

## Growth and Productivity of Micro Manufacturing Enterprises in West Bengal: An Analysis

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### Abstract

*Present paper makes an attempt to study the status of Micro Manufacturing Enterprises (MMEs), its labour productivity and profitability in general and analyse the factors that determine the status of growth of MMEs in the context of West Bengal on the basis of 67<sup>th</sup> Round(2010-11) & 73<sup>th</sup> round (2015-16) NSSO Unit Level data. West Bengal has occupied the top position in the growth of number of MMEs as well as in the expansion of employment and output in MMEs. The density of MMEs is the highest in West Bengal among the states of India where one MME exists per 5 households. But the productivity of MMEs has been declined during 2010-11 to 2015-16. Productivity of MMEs is significantly high in establishment enterprises than that of own account enterprises (OAEs). From the status of growth of MMEs in West Bengal it is evident that establishment enterprises are more promising than OAEs. Multinomial logit estimates indicate that expanding status of growth is significantly affected by productivity, profitability, location, nature of enterprise and size of firm. Rural located, establishment, higher productive and larger size MMEs are more likely expanding than stagnating as well as contracting nature of growth.*

**Keywords:** Micro Manufacturing Enterprise, Productivity, Elasticity of Productivity, Return to Scale, Status of Growth

**JEL classification:** D20, D24, L25

### 1. Introduction

Micro Manufacturing Enterprises (MMEs) occupy an important and strategic place in the economic growth and equitable development by creating employment, enhancing income, strengthening purchasing power, lowering costs, adding business convenience and creating entrepreneurial spirit among the households. These enterprises facilitate an effective mobilization of local resources and skill which might otherwise remain unutilized. MMEs refer to an economic unit engaged in the production of manufacturing goods where investment (on plant and machinery) do not exceed Rs. 25 lakh. This sector is identified with features like reliance on indigenous resources, family ownership of enterprise, small scale of operation, labour intensive, adapted technology and minimum skill. They possess the features like self-employment generation, employment to poor and women, low capital input, meeting basic needs of the poor, self-satisfaction on the job, entrepreneurship, innovative and fair income distribution among the poor.

In West Bengal where labour forces are very high and majority of them are not able to absorb in organized industry or in service sector. The residual army who are not accessed in organized industry and service sectors enter into unorganized sector, specifically in the MMEs. NSSO (National Sample Survey Organization) data reveals that, in West Bengal, total employment increased at the extent of 40,72,056 during 2004-05 to 2011-12. Out of total additional employment manufacturing employment has been increased 67.8 per cent. Within the additional manufacturing employment only 5 per cent jobs has been created in the organized manufacturing sector and remaining 95 per cent employment has been generated in the unorganized manufacturing sector. In unorganized manufacturing sector most of the employment has been generated in the MMEs which is numbered out as 24,19,129. That is, a significant portion of new jobs (64.2 per cent) has been created in the MMEs. Recently number of MME has significantly increased in West Bengal. In 2015-16, among the states of India, West Bengal has the highest share (21.3 per cent) of MMEs and about 11.1 per cent of total MMEs output in India produced in West Bengal. MMEs have made significant contribution towards generation of employment and output in West Bengal. Among the states of India West Bengal has also ranked 1<sup>st</sup> in respect of generation of employment and output in MMEs. The share of micro manufacturing employment to total employment is relatively high in West Bengal (14.4 per cent) than that of India (7.2 per cent). The share of micro manufacturing output to total industrial output is also relatively high in West Bengal (8.8 per cent) than that of India (5.8 per cent). Among the states of India the density of MMEs is also highest in West Bengal. That is MMEs play crucial role in West Bengal economy.

### ***Review of Existing Literature***

In this connection we may briefly review the existing literature on MMEs under different heads, mainly employment generation, poverty reduction, women empowerment, entrepreneurship development and economic growth. It may be noted that MMEs are instruments that allow poor to enhance their income, build assets, and take part in community actions. MMEs act as reduction of poverty and vulnerability of poor through enabling them to enhance self-empowerment and social dignity (Chowdhury 2009). They are important sources of employment creation, income generation, product diversification and economic growth (Hussain 2000). Agyapong (2010) points out that MMEs have been identified to play key role in a society by contributing to jobs through innovations and creativity as well as aiding human resource development. The livelihoods of the entrepreneurs have been improved to large extent after the undertaking of Micro Enterprising activities and they have been able to satisfy their most needs and to accumulate assets (Subedi 2006). Kanitkar (1994) advocates that MMEs growth stimulates competition and entrepreneurship which, in turn, enhances efficiency, innovation, and productivity growth. Alam (2009) finds that the level of employment in MMEs is significantly higher than that of large scale industries and hence the contribution of MMEs is rather more pervasive compared to the large industries and is more prominent at the grassroots level. Subramanian (2010) finds that MMEs are important in creating employment and entrepreneurial talent among the Malaysian youth where MMEs provide young and budding entrepreneurs an opportunity to be involved in entrepreneurships that require less financial commitment. Adhikari (2010) reveal that the socio-economic condition of women has changed and women's access to and control over the resources has increased after undertaking of MMEs. Sharma (*et al* 2012) discuss opportunities and challenges faced by women micro entrepreneurs in rural areas, and also examined the impact on women empowerment through micro entrepreneurship development. Sen and Salim (2016) observes that there exist regional variations among districts in West Bengal in case of

MME units, employment and investment. Ganguly (2013) advocates the MMEs in West Bengal faced very tough situation due to utmost competition in national and international level from large industries due to lack of infrastructure, lower volume of capital, lack of product standardization, lack of access to modern technology etc. Sathish (2014) shows the trend of MMEs in terms of number of unit, employment and investment in Goa from 2007-08 to 2013-14. Rangacharya (2014) analyses the trends of MMEs in Karnataka state after enactment of MSMED Act 2006, and also discusses investment, employment, production and export performance of the MMEs in Karnataka.

### **Objectives**

From the brief review of the existing literature, it appears that the recent status of MMEs, its labour productivity and profitability and their growth status, the factors that determine the status of growth of MMEs in West Bengal have not been adequately discussed. The present study explores these and allied issues of MMEs in depth on the basis of NSSO unit level data in the context of West Bengal. The specific objectives are given below:

1. To explore the growth of MMEs in West Bengal vis-à-vis other States in India during 2010-11 to 2015-16.
2. To analyse the labour productivity of own account and establishment MMEs in West Bengal.
3. To explore the characteristics of different categories of MME in West Bengal in terms of elasticity of labour productivity and return to scale.
4. To explain the factors that affects the status of growth of MMEs in West Bengal.

## **2. Data Base and Methodology**

### **2.1. Data Base**

NSSO 67<sup>th</sup> Round (2010-11) and 73<sup>th</sup> Round (2015-16) Survey<sup>1</sup> on *Unincorporated Non-Agricultural Enterprises (Excluding Construction) in India*, gives an opportunity to analyse the status of MMEs in West Bengal. According to Micro, Small and Medium Enterprises Development (MSMED) Act 2006 a manufacturing enterprise is treated as MMEs in the investment in plant and machinery does not exceed Rs. 2.5 million. On the basis of the value of investment in plant and machinery we have find out MMEs in NSSO unit level data.

In West Bengal more than 27,63,784 MMEs are operating in 2010-11 wherein 50,02,287 persons are employed. NSSO 73<sup>rd</sup> round is fully comparable with 67<sup>th</sup> round. The MMEs enormously increased during 2010-11 to 2015-16. In 2015-16, 41,75,468 MMEs are operating wherein 69,39,129 persons are employed. The survey explored different aspects of MMEs by the means of ownership, location, nature of operation, social ownership, life-span, number of months operated, number of working hours, gross output, gross value added, employment, fixed assets, status of growth etc.

### **2.2 Methodology of Study**

#### ***Status of growth and productivity of MME***

The status of growth of enterprises is classified in four categories viz, expanding, stagnant, contracting and others on the basis of their performance during last three years. If income of enterprises is increasing, decreasing and remaining stagnant over last three years they are categorised as expanding, contracting and stagnant enterprises respectively. The status of growth of the enterprises with life-span less than 3 years is not specified and treated as 'others'. Labour productivity can be measured as a ratio of the total output to the number of man hours or man-day to produce the output. We can also measure labour productivity as the ratio of total output to the number of workers used to produce the output. Labour Productivity, measured by gross value added<sup>6</sup> per man-day, is widely varied across enterprises.

### ***Elasticity of Labour Productivity***

The CES production function is used to estimate the elasticity of labour productivity of MMEs sector. The required data on gross value added, capital, employment and wages are obtained from the 67<sup>th</sup> round NSSO unit level data relating to the MME sector. The variables selected for this exercise are gross-value added (V), number of man-day (L), fixed capital (K) and wage rate (W/L). The estimate of sum of elasticities gives an idea about the nature of return to scale (R) across different MME sectors. Elasticity of labour productivity can be estimated both from Cobb-Douglas and constant elasticity of substitution (CES) production functions. But Cobb-Douglas production function is based on the most restrictive assumption of unitary elasticity of substitution. This assumption can be relaxed by using an indirect method of estimating CES production function based on the conditions of profit maximization under perfectly competitive markets. The CES function is based on the observation that output per labour (V/L) is a changing proportion (increasing, decreasing or constant proportion) of wage rate (W/L). The CES production function can be written as follows.

$$V/L = a (W/L)^\sigma e^{ut}$$

The above equation is obtained from the following CES production function.

$$V = A [\delta K^\rho + (1 - \delta) L^{-\rho}]^{-1/\rho} \quad (A > 0; 0 < \delta < 1; -1 < \rho \neq 0)$$

Where V = gross-value added

K, L = capital and labour inputs

A = efficiency parameter, A > 0

$\delta$  = distribution parameter  $0 < \delta < 1$

$\rho$  = extent of substitution between labour and capital

$\sigma$  = elasticity of labour productivity  $\sigma = \frac{1}{1 + \rho}$

From the above function marginal productivity of labour (MP<sub>L</sub>) can be obtained as follows:

$$\begin{aligned} \frac{dV}{dL} &= A \left(-\frac{1}{\rho}\right) [\delta K^{-\rho} + (1 - \delta) L^{-\rho}]^{-(1/\rho)-1} (1 - \delta) (-\rho) L^{-\rho-1} \\ &= (1 - \delta) A [\delta K^{-\rho} + (1 - \delta) L^{-\rho}]^{-(1 + \rho)/\rho} L^{-(1 + \rho)} \\ &= (1 - \delta) \frac{A^{1 + \rho}}{A^\rho} [\delta K^{-\rho} + (1 - \delta) L^{-\rho}]^{-(1 + \rho)/\rho} L^{-(1 + \rho)} \\ &= \frac{(1 - \delta)}{A^\rho} \left(\frac{V}{L}\right)^{(1 + \rho)} \end{aligned}$$

$$\text{Similarly } \frac{dV}{dK} = \frac{\delta}{A^\rho} \left(\frac{V}{K}\right)^{(1 + \rho)}$$

The marginal productivity theory of wages has been generally accepted by the economists as it gives an adequate explanation of wage determination. It is well known that the price of labour (wage) under the conditions of perfect competition is equal to the average and marginal product of labour in the long run. The firm, being a profit maximiser, will continue to increase the labour force up to a point at which the reward paid to the marginal unit of labour (marginal wage) is equal to the contribution made by the unit (marginal productivity of labour). According to marginal productivity theory under perfect competition

$$MP_L = \text{wage rate} = \frac{dV}{dL} = \frac{W}{L}$$

$$= \frac{(1-\delta)}{A^\rho} \left(\frac{V}{L}\right)^{1+\rho} = \frac{W}{L}$$

$$\left(\frac{V}{L}\right)^{1+\rho} = \frac{A^\rho}{(1-\delta)} \cdot \frac{W}{L}$$

$$\frac{V}{L} = \left(\frac{A^\rho}{(1-\delta)} \cdot \frac{W}{L}\right)^{1/1+\rho}$$

$$\frac{A^\rho}{(1-\delta)} = \text{a constant}$$

$$\frac{1}{1+\rho} = \sigma = \text{elasticity of substitution or elasticity of labour productivity.}$$

$$\frac{V}{L} = a \left(\frac{W}{L}\right)^\sigma = \log \left(\frac{V}{L}\right) = \log a + \sigma \log \left(\frac{W}{L}\right)$$

The coefficient of  $\log \frac{W}{L}$  in the above regression of  $\log \frac{V}{L}$  on  $\frac{W}{L}$  yields an estimate of  $\sigma$

$$\sigma = \frac{1}{1+\rho}$$

$$\rho = \frac{1}{\sigma} - 1$$

possible values for  $\rho$  range from  $\rho = \alpha$  to  $-1$

where  $\sigma = \alpha$  substitution of labour for capital is impossible

$\sigma = \alpha$  substitution possibilities of labour for capital are greatest.

where  $\sigma$  is a constant whose magnitude depends on the value of the parameter  $\rho$  as follows,

$$\begin{cases} -1 < \rho < 0 \\ \rho = 0 \\ 0 < \rho < \alpha \end{cases} = \begin{cases} \sigma > 1 \\ \sigma = 1 \\ \sigma < 1 \end{cases}$$

When  $\rho = 0$ ,  $\sigma = 1$ , leads Cobb-Douglas production. More specifically from the above partial elasticity of labour productivity it can be inferred that if  $\sigma > 1$  higher substitution possibilities of labour for capital and  $\sigma < 1$  lower the substitution possibilities of labour for capital.

The estimating from of the above equation is  $\log (V/L) = \log a + \sigma \log (W/L)$

Elasticity of labour productivity with respect to wage rate

$$= \frac{\text{Marginal labour productivity in relation to wage rate}}{\text{Average labour productivity in relation to wage rate}}$$

$$= \frac{d\left(\frac{V}{L}\right)}{d\left(\frac{W}{L}\right)} \div \frac{V/L}{W/L}$$

$$= \frac{d \log V/L}{d \log W/L}$$

$$= \frac{d \left( \frac{V}{L} \right)}{\left( \frac{V}{L} \right)} \times \frac{\left( \frac{W}{L} \right)}{d \left( \frac{W}{L} \right)} = \sigma$$

The proportionate change in labour productivity (V/L) due to a small proportionate change in wage rate (W/L) is the measure of elasticity of substitution  $\sigma = \frac{1}{1+\rho}$ . The numerical value of  $\sigma$  need not necessarily be unity and it can take any value. If the numerical value of  $\sigma$  to be estimated is significantly unity ( $\sigma = 1$ ) then we have the Cobb-Douglas production function. More specifically from the above partial elasticity of labour productivity it can be inferred that if  $\sigma > 1$  higher substitution possibilities and  $\sigma < 1$  lower the substitution possibilities.

It is well known that the Cobb-Douglas production function assumes the elasticity of substitution between capital and labour to be equal to unity which may not always be true because of a lot of disparity in factor payments. Therefore the elasticity of substitution is estimated through CES production function to test the hypothesis of unitary elasticity ( $\sigma = 1$ ). Therefore, equation of CES function can be  $\log (V/L) = \log a + \sigma (W/L)$  is fitted to the cross section data.

### ***Return to Scale of MMEs***

The estimate of sum of elasticities gives an idea about the nature of return to scale (R) in the Micro Manufacturing sector. Unrestricted (non constant returns to scale) Cobb-Douglas form of production function is used. It can be written as following

$$V = a L^\alpha K^\beta e^u$$

The estimating form of the above equation is

$$\log V = \log a + \alpha \log K + \beta \log L$$

Where  $\alpha+\beta$  need not equal one. The summation of the coefficients elasticities of capital and labour ( $\alpha+\beta$ ) factors gives an important parameter called return to scale, i.e,  $R=1$ . The returns to scale are increasing, decreasing or constant depending on whether R is greater than, equal to or less than one, i.e,  $R > 1$  increasing returns to scale (economics of scale).  $R = 1$  constant returns to scale,  $R < 1$  decreasing returns to scale (dis-economics of scale). Number of man-day (L), the gross value added (V), fixed capital (K) and wage rate (W/L) have been taken in the value terms at current prices.

### ***Analysis of Status of Growth of MME***

For econometric analysis of status of growth here we have consider the firms with expanding, stagnating and contracting nature of their status of growth. We have ignored the firms whose status of growth is not specified (i.e., firms belong in others category of status of growth). Status of growth (STGR) of MMEs is multinomial and we have assigned the values 1, 2 and 3 for expanding, stagnating and contracting MMEs respectively and it depends on the specific characteristics of MMEs. The notations and specifications of status of growth and its determinants are presented in Table 1.

**Table 1 Notation, Specification and summary Statistics of Variables used in the regression Model, 2011-12 and 2015-16**

Notation	Specification	Mean	SD
	Dependent variable		
STGR	Status of growth is categorized as 1 if expanding, 2 if stagnating, 3 if contracting, and 4 if others.	1.74 (1.95)	0.68 (0.95)
	Independent variables		
ESTT	Nature of enterprises: Whether the MME is establishment or not (Yes = 1, No = 0).	0.47 (0.52)	0.50 (0.48)
LOCN	Location of enterprises: Whether the MMEs is located in urban area or not (Yes=1, No= 0).	0.40 (0.44)	0.49 (0.22)
NOPN	Nature of operation: Whether MME is perennial or not (Yes=1, No=0).	0.98 (0.96)	0.14 (0.57)
GOVA	Whether MMEs is received government assistance (in the form of subsidy) or not, (Yes= 1, No=0).	0.02 (0.01)	0.50
LPRD	Labour productivity (in Rs.'000) of MME is measured by gross value added per man-day.	0.48 (0.83)	1.61 (28.11)
PRAT	Profitability (in Rs.'000) of MME is the ratio of net profit to total number of workers of enterprises.	2.54 (4.03)	3.16 (80.01)
SFAM	Size of firm (in Rs.'000) is measured by the volume of fixed asset of MME.	183.75 (229.3)	523.66 (960.9)
LOAN	Credit: The volume of credit (in Rs.'000) access of MME.	20.58 (36.13)	171.12 (49.7)

Note: Figures parenthesis indicate the value in 2015-16

Source: Author's calculation based on NSSO Unit Level data of 2010-11 and 2015-16

Nature of enterprise (ESTT) is a dummy variable taking the value 1 if it is establishment and 0 if it is OAEs. Location of enterprises (LOCN) is also a dummy variable taking the value 1 if it is located in urban area and 0 if it is located in rural area. Other dummies like Nature of operation (NOPN) taking the value 1 if it is perennial and 0 if it is seasonal and casual enterprise and government assistance (GOVA) taking the value 1 if it received assistance in the form of subsidy from the government and 0 otherwise. Labour productivity (LPRD) of MME is measured by gross value added per man-day. Whereas profitability of MME is measured by the ratio of net profit to total number of worker of MME. Size of firm (SFAM) is measured by the volume of fixed asset of MME.

Multinomial logit Model is used to explain the status of growth of Micro Manufacturing Enterprises. The Model is specified as follows: the data consists of status of growth of MMEs are facing three choices- expanding, stagnating and contracting, which are coded as 1, 2 and 3. It is assumed that we have a set of observations  $Y_i$ , for  $i = 1 \dots n$ , of the outcomes of multi-way choices from a categorical distribution of size  $m = 3$ . Along with  $Y_i$  there are a set of  $k$  observed values  $x_{1,i}, \dots, x_{k,i}$  of explanatory variables like labour productivity (LPRD), nature of enterprise (ESTT), location of enterprise (LOCN), nature of operation (NOPN), size of firm (SFAM), profitability (PRAT), Credit (LOAN) and government assistance (GOVA).

The multinomial logit (MNL) model can be used when all the regressors are case specific, the MNL model specifies that

$$p_{ij} = \frac{\exp(x_i' \beta_j)}{\sum_{l=1}^m \exp(x_i' \beta_l)}$$

Where  $X_i$  are case-specific regressors, here an intercept and income. Clearly, this model ensures that  $0 < p_{ij} < 1$  and  $\sum_{j=1}^m p_{ij} = 1$ . To ensure model identification,  $\beta_j$  is set to zero for

one of the categories, and coefficients are then interpreted with respect to that category, called the base category.

Where independent variables are the case-specific regressors, and the default is to automatically included an intercept. The base outcome option specifies the value of dependent variable to be used as the base category, overriding the STATA default of setting the most frequently chosen category as the base category. Other options include rrr to report exponentiated coefficient ( $e^{\hat{\beta}}$  rather than  $\hat{\beta}$ ).

Coefficient in a multinomial model can be interpreted in the same way as binary logit model parameters are interpreted, with comparison being to the base category. This is a result of the multinomial logit model being equivalent to a series of pairwise logit models. For simplicity, we set the base category to be the first category. Then the MNL model defined in implies that

$$\Pr(y_i = j | y_i = j \text{ or } 1) = \frac{\Pr(y_i = j)}{\Pr(y_i = j) + \Pr(y_i = 1)} = \frac{\exp(x_i' \beta_j)}{1 + \exp(x_i' \beta_j)}$$

Using  $\beta_1 = 0$  and cancellation of  $\sum_{l=1}^m \exp(x_i' \beta_l)$  in the numerator and denominator.

Thus  $\hat{\beta}_j$  can be viewed as parameters of binary logit model between alternative  $j$  and alternative 1. So a positive coefficient from mlogit means that as the regressor increases, we are more likely to choose alternative  $j$  than alternative 1. This interpretation will vary with the base category and is clearly most useful when there is a natural base category.

Some researchers find it helpful to transform to odds ratios or relative-risk ratios, as in the binary logit case. The odds ratio or relative-risk ratio of choosing alternative  $j$  rather than alternative 1 is given by

$$\frac{\Pr(y_i = j)}{\Pr(y_i = 1)} = \exp(x_i' \beta_j)$$

so  $e^{\beta_j}$  gives the proportionate change in the relative risk of choosing alternative  $j$  rather than alternative 1 when  $x_{ir}$ .

### 3. Results and Discussion

#### 3.1 Growth of MMEs in West Bengal vis-à-vis other States in India

MMEs in West Bengal have expanded enormously from all aspects – number of enterprises, employment generation and output. During 2010-11 to 2015-16 number of MMEs increased from 2763 thousand to 4175 thousand, number of employment increased from 5002 thousand to 6939 thousand and output increased from Rs.41,549 crore to Rs.71313 crore. In all these aspects of MME West Bengal has occupied in the top position among states in India (Table 2).

West Bengal has also occupied in the top position for the growth of number of MMEs, growth of employment generation in MMEs and growth of output of MMEs. During the same period as many as 1411698 new MMEs, 1936841 additional employments and Rs.29763 crore additional value of output have been accumulated in West Bengal. These expansions are substantially high in West Bengal compared to other states of India. The new MMEs that have been established in West Bengal since 2010-11 to 2015-16 are 60 per cent of new MMEs established in India. While the number of MMEs declined in a number of states (11



out of 22 major states) during this period. Most important aspect of the expansion of MMEs is the generation of employment. MMEs of West Bengal have been generated 444 per cent of additional employment of India. The number of MME employment declined in number of states. The declined is substantially high in Gujarat, Maharashtra, Uttar Pradesh, Orissa, Tamil Nadu and Punjab (Table 3).

**Table2 Number of MMEs, employment and output in West Bengal vis-à-vis others states, 2010-11 to 2-15-16**

States	No of MME ('000)		Employment('000)		Output (Rs. Crore)	
	2010-11	2015-16	2010-11	2015-16	2010-11	2015-16
West Bengal	2763	4175	5002	6939	41549	71313
Uttar Pradesh	2339	2205	5215	4569	45948	68666
Tamil Nadu	1649	1739	3472	3326	46256	67406
Andhra Pradesh	1620	2162	3095	3420	29826	49506
Gujarat	1409	1205	3141	2245	52599	58459
Maharashtra	1385	1239	3212	2458	45918	63370
Madhya Pradesh	883	831	1532	1442	10028	16497
Karnataka	860	1247	1507	2146	20087	43073
Rajasthan	626	749	1206	1328	19941	34304
Orissa	614	485	1261	844	7114	8138
Kerala	501	544	971	991	18002	24805
Bihar	448	768	751	1216	7607	24937
Punjab	387	383	773	682	14505	23104
Jharkhand	335	494	602	753	3101	6804
Jammu & Kashmir	223	234	337	337	5249	7306
Assam	218	202	421	350	7015	8156
Delhi	204	178	739	673	15475	28264
Haryana	188	181	460	382	9465	16256
Chhattisgarh	164	194	351	417	6419	5759
Uttarakhand	97	71	173	116	2703	3164
Himachal Pradesh	91	93	154	138	3385	3071
All India	17194	19599	34697	35134	416906	640702

Source: As in Table 1

The percentage share of number of MMEs of West Bengal to total number of MMEs in India was increased from 16.1 per cent in 2010-11 to 21.3 per cent in 2015-16. The share MME employment (output) of West Bengal to total MME employment (output) in India also increased from 14.4 (10.0) per cent to 19.8 (11.1) per cent during the same period. Among the states of India the position of the West Bengal also elevated during this period and occupied in the top position in respect number of MMEs, employment and output.

**Table3 Growth of MMEs in West Bengal vis-à-vis other States in India during 2010-11 to 2015-16**

States	Growth of Enterprise		Growth of Employment		Growth of Output(Rs. Crore)	
	No of MME	Growth rate	Employment	Growth rate	Output	Growth rate
West Bengal	1411698	51.1	1936841	38.7	29763	71.6
Andhra Pradesh	542435	33.5	324891	10.5	19680	66.0
Karnataka	386371	44.9	638394	42.3	22986	114.4
Bihar	320298	71.5	465123	61.9	17330	227.8
Jharkhand	158822	47.4	150242	24.9	3704	119.4
Rajasthan	123454	19.7	121144	10.0	14363	72.0
Tamil Nadu	89887	5.4	-146345	-4.2	21149	45.7
Kerala	42704	8.5	20017	2.1	6802	37.8
Chhattisgarh	29674	18.0	65361	18.6	-660	-10.3
Jammu & Kashmir	11182	5.0	-737	-0.2	2057	39.2
Himachal Pradesh	2198	2.4	-16384	-10.6	-315	-9.3
Punjab	-4303	-1.1	-91333	-11.8	8599	59.3
Haryana	-7661	-4.1	-78298	-17.0	6791	71.7
Assam	-15625	-7.2	-71095	-16.9	1141	16.3
Uttarakhand	-25764	-26.4	-56713	-32.8	461	17.0
Delhi	-25775	-12.6	-66177	-9.0	12789	82.6
Madhya Pradesh	-51899	-5.9	-89542	-5.8	6469	64.5
Orissa	-128903	-21.0	-417515	-33.1	1024	14.4
Uttar Pradesh	-134338	-5.7	-646173	-12.4	22717	49.4
Maharashtra	-145182	-10.5	-754563	-23.5	17451	38.0
Gujarat	-204344	-14.5	-895619	-28.5	5860	11.1
All India	2404428	14.0	436202	1.3	223796	53.7

Source: As in Table 1

**Table 3 Share of MME of a state to total MMEs in India, 2010-11 to 2015-16**

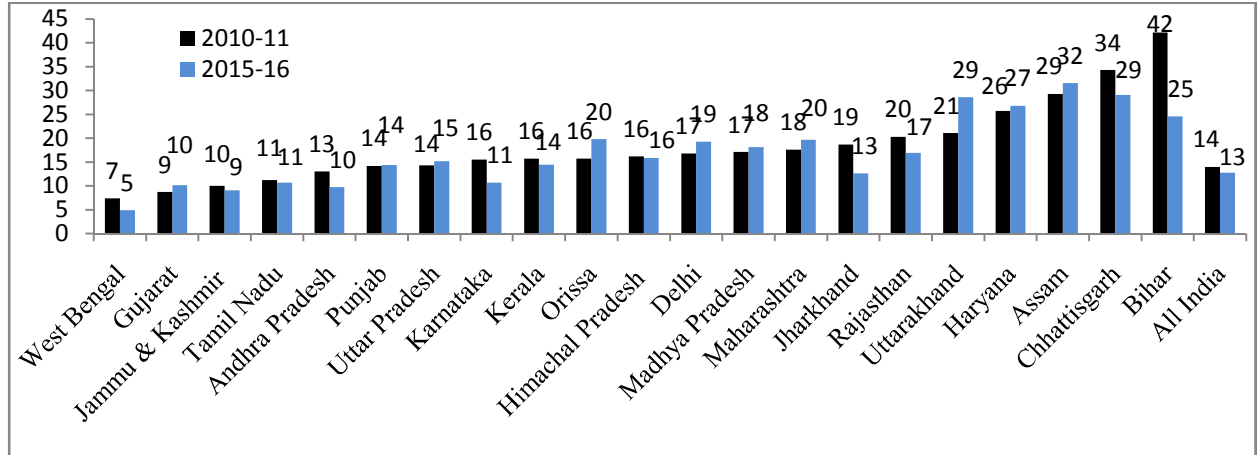
	2010-11		2015-16	
	Percentage share of MMEs of West Bengal to total MMEs in India	Rank	Percentage share of MMEs of West Bengal to total MMEs in India	Rank
No of MME	16.1	1 <sup>st</sup>	21.3	1 <sup>st</sup>
Employment	14.4	2 <sup>nd</sup>	19.8	1 <sup>st</sup>
Output	10.0	5 <sup>th</sup>	11.1	1 <sup>st</sup>

Source: As in Table 1

Other important features of MMEs in West Bengal in comparison of other states are noted as follows: *Firstly*, the density of MMEs, measured by the ratio of total number of households to total number of MMEs of a particular state, is highest in West Bengal where one MME exists per 7 households and it is lowest in Bihar where one MME exists per 42 households in 2010-11. But in 2015-16 the density of MMEs significantly increased West Bengal and Bihar – in West Bengal one MME exist per 5 households and in Bihar one MME exist per 25 households. Others states like Gujarat, Tamil Nadu, Jammu & Kashmir, Andhra Pradesh, Punjab and Uttar Pradesh have also experienced high density of MMEs and it is relatively low in the states like Chhattisgarh, Assam, Haryana and Uttaranchal (Figure 1). In all over India one MME exists per 14 households. Density of MMEs is significantly high in West

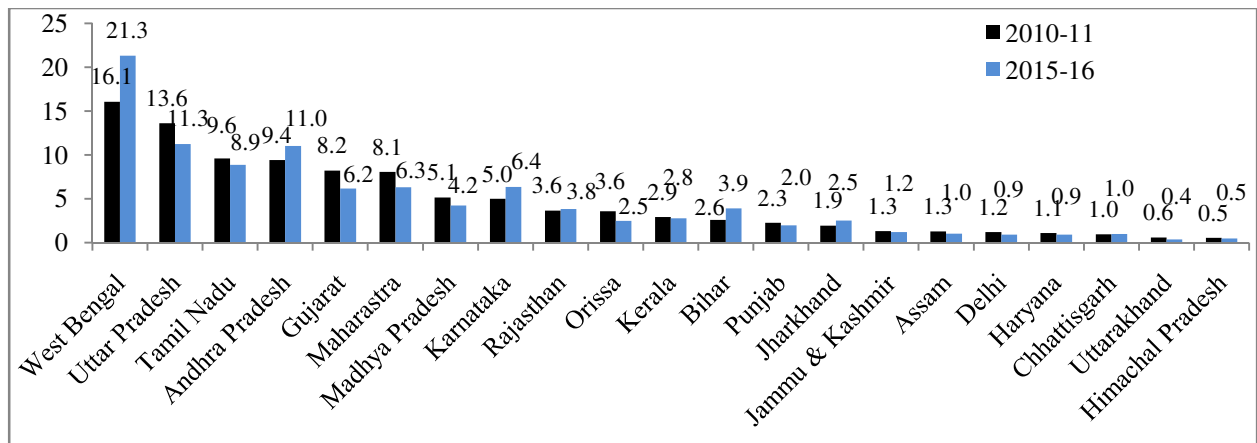
Bengal because during last ten years a significant number of people are employed in MMEs due to the limited job opportunity in the big organized industry sector or in service sector.

**Figure 1 Density of MMEs in West Bengal vis-à-vis others states**



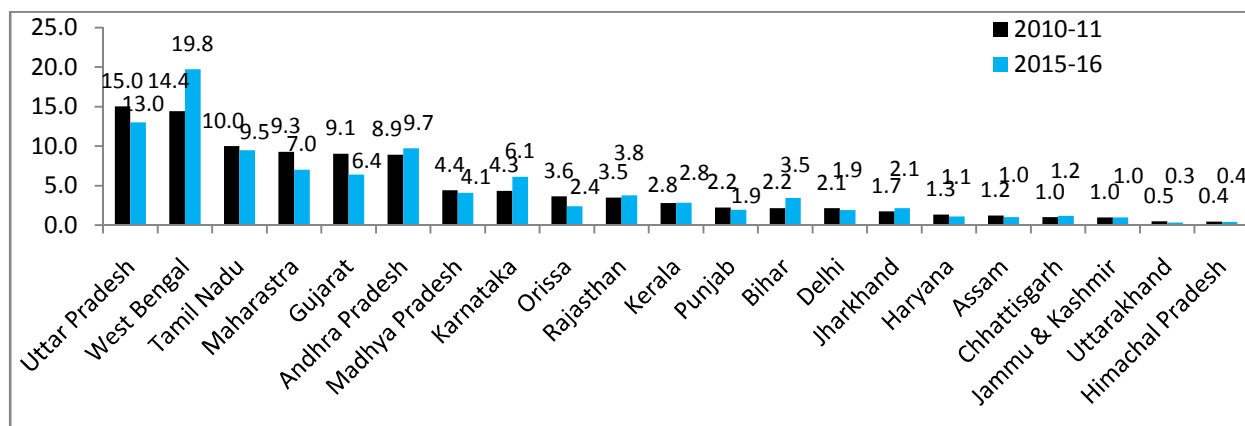
Source: As in Table 1

**Figure 2 Relative Share of No. of MMEs in West Bengal vis-à-vis others states**



Source: As in Table 1

Secondly, the share of number of MMEs in a state to total number of MMEs in India is also highest in West Bengal 16.1 per cent in 2010-11 and its share increase 21.3 per cent in 2015-16. Other states with relatively high share of MMEs are Uttar Pradesh, Tamil Nadu, Andhra Pradesh, Gujarat and Maharashtra and these six states are accounted for 64.9 per cent of MMEs in India (Figure 2).

**Figure 3 Relative Share of Employment of MMEs in West Bengal vis-à-vis others states**

Source: As in Table 1

*Thirdly*, most significant aspect of MMEs is the generation of employment. The relative importance of a particular state in total MME employment in India is shown in Figure 3. The share of MME employment in a state to total MMEs employment in India is highest in West Bengal (19.8 %) in 2015-16. It is also significantly increased in Uttar Pradesh, West Bengal, Tamil Nadu, Andhra Pradesh, Maharashtra and Gujarat and these six states are accounted for 66.7 per cent of MMEs employment in India. The bottom five states, namely Himachal Pradesh, Uttaranchal, Chhattisgarh, Jammu & Kashmir and Assam have contributed only 4.1 per cent of total MME employment of India.

### 3.2 Labour Productivity of MMEs in West Bengal

It is significantly low in OAE in comparison with establishment enterprises. Labour productivity in MMEs significantly increased in West Bengal during 2010-11 to 2015-16. In 2010-011, for OAEs 51.4 per cent of MMEs was labour productivity Rs. 50 per man-day or less but in case of establishment it was only 0.6 per cent. For establishment there were 63.9 per cent of MMEs with labour productivity more than Rs. 200 but in case of OAE it was only 4 per cent. There were 36.4 per cent establishment MMEs having the labour productivity more than Rs. 500 but in case of OAE it was 0.3 per cent. That is, the labour productivity is significantly high in establishments than that of OAEs because average use of capital for establishment enterprises is higher than that of OAEs. Furthermore, it is significantly high in proprietary male run enterprises than that of female run enterprises. Labour productivity was increased in 2015-16 in OAEs as well as establishment enterprises and thus in overall (Table 5).

**Table 5 Distribution of labour productivity of MMEs in West Bengal, 2010-11**

Labour Productivity	2010-11			2015-16		
	OAE	Estt	All	OAE	Estt	All
0—50	51.4	0.6	45.3	23.2	1.3	21.2
51—100	29.3	3.2	26.2	41.2	0.9	37.6
101—200	15.3	19.3	15.8	22.9	5.4	21.4
201—500	3.7	40.4	8.1	11.7	30.1	13.4
501—1000	0.3	23.5	3.1	0.9	35.4	4.0
above 1000	0	12.9	1.6	0.1	27.0	2.5
All	100 (2432482)	100 (331301)	100 (2763784)	100 (3805167)	100 (370301)	100 (4175468)

Source and Note: As in Table 1.

**Table 6 Test of Labour Productivity between Establishments and OAEs**

2010-11	Mean	SD	No. of obs	F- test	Test Result $H_0 : \sigma_1 = \sigma_2$ $H_1 : \sigma_1 \neq \sigma_2$	t- test	Test Result $H_0 : \mu_1 = \mu_2$ $H_1 : \mu_1 > \mu_2$
ESTT	901.53	2280.05	4204	0.0029	$H_0$ is rejected.	-22.58	$H_0$ is rejected.
OAE	106.33	123.37	4827				
2015-16							
ESTT	1414.58	3024.69	3543	0.0071	$H_0$ is rejected.	-24.22	$H_0$ is rejected.
OAE	178.97	254.74	3350				

Note:  $\mu_1$  &  $\sigma_1$  are the mean & sd of the labour productivity of OAEs, where as  $\mu_2$  &  $\sigma_2$  are the respective values of ESTT, statistical tests have been done following the methodology of Goon, Gupta and Dasgupta (1968) pp, 396-404. SD = Standard Deviation, df = degrees of freedom, n = no of observations.

Source: As in Table 1

From the test results (as in Table 6), it is concluded that labour productivity is significantly high in establishments than that of OAEs. The main reason behind this is that the establishment entrepreneurs are becoming more progressive in doing their business management and accessing market as compared to OAEs. They are able to increase market access, enhanced investment flows, skill development and technological advancements. They are upgrading their product quality, improving design and packaging and training to improve competitiveness and able to raise their productivity. Whereas most of the own account entrepreneurs are poorly educated, less efficient, low skilled and utilized their small size of business. Their business management and product distribution system are relatively insignificant in comparison to establishment enterprises. They are facing problem of access to market and unable to adapt modern technology and hence their productivity is relatively low. Labour productivity is significantly high in establishment enterprises than that of OAEs because average use of capital for establishment enterprises is higher than that of OAEs. From the test results (as in Table 7), it is also observed that that labour productivity was significantly increased in West Bengal in 2015-16 than that of 2010-11.

**Table 7 Test of Labour Productivity of OAE and ESTT MME in 2010-11 and 2015-16**

OAE	Mean	SD	No. of obs	F- test	Test Result $H_0 : \sigma_1 = \sigma_2$ $H_1 : \sigma_1 \neq \sigma_2$	t- test	Test Result $H_0 : \mu_1 = \mu_2$ $H_1 : \mu_1 > \mu_2$
2015-16	178.97	254.73	3350	4.263	$H_0$ is rejected.	15.317	$H_0$ is rejected.
2010-11	106.33	123.37	4827				
ESTT							
2015-16	1414.58	3024.69	3543	1.759	$H_0$ is rejected.	8.302	$H_0$ is rejected.
2010-11	901.53	2280.05	4204				

Note:  $\mu_1$  &  $\sigma_1$  are the mean & sd of the labour productivity of OAEs, where as  $\mu_2$  &  $\sigma_2$  are the respective values of ESTT, statistical tests have been done following the methodology of Goon, Gupta and Dasgupta (1968) pp, 396-404. SD = Standard Deviation, df = degrees of freedom, n = no of observations.

Source: As in Table 1

### 3.3 Elasticity of Labour Productivity

The equation of CES function can be  $\log(V/L) = \log a + \sigma(W/L)$  is fitted to the cross section data and the estimated results of the parameters are given in Table 8.

The value of elasticity of labour productivity with respect to wage rate is found to be 1.011 which is significantly different from one ( $\sigma \neq 1$ ) at 1 per cent level. This result suggests that the elasticity of labour productivity with respect to wage rate in MME sector is more than

unity and hence the appropriate form of the function for the present exercise is the CES. From this it can be inferred that the marginal labour productivity in relation to wage rate is very high than that of the average labour productivity in relation to wage rate. Therefore, still there exist substitution possibilities until the marginal labour productivity is equal to the average labour productivity. From the value of elasticity it can also be inferred that the wage rate prevailing in the sector is less than the marginal productivity of labour. It is well known that profit maximizing entrepreneurs facing perfectly competitive markets are supposed to continue to increase the labour force until *marginal product of labour is equal to wage rate*. *In the present exercise the elasticity of labour productivity with respect to wage rate is very high. Therefore, it is profitable for the entrepreneurs to substitute the abundant labour force for scarce capital until marginal productivity of labour is equal to wage rate.* The elasticity of labour productivity is significantly high there is a scope of substitution of capital with labour.

**Table 9 Elasticity of Labour Productivity of Establishment MMEs across industries, 2015-16**

Sectors of MMEs	Sector with Large number of Firms						
	Intercept	$\sigma$	$\rho$	Obs	R <sup>2</sup>	Adj R <sup>2</sup>	F- value
Food Products	4.38	0.552	0.81	831	0.39	0.391	534.31*
Wearing Apparel	4.49	0.509	0.96	678	0.46	0.460	577.39*
Textiles Products	4.65	0.452	1.21	568	0.48	0.479	523.16*
Furniture Products	4.48	0.533	0.88	417	0.41	0.405	283.74*
Other Manufacturing	3.54	0.680	0.47	370	0.48	0.477	337.36*
	Sector with Medium number of Firms						
Other Non Metallic Mineral Products	3.09	0.678	0.47	300	0.63	0.627	502.87*
Fabricated Metal Product except machinery & equipment	3.93	0.609	0.64	281	0.47	0.464	243.11*
Wood and Cork Products	3.80	0.609	0.64	178	0.54	0.542	210.78*
Printing and reproduction of recorded Media	4.39	0.543	0.84	92	0.57	0.567	119.94*
Leather and Related Products	3.12	0.672	0.49	92	0.67	0.666	182.26*
Repair & Installation of Machinery & equipment Products	3.83	0.611	0.64	60	0.70	0.690	132.46*
Chemicals and Chemical Products	1.50	0.932	0.07	56	0.71	0.709	134.99*
Rubber and Plastics Products	3.98	0.598	0.67	53	0.39	0.381	33.073*
Paper & Paper related Products	3.53	0.642	0.56	41	0.66	0.651	75.49*
	Sector with Small number of Firms						
Machinery & equipment N.E.C	6.15	0.329	2.04	36	0.28	0.254	12.93*
Basic Metals	3.14	0.702	0.42	31	0.54	0.526	34.33*
Tobacco Products	3.10	0.70	0.43	30	0.38	0.361	17.37*
Electrical Equipments	0.79	1.011	-0.01	30	0.80	0.795	113.38*
Beverages Products	7.12	0.173	4.78	20	0.05	-0.006	0.884
Coke and Refined Petroleum Products	7.57	0.111	8.01	12	0.02	-0.073	0.255
Motor Vehicles, Trailers & semi Trailers	5.84	0.357	1.80	10	0.36	0.280	4.49***
Other Transport Equipment	1.66	0.891	0.12	9	0.59	0.532	10.11**
Computer, Electronic & Optical Products	2.02	0.857	0.17	7	0.68	0.613	10.51**
MMEs	3.95	0.59	0.69	4204	0.48	0.479	3865.75*

Notes: \*\*Significant at 5 percent level and \* 1 percent level and \*\*\*10 percent level.

Source: As in Table 1

### 3.4 Return to Scale of MMEs in West Bengal

The unrestricted Cobb-Douglas production function fitted to the cross section data on the Micro Manufacturing sector and the resultant estimated values of the parameters are given in Table 9. The results of this exercise show that MME sector is labour intensive and is operating under increasing return to scale. The elasticity of labour productivity is found to be significantly more than unity, implying that substitution possibilities in favour of labour are quite high. Elasticity of output with respect to capital is found to be statistically significant at 1 per cent level whereas the elasticity of output with respect to labour is also found to be statistically significant at 10 per cent level. One thing is clear that the sum of the two elasticities is found to be around 1.28 which implies that the MME sector is subject to increasing returns to scale ( $R > 1$ ). This indicates that MME sector is labour intensive, employing the factors (capital and labour) beyond the optimum scale of production. Therefore, it is profitable to increase the factors of labour. The coke & petroleum industries elasticity of output with respect to labour is negative which is meaningless and not conceivable. The estimates of parameters of Cobb-Douglas production function often yield unrealistic estimates of elasticity of output with respect to labour. It cannot be conceived that in actual practice addition of some factors would decrease the total output. The negative sign of the elasticity of output with respect to labour factors leads to an inference that an increase in gross value added is slower than an increase in the capital employed attributed to the labour co-efficient a negative value. The low value of co-efficient of variation estimated for labour factor confirms the insignificant impact of labour on output (gross- value added) in MME sector.

**Table 9** Return to Scale of MMEs in West Bengal, 2015-16

Sectors of MMEs	Sector with Large number of Firms							
	Intercept	$\alpha$	$\beta$	$\alpha + \beta$	Obs	$R^2$	Adj $R^2$	F
Wearing Apparel	3.98	0.34	0.99	1.33	1737	0.69	0.69	1954.97*
Food Products	4.78	0.30	0.82	1.12	1385	0.60	0.60	1026.11*
Textiles Products	3.54	0.36	1.05	1.40	1266	0.77	0.77	2122.9**
Tobacco Products	5.65	0.12	0.84	0.96	898	0.38	0.38	273.92*
Other Manufacturing	1.59	0.58	0.68	1.25	781	0.65	0.65	729.98*
Furniture Products	6.50	0.16	0.99	1.14	653	0.64	0.64	589.81*
	Sector with Medium number of Firms							
Wood and Cork Products	4.21	0.32	0.86	1.19	491	0.67	0.67	488.01*
Fabricated Metal Product except machinery & equipment	5.20	0.26	0.91	1.17	400	0.71	0.70	474.58*
Other Non Metallic Mineral Products	5.09	0.25	0.95	1.19	390	0.89	0.89	1606.54*
Printing and reproduction of recorded Media	4.01	0.34	0.88	1.22	154	0.70	0.70	177.37*
Leather and Related Products	4.62	0.30	0.83	1.13	151	0.68	0.68	158.79*
Paper & Paper related Products	0.73	0.55	1.09	1.64	150	0.75	0.75	223.66*
Repair & Installation of Machinery & equipment	6.39	0.16	0.86	1.02	116	0.59	0.58	80.39*
Beverages Products	3.59	0.39	0.62	1.00	98	0.53	0.52	54.37*
Chemicals and Chemical Products	0.67	0.60	1.00	1.60	98	0.82	0.81	213.82*
Rubber and Plastics Products	2.22	0.50	0.70	1.21	80	0.84	0.84	205.59*
	Sector with Small number of Firms							
Machinery & equipment N.E.C	6.17	0.16	1.17	1.33	48	0.85	0.84	126.31*
Basic Metals	4.09	0.38	0.53	0.91	38	0.74	0.73	50.43*
Electrical Equipments	2.99	0.40	1.01	1.42	35	0.64	0.62	28.42*
Motor Vehicles, Trailers & semi Trailers	1.52	0.58	0.77	1.35	15	0.88	0.86	44.70*
Coke and Refined Petroleum Products	13.03	-0.36	1.07	0.72	12	0.73	0.67	12.08*
Computer, Electronic & Optical Products	5.05	0.33	0.50	0.82	10	0.78	0.72	12.29*
Other Transport Equipment	6.01	0.21	0.86	1.07	10	0.81	0.75	14.72*
MMEs	3.50	0.39	0.90	1.28	9031	0.73	0.73	12228.9*

Notes: \*\*Significant at 5 percent level and \* 1 percent level and \*\*\*10 percent level.

Source: As in Table 1

### 3.5 Analysis of Status of Growth of MMEs in West Bengal

In West Bengal the status of growth was expanding in 34.6 per cent of MMEs whereas around 46.1 per cent of MMEs were stagnating and only 11.4 per cent MMEs were contracting in 2010-11. But in 2015-16 only 18.1 per cent MMEs were expanding, 46 per cent were stagnating and 23.6 per cent were contracting. It has been observed that OAEs are more stagnating as compared to establishment enterprises in rural as well as in urban areas. In urban area higher number of both OAEs and establishment enterprises are contracting as compare in the rural area. Higher number (as well as share) of establishment MMEs have been showing expanding in their nature of growth in comparison with OAEs. That is, from the status of growth of MMEs in West Bengal it is evident that establishment MMEs are more promising but OAEs are more stagnating or contracting (Table 10).

**Table 10 Distribution of MMEs by type of the Growth Status in West Bengal, 2010-11**

Status of Growth	2010-11			2015-16		
	OAE	Estt	All	OAE	Estt	All
Expanding	34.2	37.8	34.6	17.1	28.2	18.1
Stagnant	46.6	42.3	46.1	47.0	34.8	46.0
Contracting	11.4	10.8	11.4	23.9	20.9	23.6
Others	7.8	9.2	7.9	12.0	16.2	12.4
All	100 (2432482)	100 (331301)	100 (2763784)	100 (3805167)	100 (370301)	100 (4175468)

Note: Figures in parenthesis are number of enterprises

Source: As in Table 1

The results of two multinomial logit regressions, one for the year 2015-16 and other for the year 2010-11, are given in Table 11. The status of growth of MMEs is significantly explained by labour productivity (LPRD), nature of enterprise (ESTT), location of enterprise (LOCN), size of firm (SFAM), profitability (PRAT), credit (LOAN) and government assistance (GOVA). Establishment MMEs are more likely expanding than stagnating nature of growth. Urban located MMEs are more likely stagnating than expanding nature of growth as well as contracting nature of growth. Highly productive MME are more likely expanding than stagnating as well as contracting nature of growth. Perennial MME are more likely expanding than stagnating as well as contracting nature of growth. Relatively large MME are more likely expanding than stagnating as well as contracting nature of growth. Large MME are more likely expanding because large MME have got the opportunities of economic of scale. Highly profitable MMEs are more likely expanding than stagnating as well as contracting nature of growth. The credit and government assistance are not significantly affect the expanding nature of growth.

**Table 11 Multinomial Logistic Regression**

Regression Results for the Year 2015-16				Regression Results for the Year 2010-11		
No of Obs = 5926 Log likelihood = -6153.91 LR $\chi^2$ (16) = 292.02 Prob > $\chi^2$ = 0.000 Pseudo R <sup>2</sup> = 0.0232				No of Obs = 8170 Log likelihood = -7957.80 LR $\chi^2$ (16) = 258.38 Prob > $\chi^2$ = 0.000 Pseudo R <sup>2</sup> = 0.016		
STGR	Coefficient	z-Statistic	P values	Coefficient	z-Statistic	P values
<i>Expanding (= 1)</i>	<i>(base outcome)</i>					
<i>Stagnating (= 2)</i>						
Constant	1.6797	7.88	0.000	0.3858	1.87	0.061



LPRD	-0.00004	-2.06	0.039		-0.000097	-3.45	0.001
ESTT	-0.6515	-9.74	0.000		-0.4362	-8.43	0.000
LOCN	0.06135	0.95	0.341		0.1207	2.38	0.017
NOPN	-0.6942	-3.27	0.001		0.0741	0.36	0.719
SFAM	-0.00009	-1.23	0.218		-0.00009	-2.05	0.040
PRAT	-0.000045	-5.73	0.000		-0.0089	-1.01	0.313
LOAN	0.000058	0.36	0.719		-0.00006	-0.38	0.702
GOVA	-0.19549	-0.6	0.547		0.00887	0.04	0.971
<i>Contracting (= 3)</i>							
Constant	1.2985	5.62	0.000		-0.1047	-0.43	0.665
LPRD	-0.00011	-4.54	0.000		-0.00019	-2.55	0.011
ESTT	-0.3914	-5.05	0.000		-0.3382	-4.34	0.000
LOCN	0.1562	2.11	0.035		0.3853	5.26	0.000
NOPN	-0.9863	-4.28	0.000		-0.7869	-3.25	0.001
SFAM	0.00011	1.7	0.088		-0.00013	-1.44	0.149
PRAT	-0.00008	-7.64	0.000		-0.0258	-1.64	0.101
LOAN	0.00044	2.97	0.003		-0.0012	-1.66	0.096
GOVA	-1.0884	-2.14	0.033		0.1111	0.27	0.786

Source: As in Table 1

#### 4. Concluding Observations

MMEs in West Bengal have been made significant contribution towards generation of employment and output in the state economy. In 2015-16 about 41,75,468 MMEs were operating in West Bengal wherein 69,39,129 person were employed. The density of MMEs is the highest in West Bengal among the states of India where one MME exists per 5 households. In respect of employment and output in MMEs the West Bengal has got first position among the states of India. About 11.1 per cent of total MME output in India produced in West Bengal in 2015-16. In West Bengal majority of MMEs have owned by general caste household and the share of ownership of MMEs by SC and ST communities are significantly low. Productivity of MMEs is comparatively high in establishment enterprises than that of OAEs but the profit rate is comparatively high in OAEs than that of establishment enterprises. A greater number of MMEs have been established during last ten years due to the limited job opportunity in the big organized industry sector or in service sector. A significant portion of MME is expanding. From the status of growth of MMEs in West Bengal it is evident that establishment enterprises are more promising but OAEs are more stagnating or contracting. The expanding status of growth is significantly affected by productivity, profitability, location, nature of enterprise and size of firm. Rural located, establishment, higher productive and larger size MMEs are more likely expanding than stagnating as well as contracting nature of growth.

From the status of growth of MMEs in West Bengal it is evident that establishment enterprises are more promising than OAEs. Most of the own account entrepreneurs are poorly educated, low skilled, not used modern technology and the resultant outcome is low productivity. Therefore, the skill development and technological up-gradation are inevitable for increase the productivity and sustainability of OAEs. Along with technological up-gradation, the large scale credit facility in favour of MMEs is also important for their expansion. To facilitate growth in the MMEs, industrial clusters need to be created to ensure common facilities, thereby reducing operating costs, increasing competitiveness and developing skills.

The present study contributes to the existing literature of unorganized manufacturing enterprises in three ways: First: it has tried to compare the growth of MMEs among the states of India. Second: it has analysed the nature of unorganised MMEs in terms of elasticity of labour productivity and return to scale to understand the condition of these enterprises in West Bengal. Finally, we have brought forward the determining factors of the status of growth of MMEs which are of high policy relevance.

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