

ESTIMATION OF SHORT TERM EMPLOYMENT ELASTICITY: AN EMPIRICAL ANALYSIS OF INDIAN MANUFACTURING INDUSTRIES

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ABSTRACT

The present study is composed to investigate the employment elasticity with respect to output, and wages and lagged employment for 2- digit Indian manufacturing Industries. The data used in this study were collected from the period of 2000 to 2012. The multi- variable regression analysis technique is used to identify the significant impact of selected independent variables on dependent variable. The model for the study was estimated by using the ordinary least square (OLS) technique. Finding of research reveal that employment elasticity with respect to output, wages and lagged employment are positive but inelastic.

Keywords: Employment Elasticity, Multi-Variable Regression, Ordinary Least Square, Manufacturing Industries.

INTRODUCTION

Today, the most challenging issue facing by developing countries are rapid increase in labour force, which create pressure for creation of employment opportunities. This issue creates many other economic, social and political problems for the economy. Industrialization plays a major role in employment generation and to reduce the population pressure on agricultural sector. In 1951, only 10.7 per cent of the working population was employed in this sector, which was increased to 18.2 per cent in 2001, and again increased to 20 per cent in year 2014-15. After the year 1991, the proportion of labour force in industrial sector increased rapidly from 12.7 percent to 20 percent in 2014-15. As far as the sub sector of industry is concerned, the proportion of labour force engaged in manufacturing sector is high. The manufacturing sector has played a fundamental role in the economic development of India. This sector not only provided large production but also helps in creating more employment than other sectors of economy. This sector is crucial for India's development and reduce unemployment rate. The growth rate of manufacturing sector was declined during the period 2009 to 2012. It was 11.3 percent in 2009, 9.7 percent in 2010, 2.9 percent in 2011 and 1.9 per cent in 2012 respectively. The share of manufacturing sector in employment was 11 percent in the year 2000, 12.2 percent in 2004-05 and 11.4 percent in 2010. Currently, this sector contributed 12 percent of total employment in the country. GDP's share of manufacturing sector was 15 percent in 2000, which was declined to 14 percent in 2012. The manufacturing sector has failed to generate sufficient employment for labour force. During the year 2000, 15.31 lakh person employed in public sector organized manufacturing sector, which was declined to 10.16 lakh person in 2011. In view of low creation of employment opportunities this paper tries to investigate the short term employment elasticity with respect to output, capital & technology, wages (total emoluments) and lagged employment. Apart from this introduction, this paper is divided into four sections. Section two discusses the previous studies related to employment elasticity, source of data and methodology, while section three discusses the results of employment elasticity; section four highlights the main findings of this study.

Earlier Estimates of Employment Elasticity of Manufacturing Industries

A number of studies are conducted on the Estimates of elasticity of employment with respect to output, wages and lagged employment of manufacturing industries at international and national level. A few studies have been taken for review (e.g., Ali (1978), Ahmed (1981), Sheikh and Iqbal (1992), Goldar (2000), Upender (2006) and Baten and Chowdhury (2009) Ali (1978) observed the short term employment elasticity with respect to production, technology and wages in the manufacturing sector of Pakistan for the period 1954 to 1969. The results of this study found that there was negative relationship between employment and wage, positive relationship between production and employment. The elasticity of employment with production is positive but inelastic (0.47). Elasticity of employment with respect to lagged employment increases the present year's employment, and elasticity was 0.37. The short run return to labour found greater than one.

Ahmed (1981) investigated the employment function of 16 manufacturing industries. This study examined the elasticity of employment with respect to technology, output and lagged employment for the period 1959 to 1969. The result found that output is only variable that positive and significantly exceeding employment level in Industrial sector. Other two variables do not have any significant impact on employment. Sheikh and Iqbal (1992) conducted a study on short term employment functions of 13 manufacturing industries of Pakistan, by using time series data for the period 1969- 1986. This study examined the labour absorption capacity of each industry and employment cost. The results revealed that the elasticity of employment with output of 10 out of 13 manufacturing industries were positive and significant. The employment elasticity almost in all industries are less than unity. The employment elasticity with employment cost was negative and highly significant almost in all industries except machinery. Goldar (2000) estimated the employment elasticity with respect to output, real wages and man days per employee of Indian manufacturing 2 digit industries for the period 1980 to 1997. This study found that employment growth was negatively associated with real wage and positively related with output. This study revealed that decline in the growth rate of real wages in the period of 1990s was one of the major reasons of the acceleration in employment growth. This study also found that there is no significant relationship between man days per employee and employment in manufacturing industries. Upender (2006) examined the output elasticity of employment for Indian Manufacturing Industries during the period 1982-83 to 1999. The result found that employment elasticity with respect to output was positive and significant during post economic reform period. It was around 0.37, which indicates that one percent increase in output boost the employment in manufacturing sector by 0.37 percent during post reform period. Baten and Chowdhury (2009) investigated the short run employment function in manufacturing industries of Bangladesh during the period 1981 to 2000. This study found that there was positive relationship between employment and value added. The results indicated that one percent increase in gross value added leads to around 0.37 percent increase in employment. This result showed that level of previous year employment increases the present year employment. The results also indicated that real wage rate negatively related with employment. The elasticity of employment with respect to real wage rate is about -0.25.

The above mentioned studies are conducted in different areas but all are investigated the effects of wages, value added, output, lagged employment on employment. It means demand of employment depends on these variables. This study is somewhat unique in the sense that so far; no study has been covered impact of output, wages and lagged employment on

employment of manufacturing industries during the period 2000-01 to 2012-13 at national level.

SOURCE OF DATA AND METHODOLOGY

The reference period for which the employment function is estimated is 2000 to 2012. The three variables are selected for empirical analyses are: i) employment, it include total person engaged), ii). Output, it measured in value terms, iii) wages it include wages & salary including Bonus. The chief source of data is the various issues of annual survey of Industries from 2000 to 2012.

A log linear regression model is applied in this study:

Model 1

$$LOG(E_t) = \alpha_0 + \alpha_1 LOG(Q_t) + \alpha_2 T + \alpha_3 LOG(E_{t-1}) + \mu$$

E_t represent to employment in year 't'

Q_t denotes to output in year 't'

T refers to time trend variable; here capita and technology are approximated by time trend

E_{t-1} previous year employment

$\lambda = 1 - \alpha_3$, it is adjustment coefficient of employment to its desired level

$\alpha = (1 - \alpha_3) / \alpha_1$, it is short run returns to labour

$\rho = -\alpha_2 / \alpha_1$, it is annual rate of technical progress

Model 2

To estimate the relationship between employments, output and wages this study applied again log linear model:

$$LOG(E_t) = \alpha_0 + \alpha_1 LOG(Q_t) + \alpha_2 LOG(W_t) + \mu$$

E_t represent to employment in year 't'

Q_t denotes to output in year 't'

W indicates the wages & salary including Bonus in year 't'

Empirical Results

Model 1: $LOG(E_t) = \alpha_0 + \alpha_1 LOG(Q_t) + \alpha_2 T + \alpha_3 LOG(E_{t-1}) + \mu$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α_0	-0.245818	3.985362	-0.061680	0.9523
α_1	0.723287	0.193148	3.744720	0.0057
T	-0.091034	0.036321	-2.506338	0.0366
α_3	0.398071	0.164950	2.413286	0.0423
R-squared	0.989185	F-statistic		243.8936
Adjusted R-squared	0.985129	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.848720			

Source: Researcher's own calculation

The regression result shows several important findings. The value of coefficient of time trend is -0.091. It is negative. It shows that there is negative relationship between employment and capital & technology. Here time trend is used as a proxy for technology and capital. This result indicates that a capital intensive technique of production has less absorption of labour force in manufacturing sector. The t-statistics of this individual variable shows that it is

significant at 5 percent of significance level. It means capital and technology are negative and significantly associated with employment.

α_1 shows the elasticity of employment with respect to output. The estimated coefficient of output is 0.723. This coefficient indicates that one percent increase in output leads to 0.72 percent increase in employment but this increase is not proportionate. The result indicates that output has positive and significant impact on employment. The above two results are consistent with each other and support the idea that choice of new technology and labour saving techniques, machines and equipments have the main reason for less absorption of labour force in manufacturing sector of India and it create the problem of unemployment. The coefficient of lagged employment (E_{t-1}) is 0.398. It indicates the elasticity of employment with respect to lagged employment (previous year employment). The coefficient of $\log E_{t-1}$ shows that one percent increase previous time employment leads to 0.39 percent increase in present year employment. It means the level of previous year employment increases present year employment. This happen due to may be these industries earns profit due to high demand of their manufacturing products, to increase their production level in industry, these industries hired more labour force and create more jobs in industries.

$$\begin{aligned} \text{Estimated Values of } \lambda &= 1 - \alpha_3, \quad \alpha = (1 - \alpha_3) / \alpha_1, \quad \rho = - \alpha_2 / \alpha_1 \\ \lambda &= 1 - \alpha_3 = 1 - 0.398 = \mathbf{0.602} \\ \rho &= - \alpha_2 / \alpha_1 = -0.0910 / 0.723 = 0.125 = \mathbf{12.58\%} \\ \alpha &= (1 - \alpha_3) / \alpha_1 = 0.602 / 0.723 = \mathbf{0.832} \end{aligned}$$

The estimated value of ρ is 0.125. It indicates the annual percentage rate of technical progress in manufacturing industries. The derived value shows that the annual rate of technical progress in Indian manufacturing industries is 12.58 percent during 2000 to 2012. The value of λ is 0.602, indicates a fast speed of adjustment of actual employment to its desired level. The value of α is 0.832, which is quite low. The derived value of short run returns to labour suggests decreasing returns to labour in manufacturing sector of India.

The value of R-square is quite high 0.98, which indicates that about 98 percent variation in employment is explained by variations in lagged employment, output and time trend.

Model 2: $LOG(E_t) = \alpha_0 + \alpha_1 LOG(Q_t) + \alpha_2 LOG(W_t) + \mu$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
α_0	11.73649	0.239812	48.94039	0.0000
α_1	0.134628	0.098993	1.359980	0.2037
α_2	0.209428	0.116772	1.793486	0.1031
R-squared	0.977117	F-statistic		213.5014
Adjusted R-squared	0.972540	Prob(F-statistic)		0.000000
Durbin-Watson stat	1.121692			

Source: Researcher's own calculation

The value of α_2 regression coefficient shows the elasticity of employment with respect to wages. The value of estimated coefficient 0.209, it indicates that one percent increase in wages (that include wages, salary, bonus and other facilities: total emoluments) leads to 0.209 percent increase in employment. The elasticity of employment with wages is positive and inelastic. The results indicate that as wages, salary, bonus and other facilities are increase total persons engaged in production process also increases. It means more people are willing to work at current total emoluments provided by industry. This implies that wages, bonus and

other facilities offered by an industry are attracted more workers in industry. This process increased the employment level in manufacturing sector. The coefficient of output, as expected, indicates that elasticity of employment with respect to output is positive and inelastic.

CONCLUSION

The major findings emanating from this study:

- I. Output is positively associated with employment for the manufacturing sector.
- II. The rate of technological progress is high in this sector that is 12.58 percent. Technology and capital are negatively related to employment.
- III. The adjustment of employment to its desired level is high that is 0.602.
- IV. There is decreasing short run returns to labour in manufacturing sector of India.
- V. The elasticity of employment with respect to output and wages (wages, salary, bonus and other facilities) are positive and inelastic.

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