Economic Underdevelopment and Total Factor Growth in Small Scale Industries: Some Evidences from India

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Globalization of Indian economy and fast and large industrialization questioned the sustainability and endurance of small scale industries (SSIs) from 1991. In this regard productivity and performance is remaining an issue that needs analysis for their development. However economic underdevelopment is remain a problem for the development of small scale industries. In this paper an attempt has been made to examine the productive performance of in small scale industries in India in underdeveloped areas with special reference to Assam. The findings of the study suggest the Total Factor Productivity (TFP) of SSIs in underdeveloped areas seemed to be growing steadily over the time. The overall linear trend line of TFPG of SSIs of India indicates a declining trend over the periods from 1973-74 to 2001-2002.

Key words: *Small scale Industry, Total factor productivity, underdevelopment.*

JEL Classifications: *L6, D24, O14.*

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1. Introduction

In modern era with the development of Indian economy and rapid expansion of trade, the small scale industrial sector has emerged as a vibrant and dynamic segment in the process of industrialization which is considered not only as a key factor to lift up the per capita income but also a vital mechanism for a larger transformation of Indian economy. In India, small scale industrial sector is defined as an industrial undertaking, in which the investment in fixed assets in plant and machin¬ery does not exceed Rs 1 crore (this investment limit of Rs 1 crore for classification as small scale industry has been further enhanced to Rs.5 crore in respect of certain specified items by the Government of India). The small scale sector has played a very important role in the socio-economic development of India during the past 50 years. It has significantly contributed to the overall growth in terms of the Gross Domestic Product (GDP), employment generation and exports. The performance of the small scale sector, therefore, has a direct impact on the growth of the overall economy. In India this sector constitutes 95% of the industrial units and contributes 40% to the total industrial output of the country and 35% of the direct export. There are about 3.6 million small scale industrial units in India and these have employed approximately 19.3 million people, which is second highest next to agriculture. However, the growth of small scale industries in the country is not evenly distributed among the states. The growth of Small-Scale Industries in The North Eastern Region is slow in comparison to the other parts of the country. The development pattern of the small-scale industries of the region is far from encouraging and these are plagued by innumerable of problems. The level of sickness of the sector is quite high and this is being aggravated by the basic structure of the small scale industrial sector. In case of state Assam, the scenario of small scale industry is very underprivileged with regards to growth and production is concerned. The importance of this sector for a populous state like Assam stems from the fact that this sector is labour intensive and is therefore seen

as an important source of generating employment opportunity both for skilled and unskilled labour force. According to Economic survey of Assam 2007-2008, there are 27,913 small scale industrial units in Assam and providing employment to 1, 31,099 persons till 2006-2007 which is only 0.50% of total population. In this paper an attempt has been made to examine the productive performance of in small scale industries in Assam.

The economy of Assam is continues to be predominantly agrarian where the dependence of rural labour force on agriculture and allied activities was nearly 53% as per population census, 2001. The industrial scenario in Assam is dominated by two major industries oil & natural gas and tea which account for maximum value addition. But despite of these, the industrial sector of Assam is not growing at a rapid pace. According to a survey in Assam conducted by Indian Institute Entrepreneurship (2002-20030), out of total small scale industries of North East India, 63.7% are in Assam which is only 1.29% of all India total small scale industries. In India about 47.22 % of the units were located in Uttar Pradesh, Andhra Pradesh, Maharashtra, Madhya Pradesh and Tamil Nadu. Even though the small scale sector has a huge potentialities in Assam but the performance is far from the satisfactory.

There exists a large and growing body of literature on small scale industry in India. In this regard, Borooah's (1977) study concentrated on prospects and problems of small scale industries in Lakhimpur district discovered that lack of modern selling practices and shortage in commercial skill were the major causes of slow productivity of the small scale industrial sector in the Lakhimpur district district of Assam. Dey (1980) also inquired about to highlight the problems of small scale industries in a backward district like Cachar. He covered the areas such as economic profit, sickness, market, finance of small scale industries in Cachar. He fined that a lots of problems are resulted due to joint ventures nature of small scale industries in Cachar. Bora (1980) in his research work on problems and prospects of small scale

industries in Lakhampur district studied the potentialities, organization, and operational analysis of small scale industry. He found that poor technique is the result of low wage, earning and productivity of workers. On the other hand non availability of skilled labour is according to him is another constraint in the development of small scale industries. Further Nayak and Dey (1996) in an article mention that production and employment per unit were found to be high in ancillary units followed by small scale industry and small scale enterprise. As far as productivity of labour was concerned it was estimated to be maximum in by small scale industry and minimum in small scale enterprise. But capital productivity was maximum in ancillary industrial undertakings and minimum in small scale enterprise. In a study conducted by Indian Institute of Entrepreneurship for Ministry of Small scale Industries, Government of India, in 2003-2004 in the North Eastern Region found that in Assam total number of small scale industry registered in Assam is 23,151 where 67.44% are manufacturing industry. They have identified the main problems as lack of demand, shortage of working capital, lack of power availability etc.

2. Methodology

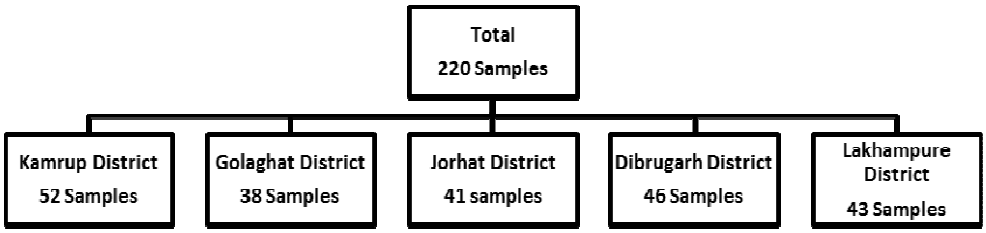
For carrying out the study we have selected the state of Assam which is underdeveloped and Assam is one of the poorest states as compared to other states. In this study, the productivity of the SSI units has been analyzed on the basis of aggregate secondary data collected from the various sources viz. NSSO data, Govt. of Assam publications, Ministry of small scale industry, Government of India, Directorate of Economics and Statistics, Research Publications etc.

The primary data is collected by undertaking field study on small scale industries of Assam. The sample survey is conducted following multi stage sampling random sampling method. Multistage sampling technique involves several methods of random sampling. In this study

in the first stage 5 districts are randomly selected namely: Kamrup, Jorhat, Golaghat, Dibrugarh and Lakhimpure district. In the 2nd stage about log proportionate sample size (table:1) is collected from the districts and the corresponding registered small scale industries from each district is selected respectively which generates about 220 Small Scale industries.

Figure 1

Sample Distribution among the Sample Districts



3. Theoretical Model

The concept of total factor productivity measures the contribution of all factors of production to productivity growth. The income shares of factor inputs are used to weigh factor input growth rates to produce an index of total factor input. Capital in addition to labour that has been included in total factor productivity. Among the various models of TFP measures, we have used Kendrick Index. Kendrick index for TFP (At) for the time period't' is stated in equation.

$$A_t = \frac{O_t}{(w_0 L_t + r_0 K_t)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

In the above equation notations 'w_0'and 'r_0' denote the factor shares to labour and capital, respectively, in the base year 'o'. Income shares are used as weights to compute the ratio of output to a weighted combination of inputs and thereby measure At. To estimate

the factor shares we have used CES production function using factor share of 0.608 and 0.402 for capital and labour respectively.

4. Principal Component Analysis

As there is not a singular parameter that expresses the SSIs performance, the rankings have been based on a number of parameters that focus the SSIs performance in a variety of perspectives. In order to analyze the performance of the SSIs in terms of various factor proportions, we have used principal component analyzing method which reduces the number of variables in data set into a smaller number of 'dimensions'. The weights for each principal component are given by the eigenvectors of the correlation matrix. The components are ordered so that the first component (PC1) explains the largest possible amount of variation in the original data, subject to the constraint that the sum of the squared weights is equal to one. At the same time we use the component matrix to determine the relative factor score among the variables to have a composite value. There are mainly two purposes to apply the principal component analysis on the data of industrial ratios (a) to determine the relative importance of the factors; (b) to use the factor scores of the principal components in ranking the industrial groups. We have use Z score of the various ratios as they are measured in different units which will standardize the variables. The standardization helps by making mutually consistent decisions. The ratios are converted into Z score using

$$\mathbf{Z} = \frac{x-\mu}{\sigma}$$

Where: x is a raw score to be standardized; μ is the mean of the population; σ is the standard deviation of the population (σ=√(d^2)/N and d =X_i-X ¯) In this study we calculates the principal components that maximize the explanation of the variances. The

Eigen value taken for calculating PCA is 0.60. The main variables used in this analysis are:

TFP: Total Factor Productivity

NP: Net Profit

L: Labour Productivity as measured by marginal productivity of labour.

K: Size of Capital.

All industrial groups are ranked according to the first principal component index (ZIP) with the following index as:

$ZIP = \alpha_1 TFP + \alpha_2 NP + \alpha_3 L + \alpha_4 K$

Where, ZIP = Composite index of industrial group. X1, X2…….. X7 = the value of the variable in standardized form and α_1, α_2, α_3… α_8 are the coefficients of the respective variables i.e. the factor loading.

5. Results and Discussion

After the post independence periods, growth of productivity in SSIs had fallen off substantially. The key explanation of this slowdown is the impact of the various socio-economic and political unprecedented factors that came together to effect productivity growth. The further deterioration of productivity growth in the 1990s is explained by the poor macroeconomic environment as economic growth below potential trend. To analyze the second objective, the productivity of SSIs, partial and total factor productivity are calculated based on both primary and secondary data.

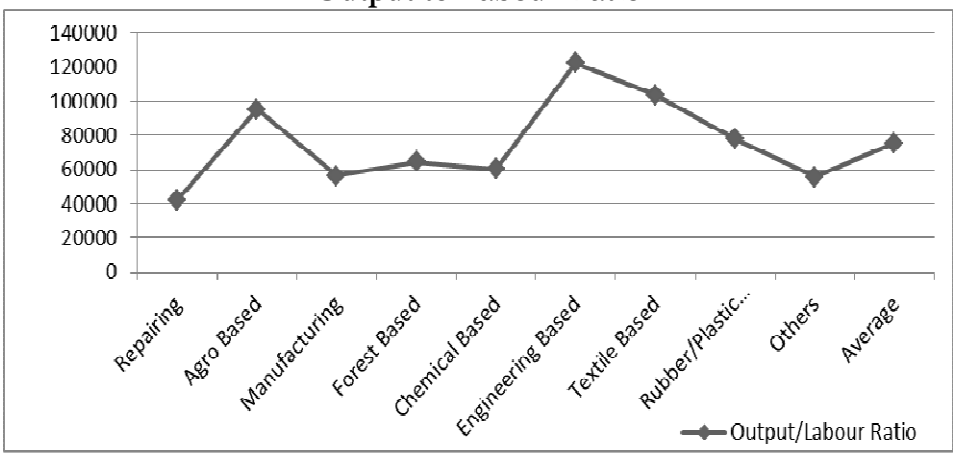
5.1. Partial Productivity

5.1.1. Labour productivity based on Output to Labour Ratio:

In SSIs it is generally seen that they are more labour intensive and output per unit of labour is less. In our study, yearly per unit labour output ratio is represented by the figure 2

Figure 2

Output to Labour Ratio



Source: Field Survey

From the Figure 2, it is clear that the output to labour ratio of SSIs is not uniform and it is varying from a minimum of Rs 42365.00 (Output value per labour) in repairing industries to a maximum of Rs 122409.1 in Engineering Based industries. The mean Output/Labour ratio of all SSI industrial groups is found to be to be Rs 75450.33. The repairing, manufacturing forest base industries are showing lower output to labour ratio. The two digit industrial group in case of Assam represents that the mean per unit labour output from 1979-2002-2003 is Rs 2,65,568. If we compare this output/labour ratio of SSIs to that of 3rd census of SSIs we will find that the output/labour ratio in SSIs of Assam is Rs 77,190.88 with Rs 1,78,424.09 in registered sector and Rs 59,237.17 unregistered sector (MSME, 2007-08). So output to

labour ratio in SSIs of Assam is small and lower than all India total SSIs' performance.

5.1.2. Investment wise Output/Labour Ratios

The investment wise output/labour ratios reflects that in the lower investment ranges the output labour ratio is low indicates that these industries the labours are mostly unorganized with low productive efficiency. However with the increase in investment the productivity increases which again starts falling at a very high level of investment. The per unit per year labour productivity is found to be very low in the investment range of 5-10 lakh and highest in 50-75 lakhs range.

Table 1

Investment wise Labour to Output Ratio in SSIs

Investment Ranges (In Lakhs)	Output/labour ratios	Percentage Change over previous range of Investment
Less than 2	71841.05	NA
2 to 5	64216.13	-11.8738
5 to 10	50770.14	-26.4841
10 to 25	71911.28	29.39892
25 to 50	85366.42	15.76163
50 to 75	98429.16	13.27121
75 to 75+	85338.13	-15.3402
Average	75410.33	NA

Source: Field Survey

From the above Table 1 it can be conclude that the labour efficiency enhances along with the increase in investment in plants and mercenary. But in the subsequent stages, it starts falling. In case of SSIs the investment range 10 to 25 lakh is found to be more suitable as at this range, the output/labour ratio increases about 29 percent over the previous investment range. The main reason behind such dramatic change is due to the efficiency of the capital input firmly suiting the labour inputs. In case of urban and rural areas the

output/labour ratio is found to be Rs 85562.00 and Rs 65258.66 respectively. It indicates that in rural areas the productivity of labours is low as compared to urban areas. However there is not so much difference of per unit labour output is found in case of food processing industries. The main reason behind such picture is that most of the food processing industries use same short of labours with almost same efficiency. For example, the labours used in rice mills have same short of efficiency.

5.2.1. Capital Productivity based on Capital Output Ratio

Capital output ratio is the ratio that shows the amount of units of capital that are needed to produce a certain level of output. A higher capital/ output ratio means a large amount of capital is needed for production. Since capital implies both the capital i.e. fixed and working, so both form capital is represented below Table 2.

Table 2

Average Capital Output Ratio in SSIs of Assam

Type of the Product	Capital/Output	Fixed Capital/ Output	Working Capital/ Output
Repairing	0.56	0.23	0.33
Agro Based	0.46	0.31	0.15
Manufacturing	0.89	0.47	0.42
Forest Based	0.45	0.15	0.3
Chemical Based	0.77	0.51	0.26
Engineering Based	0.98	0.61	0.37
Textile Based	0.54	0.37	0.17
Rubber/Plastic Based	0.65	0.39	0.26
Others	0.55	0.23	0.32
Average	0.65	0.37	0.29

Source: Field Survey

The Table 2, it is clear that the capital/output ratio of SSIs in Assam is not uniform and it is varying from a minimum of 0.45 in Agro based

industries to a maximum of 0.89 in Engineering Based industries. The mean capital/output ratio of all SSI industrial groups is found to be to be 0.65. This implies that to produce Rs.100 output there is a need of capital with Rs. 67 is required. It represents a good picture of status capital output ratio. In India, it is lower in agriculture which ranges from 1 to 2, higher in manufacturing it ranges from 3.5 to 4.5 and more or less the same in service sector. If we compare this capital/output ratio of SSIs to that of Ranabijoy Deb calculation of than we will find that the capital output ratio is almost the same even though the industrial groups that are considered are somewhat different. He had found lowest capital/labour ratio in food & allied products (0.32) and highest in machinery products (0.92) (Deb, 1993)

Comparing with the two digit industrial group of India from 1979-80 to 2003-04, than we will find that as against the capital/output ratio of 0.65 in all SSIs, the capital/labour ratio of two digit industrial group is 0.66. (table: 3). On the other hand fixed capital/output ratio and working capital/labour of SSI in Assam are 0.37 and 0.29 as against 0.49 & 0.17 of two digit industrial group of Assam from 1979-80 to 2003-04 respectively. So there is not so much difference in between the capital/output ratio of Assam and all India major industrial groups. But the main difference is found in terms of fixed capital output ratio and working capital output ratios. The fixed capital output ratio is higher in all India major industrial groups (0.49) as compared to SSIs of Assam (0.37). It is obvious that major industrial groups required higher amount of capital as compared to SSIs and so the fixed capital output ratio is on a high side.

Table 3

Capital/Output Ratios of Major Industrial Group in India

(Two Digit Industrial Group)

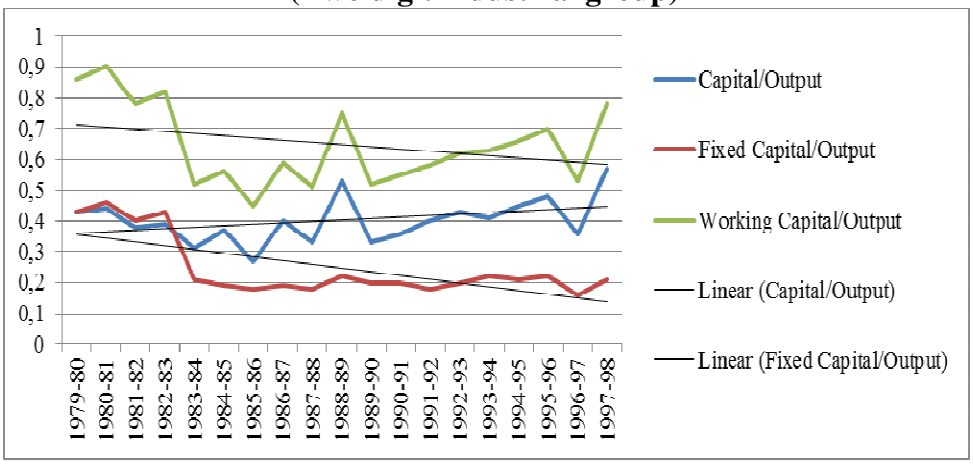
Years	Capital/Output	Fixed Capital/Output	Working Capital/Output
Before 1991	0.69	0.50	0.19
After 1991	0.63	0.48	0.14
Average	0.66	0.49	0.17
Capital/Output Ratios of Major Industrial Group in Assam (Two Digit Industrial Group)			
Before 1991	0.38	0.27	0.65
After 1991	0.44	0.20	0.64
Average	0.40	0.25	0.65

Source: *Annual Survey of Industries*

However the capital/output ratio of SSIs in Assam (0.65) is higher as indicated by the Figure 3 comparing with the major industrial group. Interestingly fixed capital to output ratio of SSIs is 0.37 which is somewhat able to compete with the all India average (0.49) reflecting efficient use of fixed assets whatever is available with them.

Figure 3

Year wise capital/output ratios of major industrial group in Assam (Two digit industrial group)



5.2.2. Investment wise Capital/Output Ratios

The investment wise capital output ratio reflects that with the increase in investment in plant or machinery the capital output ratios are increased first especially in the middle ranges and then starts falling. In the table 4 the capital/output ratio increases from 0.45 (investment range: less than 2 lakh) to 0.87 (investment range: 10-25 lakh) then fall to 0.48 in the highest investment range of 75 or more.

Table 4

Investment wise Capital to Output Ratio in SSIs

Investment (In Lakhs)	C/O Ratio	Percentage Change	Fixed C/O Ratio	Percentage Change	Working C/O Ratio	Percentage Change
Less than 2	0.45	-	0.34	-	0.11	-
2 to 5	0.59	23.73	0.45	24.44	0.14	21.43
5 to 10	0.78	24.36	0.48	6.25	0.3	53.33
10 to 25	0.87	10.34	0.42	-14.29	0.45	33.33
25 to 50	0.68	-27.94	0.31	-35.48	0.37	-21.62
50 to 75	0.70	2.86	0.31	6.45	0.39	5.13
75 to 75+	0.48	-45.83	0.28	-10.71	0.2	-95.00
Average	**0.65**	**NA**	**0.37**	**NA**	**0.28**	**NA**

Source: Field Survey

It is important that the percentage change in the capital output ratio over the previous investment range reflects that percentage decrease in capital output ratio is highest in the investment range of 75 lakh or more. It declines by -45.83% over 50-75 lakh investment. However the percentage decrease in C/O ratio over the previous investment range is more in case working capital to output ratios which is due to the reason that with the declining fixed capital output ratio the working capital to output ratio is bound to decline. As we stated previously in the initial stage of operation, the small firms utilize most of the capacities efficiently. That is why while capital/output ratio shows increasing trend followed by declining ratios. Thus from the analysis of the Capital/ Output ratio it is clear that those SSI industries of Assam have higher capital output ratio as compared to major

industrial groups even though it is declining in the subsequent stages of operations.

5.3. Relative Total Factor Productivity (TFP) in Small Scale Industries of Assam

The TFP for the simple SSIs in terms of gross value added is shown by table 5.

Table 5

Total factor Productivity of SSIs

Type of the Product	TFP *(Rupees in lakhs)* (Gross value added)
Repairing	0.19
Agro Based	0.21
Manufacturing	0.66
Forest Based	0.36
Chemical Based	0.14
Engineering Based	0.14
Textile Based	0.17
Rubber/Plastic Based	0.13
Others	0.38
Average	0.25
Standard Deviation	0.18

From the table the TFP of SSIs in Assam is found 0.25(Rupees in lakhs) measured in terms of gross value added terms. On the other hand, the highest TFP is found for manufacturing units and lowest is for Rubber/Plastic Based industries. On the other hand the standard deviation of the TFP is 0.18.

5.3.1. Total Factor Productivity (TFP) Growth in SSIs of Assam

For analyzing the TFP growth we have used same Kendrick index as used in the section but now we have used value of output rather value added based measure as macro data for value added output are not available. The total Factor Productivity of SSIs in Assam from 2001-2002 to 2008-2009 are as follows

Table 6

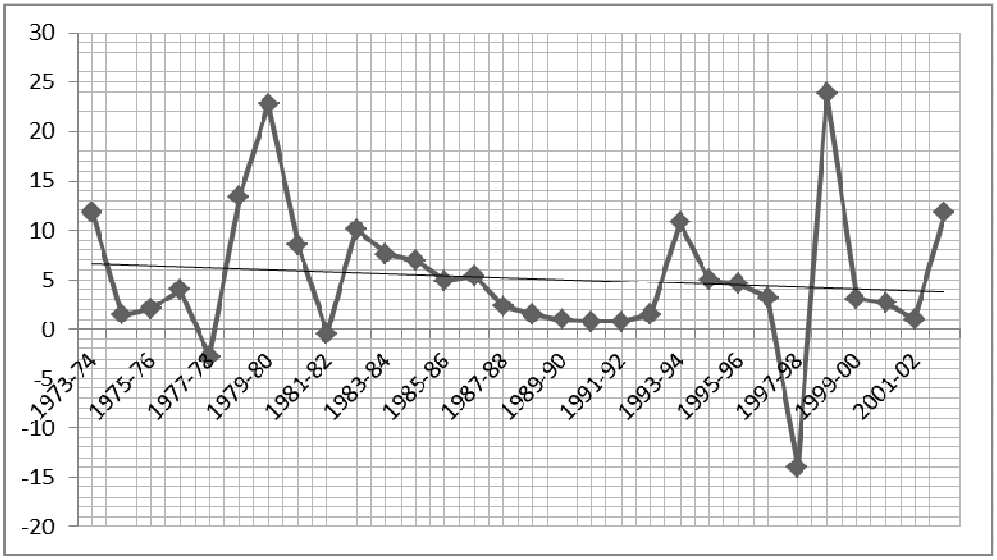
Total factor Productivity of SSIs in Assam (2000-2009)

Type of the Product	TFP *(Rupees in lakhs)* (Gross value added)	TFP growth (%)
2000-2001	2.088217	-
2001-2002	1.552749	**-25.64**
2002-2003	1.63623	5.38
2003-2004	1.637892	0.10
2004-2005	1.992456	21.65
2005-2006	1.224114	**-38.56**
2006-2007	2.022815	65.25
2007-2008	2.249258	11.19
2008-2009	2.039558	**-9.32**
Average	1.827032	3.75

The Table 6 it is seen that the TFP of SSIs in Assam seemed to be growing steadily over the time. However there is a fall in the rate of growth of TFP growth of -38.56% from 2004-2005 to 2005-2006. But again it recovered with 65.25 growth rates in the year 2006-2007. On average the TFP growth in Assam shows 3.75% annual growth over the years from 2000-2009. For comparing the TFP of SSIs in Assam of that to the all India SSIs, we have used real gross output based measure of TFP as data on value added output is not available.

Figure 4.

Total factor Productivity Growth of SSIs in India (Percentage)



Source: Development Commissioner (SSI), Ministry of Small Scale Industries, Government of India

The Total factor Productivity Growth of SSIs in India from 1973 to 2002 reflects that the TFP growth shows steady rates over the time and growing at an average rate of 5.18% over the years. The highest positive growth rate is found in the year 1998-99 with 23% growth rate and lowest negative growth rate is found in the year 1997-98 with -13% growth rates. Overall the standard deviation is found to be 7.20.

So even though the comparing period for SSIs in India and Assam are not the same, but the TFPG growth rate of Assam is lower than the all India level. The overall linear trend line of TFPG SSIs of India indicates a declining trend over the periods from 1973-74 to 2001-2002.

5.3.2. Determinants of Total Factor Productivity in Assam (A Cross-section Regression Analysis)

Determinants of TFP, as a residual, could be due to a host of factors. In the literature, in giving a theoretical sense to the residual, Grossman and Helpman (1991), Romer (1990), and Aghion and Howitt (1998) attempted to put in the role of technology, i.e., better instructions for combining raw materials into useful products and services. Romer (1986), Lucas (1988) and others tried to incorporate the critical role of externalities, including spillovers, economies of scale, and various complementarities in explaining TFP. However, in our study the possible determinants of TFP in the SSIs of Assam are investigated using regression analysis.

Variables used in regression Analysis:

Dependent Variable

(1) X = Total Factor Productivity

Independent Variable

(2) Y_1= Capital intensity measured by capital labour ratio;

(3) Y_2= Cost of Production measured by (Fixed + Variable Cost);

(4) Y_3= Demand for the product as measured by sales value;

(5) Y_4= Labour quality as measured by number of years taking education.

Model:

We have used nonlinear regression model for TFP determinants

$$Q = \alpha Y_1^{\beta_1} Y_2^{\beta_2} Y_3^{\beta_3} Y_4^{\beta_4} e^u$$

Taking log form

$$X = \ln\alpha + \beta_1 \ln Y_1 + \beta_2 \ln Y_2 + \beta_3 \ln Y_3 + \beta_4 \ln Y_4 + u$$

Where

A = Intercept

β_i = Regression coefficients
U = Random error.

5.3.3. Result and Discussion

From the regression analysis, it is established that the R^2 (0.520) and $\bar{R}^2$ (0.501) are both high even though extensive cross section data are used. The significant F statistics also replicates that the model fit the data well and analysis is significant.

Table 7

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.651[a]	.640	0.631	0.210

Table 8

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.56	3	20.52	19.68	.001[a]
	Residual	225.140	216	1.0423		
	Total	16.196	219			

From the coefficient table: 7 & 8 it is found that even though $\mathbf{R^2}$ and $\bar{\mathbf{R}}^2$ is both high and F is significant. All variables are found to be significant except the intercept term. The coefficient of Y_1 is 4.11 indicating that with the increase in the capital intensity the total factor productivity level also increases; while strong negative and significant cost variable (Y_3) coefficient is also found. With the increase in the cost of production the total factor productivity declines significantly. Notably we consider labour quality through the numbers of years in education as a variable. Even though significant relationship is found

for labour quality variable but its coefficient is found to be very stumpy and little influence on the total factor productivity level. The main reason of such little influence is due to traditional and indigenous production process in some SSIs especially SSIs product of villages need experiences rather than the educational quality.

Table 9

Coefficients[a]

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	α	- 4.40	5.619		-0.783	0.985
	Y_1	4.11	0.293	4.017	14.020	.000
	Y_2	3.52	0.296	2.054	11.893	.000
	Y_3	-6.83	2.363	2.003	-2.891	.004
	Y_4	0.32	0.030	0.987	10.783	.000

Residual analysis reflects that the adjusted predicted value and the predicted values are nearer. On the other hand the Cook's Distance is just under 1 and Mahalanobis Distance is also low. So over all the regression analysis is rigorous and represents the data well.

Table 10

Residuals Statistics[a]

Residuals Statistics	Minimum	Maximum	Mean	Std. Dev
Predicted Value	1.429	1.366	1.398	0.045
Std. Predicted Value	1.258	2.039	1.649	0.552
Std Error of Predicted Value	0.828	1.102	0.965	0.194
Adjusted Predicted Value	1.461	1.979	1.720	0.366
Residual	0.984	1.475	1.230	0.347
Std. Residual	0.279	2.446	1.363	1.532
Stud. Residual	0.301	7.322	3.812	4.965
Deleted Residual	0.065	1.933	0.999	1.321
Stud. Deleted Residual	0.378	0.718	0.548	0.240

Mahal. Distance	0.071	0.576	0.324	0.357
Cook's Distance	0.052	0.149	0.101	0.069
Centered Leverage Value	0.04	.429	0.235	0.275

6. Ranking of the Small Scale industries using Principal component Analysis

The cross-correlation of parameters can be seen in Table: 11. three parameters are highly correlated with each other (greater than 0.60).The three factors TFP, NP, K are strongly associated with each other and the positive definite (0.273) determinant also state that there is no multicolinearity problem with the data.

Table 11

Correlation Matrix[a]

		TFP	NP	L	K
Correlation	TFP	1.000	.924	.148	.740
	NP	.924	1.000	.612	.796
	L	.148	.612	1.000	-.667
	K	.740	.796	-.667	1.000
Sig. (1-tailed)	TFP		.012	.492	.001
	NP	.012		.487	.005
	L	.492	.487		.033
	K	.001	.005	.033	

a. Determinant = .273

Since the Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.701 (table: 12) which is considered as good for data for applying the factor analysis.

Table 12

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.701
Bartlett's Test of Sphericity	Approx. Chi-Square	51.790**

** Significant at 1% level of significance

Table 13

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.083	52.071	52.071	2.083	52.071	52.071	2.062	51.556	51.556
2	1.007	25.175	77.246	1.007	25.175	77.246	1.028	25.690	77.246
3	.732	18.307	95.553						
4	.178	4.447	100.000						

Extraction Method: Principal Component Analysis.

In the Table 13, principal component-1 explains about half (52 %) of the data variance, component-2 explains about 25% and component-3 explains about 18.30% the variance. The initial Eigen values of the two variables are fairly large explaining almost 77.246% of the cumulative variance.

The component matrix and rotate component matrix with Varimax with Kaiser Normalization method are presented in table. In the component matrix (table:14) before extraction two parameters namely TFP, NP are highly correlated with factor. However after rotation, TFP, NP and K are highly loaded in component one.

Table 14

Component Matrix[a]

Variables	Component	
	1	2
TFP	.644	.180
NP	.880	.106
L	-.159	.980
K	.932	-.057

Extraction Method: Principal Component Analysis.
a. 2 components extracted.

Table 15

Rotated Component Matrix[a]

	Component	
	1	*2*
TFP	*.662*	*.090*
NP	*.886*	*-.017*
L	*-.022*	*.992*
K	*.916*	*-.186*

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

Table 16

Component Transformation Matrix

Component	1	2
1	.990	-.138
2	.138	.990

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 17

Component Score Coefficient Matrix

	Component	
	1	2
TFP	.331	.135
NP	.433	.046
L	.059	.974
K	.435	-.118

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Component Scores.

Now ranking all industrial groups according to the first principal component index (Z_{ID}) with the following index as:

Table 18

Rankings of the SSIs

Type of the Industry	Factor Score	Rank
Repairing	-1.80145	8
Agro Based	1.02116	2
Manufacturing	-0.29126	6
Forest Based	1.18171	1
Chemical Based	-0.07724	5
Engineering Based	0.45940	4
Textile Based	0.94265	3
Rubber/Plastic Based	-0.93611	9
Others	-0.49885	7

From the above analysis it is clear that forest based industries secures the top most ranking (Rank-1) in PCA based ranking followed by agro based industries (Rank-2). On the other hand textile based industries are in rank 3rd followed by Engineering industries (Rank-4), Chemical based industries (Rank-5), Manufacturing industries (Rank-6), other industries (Rank-7), Repairing industries (Rank-8) and Rubber based industries (Rank-9).

Conclusion and Policy Implications

Thus from the analysis the overall performance of SSIs are not satisfactory and productivity is still low, even thought it shows a positive sign of improvement and a continuous and comprehensive backup operational support is needed to the existing SSIs. A well organized and a well planned special policy regime for the restructuring the SSIs of Assam will help them to compete with the other SSIs of India. So a special policy package should be formed. The following policy suggestions can be followed to develop SSIs in India.

- The lack of entrepreneurial ability is one of the main problems that need special attention and educational and moral incentives are needed to developed entrepreneurial ability among the entrepreneurs of Assam.
- The SSIs of Assam facing the problem of organizing finance in developing and forming the industry. So a special banking and financial facility is a must required aspect of the SSIs in Assam.
- There are two important problems faced by North East India as well as Assam. One is low power supply and other is insurgency problem. The 45% SSIs of Assam needs no power supply but 35% used electricity as power supply. Even though these two problems are hard to resolve but improvement can be done by technological up-gradation and large scale policy implementation.

Given the backdrop of the status of small scale industries and taking into consideration the challenges that they face, various interventions are needed for growth of small scale industries. Even though the performance of SSIs in Assam is not satisfactory but after the liberalization period the productivity and employment in SSIs of Assam have increased slowly. But to compete in all India as well as global scenario they need special attention and reformulation in terms of number and performance as well as quality.

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