of wage with respect to net value added

## Measurement of Technical Progress

The technical progress of the industries were analysed by calculating Marginal Productivity of Labour ( $MP_L$ ), Marginal Productivity of Capital ( $MP_K$ ), and Marginal Rate of Technical Substitution of labour for capital ( $MRTS_{LK}$ ). Marginal Productivity or co-efficient of capital ( $MP_K$ ) and may be defined as the ratio between a change in output in a given economy of industry for a given time period and change in gross block of that economy. Marginal Productivity of labour ( $MP_L$ ) may be defined as the ratio between a change in output in a given economy or industry for a given period and change in amount of labour use. The  $MRTS_{LK}$  explains the rate at which substitution was taken place between labour and capital.

## Growth of $MP_L$ Ratios

The trends in the growth of  $MP_L$  ratios from 2002-03 to 2011-12 presented in table-1

Table 1 - Trends Marginal Productivity Of Labour (Mp.) Ratios

Industry	Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	$\sigma$	C.V
Food products and beverages	5.288	5.235	5.129	5.539	7.001	9.920	9.626	10.749	11.205	13.773	8.346	2.942	35.252
Textiles	2.102	2.396	2.452	2.691	3.208	3.401	3.627	3.303	4.455	6.579	3.421	1.241	36.276
Tobacco products	0.300	0.369	0.376	0.395	0.426	0.517	0.550	0.748	0.638	0.811	0.513	0.163	31.864
Wearing apparel dressing and dyeing of furniture	0.006	0.007	0.005	0.006	0.006	0.005	0.008	0.009	0.006	0.010	0.006	0.001	24.596
Paper and paper products	2.724	3.199	3.169	3.190	4.047	4.181	3.792	4.820	3.897	2.831	3.585	0.634	17.689
Furniture and n.e.c	0.321	0.252	0.275	0.323	0.329	0.382	0.440	0.398	0.489	0.614	0.382	0.103	27.064
Publishing, printing and reproduction of recorded media	1.429	1.622	1.947	1.919	2.351	2.462	3.055	2.294	2.780	3.795	2.365	0.671	28.395
Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear	0.159	0.150	0.172	0.168	0.198	0.231	0.217	0.234	0.310	0.269	0.211	0.049	23.238
Wood and wood products, cork except furniture	3.509	4.015	4.313	4.057	7.050	4.430	6.965	5.901	8.736	7.241	5.622	1.699	30.222
$\sigma$	1.759	1.916	1.982	2.032	2.735	2.837	3.142	3.162	3.613	3.991			
C.V	1.716	1.804	1.814	1.866	2.664	3.003	3.157	3.342	3.7696	4.288			
	97.515	94.163	91.553	91.853	97.420	105.873	100.467	105.708	104.328	107.436			

Source: Calculations are based on ASI data

$MP_L$  ratios across major non-research intensive industries of India showed that during the period as a whole the average growth was maximum in the manufacture of food products and beverages. On the other hand across the period it had shown gradual increase from the beginning of the period to the end of the period. It is also found that the magnitude variability in the growth of  $MP_L$  ratios were more across the reference period when compared with the trend across the industries.

#### d. Growth of $MP_K$ ratios

The trends in the growth of  $MP_K$  ratios from 2002-03 to 2011-12 presented in the table-2

**Table 2 - Trends in Marginal Productivity of Capital ( $MP_K$ ) Ratios**

Year Industry	2002- 03	2003- 04	2004- 05	2005- 06	2006- 07	2007- 08	2008- 09	2009- 10	2010- 11	2011- 12		$\sigma$	C.V
Food products and beverages	0.123	0.109	0.108	0.111	0.1313	0.153	0.129	0.127	0.112	0.116	0.122	0.013	10.740
Textiles	0.249	0.278	0.279	0.289	0.305	0.253	0.262	0.212	0.249	0.034	0.241	0.073	30.280
Tobacco products	1.056	1.129	1.056	1.175	1.204	1.105	1.042	1.432	0.890	1.372	1.146	0.152	13.278
Wearing apparel dressing and dyeing of furniture	0.900	0.973	0.855	0.917	0.827	0.896	0.928	0.800	0.771	0.7717	0.864	0.066	7.665
Paper and paper products	0.063	0.064	0.070	0.069	0.076	0.073	0.737	0.068	0.043	0.065	0.133	0.201	151.247
Furniture and n.e.c	0.804	1.035	1.161	1.485	1.241	1.586	1.724	1.030	1.043	1.186	1.229	0.271	22.087
Publishing, printing and reproduction of recorded media	0.343	0.382	0.404	0.367	0.355	0.318	0.340	0.201	0.267	0.312	0.329	0.056	17.021
Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear	0.982	0.912	1.021	0.927	1.091	1.1078	1.051	0.963	1.074	1.102	1.023	0.069	6.787
Wood and wood products, cork except furniture	0.364	0.374	0.380	0.348	0.589	0.271	0.457	0.273	0.378	0.222	0.365	0.098	26.930
	0.542	0.584	0.592	0.632	0.646	0.640	0.741	0.567	0.536	0.576			
$\sigma$	0.367	0.399	0.405	0.477	0.433	0.510	0.475	0.466	0.384	0.503			
C.V	67.755	68.296	68.307	75.471	66.984	79.638	64.099	82.256	71.606	87.401			

Source: Calculations are based on ASI data

$MP_K$  ratios of non-research intensive industries showed that it was positive across the years and across the manufacturing sectors, which implied that capital has contributed positively to output. It is also evident from the analysis that much variations were not observed across the reference period, while it was showing different picture across the non-research intensive industries.

#### e. Growth of $MRTS_{LK}$ ratios

Marginal rate of Technical Substitution of labour for capital ( $MRTS_{LK}$ ) is shown in table-3

Table 3 - Trends in Marginal Rate of Technical Substitution (Mrt<sub>ik</sub>) of Labour for Capital

Industry	Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	$\sigma$	C.V
Food products and beverages		42.991	47.722	47.275	49.952	53.326	64.884	74.223	84.242	99.958	118.631	68.3208	35.56245
Textiles		8.441	8.610	8.774	9.309	10.515	13.403	13.819	15.536	17.893	189.610	29.591	180.5583
Tobacco products		0.284	0.326	0.356	0.336	0.354	0.468	0.528	0.522	0.716	0.591	0.448	29.60274
Wearing apparel dressing and dyeing of furniture		0.006	0.007	0.005	0.006	0.007	0.005	0.008	0.011	0.007	0.013	0.007	21.70592
Paper and paper products		43.238	49.610	44.892	46.111	52.695	56.892	51.464	70.895	88.972	43.230	54.800	25.25158
Furniture and n.e.c		0.399	0.243	0.237	0.217	0.265	0.241	0.255	0.387	0.181	0.518	0.294	33.81132
Publishing, printing and reproduction of recorded media		4.166	4.241	4.818	5.228	6.618	7.723	8.974	11.405	10.387	12.134	7.569	37.85057
Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear		0.161	0.165	0.168	0.182	0.182	0.208	0.206	0.243	0.289	0.244	0.205	19.45633
Wood and wood products, cork except furniture		9.640	10.733	11.347	11.648	11.959	16.337	15.221	21.545	23.068	32.546	16.404	42.1737
		12.147	13.517	13.097	13.665	15.102	17.796	18.300	22.754	26.830	49.688		
$\sigma$		16.903	19.153	18.060	18.828	20.723	23.811	25.049	30.366	37.102	64.566		
C.V		139.148	141.685	137.892	137.776	137.219	133.802	136.879	133.454	138.286	129.942		

Source: Calculations are based on ASI data

It is evident that  $MRTS_{LK}$  ratios during period were positive which implied that  $MP_L$  was greater than  $MP_K$ . The inter- industry ratio was high in the manufacture of food products and beverages, textiles, paper and paper products and  $MRTS_{LK}$  varied widely across the non-research intensive industries. and across the period, indicating differences in the marginal productivity ratios.

### Analysis of Elasticities

Table-4 below gives details regarding the analysis of employment elasticity in non-research intensive industries in India.

**TABLE 4 - Employment Elasticities in Non-research Industries in India**

Industry	Constant (A)	$Y_t$	$K_t$	$R^2$	DW -Statistics	F-value
<b>Food products and beverages</b>	88.556* (49.449)	0.098** (2.504)	0.030 (0.803)	0.958	1.663	102.701
<b>Textiles</b>	81.378* (11.633)	0.199* (4.551)	-0.013** (-2.824)	0.778	1.971	12.295
<b>Tobacco products</b>	114.176* (23.678)	-0.008 (-0.192)	-0.136** (-2.563)	0.742	2.133	10.069
<b>Wearing apparel dressing and dyeing of furniture</b>	63.612* (4.578)	0.477 (1.283)	0.003 (0.010)	0.966	1.404	98.909
<b>Paper and paper products</b>	78.282* (16.198)	0.098** (2.203)	0.146** (2.494)	0.939	1.928	53.727
<b>Furniture and n.e.c</b>	-9.110 (-0.359)	0.480 (1.902)	0.767 (1.274)	0.864	0.807	22.299
<b>Publishing, printing and reproduction of recorded media</b>	84.577* (20.763)	0.066 (1.503)	0.107* (3.221)	0.953	2.484	71.707
<b>Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear</b>	55.295* (6.592)	0.099 (0.331)	0.338 (1.001)	0.950	2.702	66.901
<b>Wood and wood products, cork except furniture</b>	77.473* (18.273)	0.108* (3.097)	0.090* (3.769)	0.953	1.065	70.896

### EMPLOYMENT ELASTICITY CO-EFFICIENTS

Source: Calculations are based on ASI data

Foot Note: \*-Significant at 1% level

\*\* -Significant at 5% level



Employment elasticity ( $L_y$ ) with respect to net value added ( $Y$ ) in all the industries were positive excepting manufacture of tobacco products. On the other hand the elasticity co-efficient in relation to fixed capital ( $K_y$ ) was positive in 7 out of 9 industries under study. From the table it is very clear that the factor which influences employment in these industries is capital. Negative elasticity with respect fixed capital in the manufacture of textiles and tobacco products implies that fixed capital used to be substitute for labour to a larger extent across the industries during the reference period under study.

Table-5 below gives details regarding output elasticity of the industries in India for the reference period under study

**Table 5 - Output Elasticity Co-Efficients**

Industry	Constant (A)	$L_t$	$K_t$	$R^2$	DW-Statistics	F-value
<b>Food products and beverages</b>	-422.102** (-2.441)	4.825** (2.504)	0.350 (1.435)	0.972	2.140	122.376
<b>Textiles</b>	-266.716** (-2.882)	3.750* (4.551)	0.070* (6.334)	0.930	2.247	46.199
<b>Tobacco products</b>	86.816 (0.228)	-0.637 (-0.192)	0.895 (1.610)	0.635	3.145	6.093
<b>Wearing apparel dressing and dyeing of furniture</b>	-1.576 (-0.062)	0.399 (1.283)	0.655* (5.286)	0.993	2.187	507.734
<b>Paper and paper products</b>	-320.522** (-2.085)	4.177** (2.203)	0.087 (0.167)	0.885	2.235	26.919
<b>Furniture and n.e.c</b>	-20.632 (-0.684)	0.710 (1.902)	0.850 (1.139)	0.859	0.625	21.319
<b>Publishing, printing and reproduction of recorded media</b>	-274.285 (-1.269)	3.675 (1.503)	0.131 (0.338)	0.886	2.214	27.294
<b>Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear</b>	-20.029 (-0.734)	0.156 (0.331)	1.053* (4.851)	0.987	2.038	265.121
<b>Wood and wood products, cork except furniture</b>	-382.170** (-2.555)	5.343* (3.097)	-0.240 (-0.867)	0.871	2.485	23.689

Source: Calculations are based on ASI data

Foot Note: \*-Significant at 1% level

\*\* -Significant at 5% level

The output elasticity with respect to employment ( $L_t$ ) showed that more than a unit increase was brought in the manufacture of food products and beverages, tobacco products and in the manufacture of paper and paper products, wood and wood products, cork except furniture which was considered to be statically significant and less than a unit change was observed in all the other industries during the reference period under study. Output elasticity with respect to fixed capital ( $K_t$ ) revealed that more than a unit change was observed in the manufacture of tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear. Excepting the manufacture of wood and wood products, cork except furniture, all the other industries recorded positive output elasticity co-efficients.

Table-6 gives details regarding wage elasticity co-efficients of selected low technology industries of India for the reference period under study.

**Table 6 - Wage Elasticity Co-Efficients**

Industry	Constant (A)	$Y_t$	$LP_t$	$R^2$	DW -Statistics	F-value
<b>Food products and beverages</b>	117.532* (13.329)	1.592* (8.751)	-1.805* (-6.852)	0.991	1.402	394.391
<b>Textiles</b>	56.003* (6.235)	-0.205 (-0.979)	0.597** (2.095)	0.919	1.085	39.757
<b>Tobacco products</b>	71.137* (4.049)	-1.163** (-2.100)	1.387* (3.177)	0.894	1.189	29.606
<b>Wearing apparel dressing and dyeing of furniture</b>	65.384* (4.194)	0.225* (5.700)	0.128 (0.660)	0.975	1.757	136.780
<b>Paper and paper products</b>	83.091 (3.094)	0.184* (3.754)	-0.083 (-0.423)	0.668	1.898	7.052
<b>Furniture and n.e.c</b>	48.816* (3.089)	-0.047 (-0.828)	0.799* (7.131)	0.882	1.230	26.109
<b>Publishing, printing and reproduction of recorded media</b>	101.472* (7.737)	0.419* (3.924)	-0.470** (-2.230)	0.934	2.059	49.167
<b>Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear</b>	75.709* (3.490)	0.330* (3.554)	-0.085 (-0.298)	0.951	1.714	68.098
<b>Wood and wood products, cork except furniture</b>	109.410* (3.760)	0.807* (3.380)	-0.860 (-1.926)	0.844	2.839	19.001

Source: Calculations are based on ASI data

Foot Note: \*-Significant at 1% level

\*\* -Significant at 5% level

Wage elasticity with respect to labour productivity ( $L_t$ ) showed that there was significant and more than a unit change with statistical significance only in the manufacture of food products and beverages whereas wage elasticity with respect to net value added ( $Y_t$ ) showed that except

manufacture of textiles and furniture and n.e.c, all the other industries showed significant relationship with mixed co-efficients. The co-efficient determination  $R^2$  calculated for all the industries in all the periods for different elasticity recorded explain the fact that the fit was good. The contribution of the independent variables over influencing dependent variable was high. Only negligible percent of change would be brought about by related variables.

## ESTIMATION OF PRODUCTION FUNCTION

Table-7 gives details regarding the estimation of factor intensity and returns to scale based Cobb-Douglas production function for the selected industries during the reference period under study.

**Table-7 - Co-Efficients Of Production Function Estimates**

Industry	Constant (A)	$\beta_1$ (Capital)	$\beta_2$ (Labour)	S	$R^2$	DW- Statistics	$\beta_1/S$	$\beta_2/S$
Food products and beverages	8.336** (2.368)	0.123 (0.249)	5.288** (2.352)	5.411	0.970	1.855	2	98
Textiles	2.650** (2.841)	0.249* (5.217)	2.102* (4.350)	2.351	0.940	2.512	11	89
Tobacco products	0.678 (0.166)	1.056** (2.369)	0.300 (0.183)	1.356	0.752	3.082	78	22
Wearing apparel dressing and dyeing of furniture	0.229 (0.694)	0.900* (3.903)	0.006 (0.016)	0.906	0.992	2.548	99	1
Paper and paper products	3.262** (2.433)	0.063 (0.147)	2.724** (2.578)	2.787	0.904	1.995	2	98
Furniture and n.e.c	0.095 (0.264)	0.804** (2.002)	0.321 (1.247)	1.125	0.888	0.679	71	29
Publishing, printing and reproduction of recorded media	1.490 (0.851)	0.343 (0.979)	1.429 (1.182)	1.772	0.915	2.028	19	81
Tanning and dressing of leather, luggage, hand bags, saddlery harness and foot wear	0.279 (0.753)	0.982* (3.517)	0.159 (0.349)	1.141	0.986	2.167	86	14
Wood and wood products, cork except furniture	4.175** (2.004)	0.364 (0.743)	3.509** (2.306)	3.873	0.869	2.167	9	91

Source: Calculations are based on ASI data

Foot Note: \*-Significant at 1% level

\*\* -Significant at 5% level

Efficiency parameter 'A' or the organisational efficiency was positive in all the industries. This implied that the contribution of entrepreneurship to output was positive. Capital co-efficient  $\beta_1$  was positive in all the selected industries in India which implied that there existed positive relationship between output and capital. Labour co-efficient  $\beta_2$ , was also positive and statistically significant for all the industries. This implied that there existed positive relationship between inputs- output. The sum of co-efficient  $\beta_1$  and  $\beta_2$  showed increasing returns to scale in all the industries excepting wearing apparel, dressing and dyeing of furniture. It was also surprising to note that the  $R^2$  was high in all the industries. The percentage share of factor inputs indicated that the percentage share of labour was high in 5 out of 9 industries than capital. The manufacture of food products and beverages and paper and paper product (98 percent) followed by wood and wood products, cork except furniture (91 percent), textiles (89 percent) and publishing, printing and reproduction of recorded media (81 percent). With regard to type of technology adopted by the industries it could be observed that 5 out of 9 industries were adopting labour intensive technology since the co-efficient of labour ( $\beta_2$ ) was greater than capital co-efficient ( $\beta_1$ ).

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