Websites:
http://www.sciencepub.net
http://www.sciencepub.net/report

Emails:
editor@sciencepub.net
reportopinion@gmail.com

Report and Opinion

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

Scale And Technical Bias For Measurement Productivities And Substitution Possibilities In Manufacturing Industries Of State Haryana (India)

*Dr. Rohtash Kumar and ** Vikki

* Associate Professor, Department of Economics, OPJS University, Churu, Rajasthan (India)
**Research Scholar, Department of Economics, OPJS University, Churu, Rajasthan (India)
Email: yadavvikki39@gmail.com

Abstract: In this research paper we analyse and compare the economies of scale and technical change in Haryana manufacturing industries at aggregate and disaggregate level and before and after economic liberalisation. It is well recognized fact that among many sources of total factor productivity growth, technical (both direct and indirect) change and economies of scale are largest contributing sources, so it becomes all the more important to discuses these two separately. The estimates of Scale economies and rate of technical change for different industrial groups of Haryana manufacturing industries are reported in table 4.1. The elasticity of cost with respect to output measures scale economies and the magnitude of neutral technical change effect, non-neutral technical change effect and scale augmenting technical change effect is reflected in the estimates of calculated for different industrial groups and reported.
[Kumar, R. and Vikki. **Scale And Technical Bias For Measurement Productivities And Substitution Possibilities In Manufacturing Industries Of State Haryana (India).** *Rep Opinion* 2020;12(10):39-42]. ISSN 1553-9873 (print); ISSN 2375-7205 (online). http://www.sciencepub.net/report. 6. doi:10.7537/marsroj121020.06.

Keywords: Scale and Technical Bias, Industries, Manufacturing, Haryana

Introduction:

Economic reforms introduced in India in 1991 aimed to remove the stringent administrative procedures relating to the acquisition of a license to establish firms, create a single window system, abolish or reduce high tariff rates and opened up Indian firms to global trade activities. The liberalization, privatization and globalization aspects of economic reform are meant to enhance the performance and productivity of the economy in general and of the manufacturing sector in particular. Against this background, the present study analyses the performance of select industries of India's organized manufacturing sector and the State of Andhra Pradesh during the pre- and post-economic reform period. The analysis of the organized manufacturing sector's performance examines capital intensity, labour productivity and TFP at the national level and in the three regions (Telangana (Tel), Coastal Andhra (CA) and Rayalaseema (RS)) of Andhra Pradesh.

Though the national policy initiatives apply equally to all the Indian states, their effects can differ considerably across the states, depending up on the nature of various institutional factors and policies in the states, which can be classified under the broad heading 'investment climate' (henceforth IC). Thus, a market oriented macro and trade policies at the national level need to be complemented with policies that foster a market friendly IC in the states. To make the point emphatically, it is important to assemble credible evidence to show that a market friendly IC is indeed a crucial determining factor of industrial performance in the states. The present study is an attempt in that direction.

The 1990s reforms in India were specifically targeted to the manufacturing sector. The emphasis on the manufacturing sector was due to the realization that the sector offers greater prospects for capital accumulation, technical change and linkages and hence job creation, especially for the semi-skilled and poorly educated segment of the labour force, which comprises most of India's working poor (Sen, 2009). There is apprehension about the role that agriculture can play in the growth process, given that the primary commodities have been facing a long run decline in prices in the world market (Sarris and Hallam, 2006). As a result, the prospect for the agricultural sector as a major employment provider and the driver of economic growth is bleak in the Indian context. Thus, the key to India's future economic growth and poverty reduction depends on the growth performance of a dynamic outward oriented manufacturing sector which can significantly attract the large pool of surplus labour employed in low-productivity work in agriculture or in the urban informal tertiary sector.

The process of economic reforms introduced since 1991 has witnessed a gradual dismantling of industrial licensing, removal of import licensing for nearly all manufactured intermediate and capital goods, tariff reduction and relaxation of rules for foreign investment.1 The reforms in respect to the industrial sector were intended to free the sector from barriers to entry and from other restrictions to expansion, diversification and modification so as to improve its efficiency, productivity, and competitiveness. Given that the main objective of reforming the manufacturing sector was to improve industrial efficiency, it would be appropriate to probe how far the reforms have contributed to the productivity performance of the Indian manufacturing sector.

Scale and Technical Bias

Technical change is one of the most important Factors affecting the productivity growth. Characterization of Technical change in Translog cost Function as given in research paper 2 reflects the non-homothetic nature of technology, comprising neutral, non-neutral and scale augmenting technical change components**.** For three inputs Translog cost function, the rate of technical change can be computed as

$$\dot{T} = \beta_T + \beta_{TT}\log T + \beta_{LT}\log P_L + \beta_{KT}\log P_K + \beta_{ET}\log P_E + \beta_{UT}\log U + \beta_{QT}\log Q.$$

This equation shows that the growth rate of technical change consists of three components.

(i) The contribution of neutral technical change i.e. $\beta_T + \beta_{TT}\log T$ which represents a pure shift in the cost function, leaving input prices, output and capacity utilization unchanged.

(ii) The contribution of non-neutral Technical Change i.e. $\sum \beta_{iT}\log P_i$ where represented a shift in cost function due to relative change in input prices.

(iii) The effect due to scale augmenting technical change i.e. $\beta_{UT}\log U + \beta_{QT}\log Q$, which represents a change in level of output and capacity utilization.

Generally technical progress is defined as an upward shift in the production function. While working with dual i.e. cost function technical progress is viewed as a downward shift in the cost function

Neutral Technical Change

Neutral Technical change acts as a pure shift in cost function leaving input prices and output unchanged and is represented by parameter β_T. Positive and statistically significant, β_T indicates upward shift of the cost function over the sample period.

Non- Neutral Technical Change or Technical Bias

The contribution of non-neutral technical change represents a shift in the cost function due to change in the relative prices of inputs. Changing Input prices affect the least-cost combination of Input and therefore may affect the rate of technical change. If for example, technical change is capital using an increase in the price of capital not only encourages substitution of other inputs for capital but also makes the adoption of the capital using technology more costly. The result is the lower rate of cost reductions associated with technical change. If however technical change is capital saving an increase in the price of capital has opposite effect on the rate of technical change. Substitution is still encouraged but not toward an input combination consistent with capital saving nature of technical change. So Independent of any direct contribution associated with the input an increase in its price may lead to a new combination of Inputs. The resulting effect on technical change is a function of substitution possibilities and factor using or factor saving nature of technical change.

The price parameter β_{iT} reflects the measure of input bias also. While, negative value of price parameter β_{iT} indicates a greater rate of cost reduction with an increase in the price of i^{th} input. Positive value of β_{iT} leads to a lower rate of cost reduction associated with the technical change.

The measure of input bias can be computed independently as a change in equilibrium input shares, holding input prices constant as suggested by Biswanger (1974). The measure of input bias is given by

$$\left(\frac{\partial S_i}{\partial T}\right)_{Q,P,U} = \beta_{iT}$$

where S_i is the cost share of the input factor. A positive value of β_{iT} implies that technology is i^{th} factor using while β_{iT} <0, implies a relative i^{th} factor saving advancement and β_{iT} = 0 implies neutrality (Hicks)

Scale Augmenting Technical Change

Scale augmenting technical change represents a shift in cost function due to a change in level of output. A Statistically significant value of β_{QT} reflects the sensitivity of rate of technical change with respect to output. If estimated value of β_{QT} is positive it suggests that cost reductions associated with technical change are decreased with change in output. Significantly negative β_{QT} will imply that rate of cost reductions are increased with the change in output.

3. Scale Economies and Scale Bias

The elasticity of cost w.r.t. output measures scale economies. Scale economies (E_{CQ}) can be calculated as

$$E_{CQ} = \frac{\partial \log C}{\partial \log Q} = \beta_Q + \beta_{QQ} \log Q + \beta_{QU} \log U + \beta_{QT} \log T + \beta_{LQ} \log P_L + \beta_{KQ} \log P_K + \beta_{EQ} \log P_E$$

And the industry will be under economies, diseconomies or constant returns to scale accordingly as $E_{CQ} \gtreqless 1$.

The conventional scale parameter estimate β_Q suggests, if significant economies of scale are present or not. Significant economies of scale for aggregate level suggest that average cost decreases with increase in output.

Input price effect on scale economies is measured by β_{LQ} , β_{KQ} and β_{EQ} as each parameter represents the logarithmic partial derivative of E_{CQ} w.r.t. corresponding input. Time effect on scale economies is measured by β_{QT} . Positive value of β_{QT} implies lower scale economies. Impact of change in capacity utilization on scale economies is measured by β_{QU} . Negative β_{QU} suggests that higher capacity utilization increases the degree of scale economies.

3. Scale and Technical Bias- Aggregate Level:

Table 1.1 gives parameter estimate for scale and technical bias for aggregate of Haryana manufacturing industries. These are based on the estimation of Translog cost function given in research paper 3.

Table 1.1 Scale and Technical Bias- Aggregate Level

Parameter	Estimate
β_Q	-3.0659 (-5.152)
β_T	1.3832 (8.167)
β_{LQ}	0.2168E-01 (2.602)
β_{KQ}	-0.5356E-01 (-6.877)
β_{EQ}	-0.3188E-01 (-2.795)
β_{LT}	-0.7558E-01 (-1.610)
β_{KT}	0.5005E-01 (3.192)
β_{ET}	0.2553E-01 (1.125)*
β_{QT}	2.9304 (7.193)
β_{QU}	9.3415 (9.618)

It is clear from the table that significant economies of scale are present at aggregate level. As Far as scale bias is concerned, it is labour using (value of β_{LQ} being positive) and capital and energy saving. Positive and significant value of β_{QT} indicate that cost reductions associated with technical change are decreased with change in output.

Technical bias at aggregate level is capital using and labour saving as is clear from the significant values of β_{KT} and β_{LT}. So our findings indicate that increasing capital prices encourage substitution of other inputs for capital and make the adoption of energy using technology more expensive.

Corresponding author:
Mr. Vikki
Research Scholar, Department of Economics,
OPJS University, Churu, Rajasthan (India)
Contact No. +91-9729196281
Email: yadavvikki39@gmail.com

References:

1. Desai, V. (2011), Fundamental of Entrepreneurship and Small Business, Himalaya Publishing House, New Delhi.
2. Desai, Vasant (2000), Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, New Delhi.
3. Dhindsa (2010), "Employment Generation in Micro Small and Medium Scale Enterprises in Punjab: An Empirical Study of Ancillaries of Rail Coach Factory, Kapurthala, SEDME, Vol. 37, No. 3, pp. 39-56.
4. Dholakia, R. H. and Dholakia, B. H. (1994) Total factor productivity growth in Indian manufacturing, Economic and Political Weekly, 29, 342-344.
5. Diewert, W.E. Services and the New Economy: Data Needs and Challenges, Discussion Paper No. 03-09, Department of Economics, University of British Columbia (UBC), Vancouver, Canada, 2003.
6. Dinesha, P.T., Jayasheela, V. B. Hans (2008), "Micro, Small and Medium Enterprises in India: Trends and Challenges", SEDME, Vol. 35, No. 2, pp. 35-48.
7. Economic and Social Affairs Papola, T.S. 1994. "Structural adjustment, labour market flexibility and employment", in The Indian Journal of Labour Economics, Vol. 37, No. 1, pp. 3–16.
8. Economic and Statistical Organisation, Statistical Abstract of Haryana, Planning Department, Haryana., Annual Publication,1991-2002.
9. Economic reforms and productivity growth in Indian manufacturing sector: An interstate analysis. The Icfai University Journal of Industrial Economics, 5(3), 35-47.
10. Eilon, S. (1981), Production Planning and Control, Bombay, Universal Book Corporation.
11. Ethopia, K. (1984), Employment and Efficiency of Production of Small Scale Enterprises, International Dissertation Abstracts, Vol. 45.
12. Fan, S., Zhang, X. and Robinson, S. (1999), Past and Future Sources of Growth for China, EPTD Discussion paper No. 53, International Food Policy Research Institute, Washington, D.C. U.S.A.
13. Färe, R. & Grosskopf, S. (1992). Malmquist indexes and fisher ideal indexes. The Economic Journal, 102(410), 158-160.
14. Fare, R., Grosskopf, S., Norris, M & Zhang. Z. (1994). Productivity growth, technical progress and efficiency changes in industrialized countries. American Economic Review, 84, 66-83.
15. Fare, R.S., Grosskopf, S., Norris, M. and Zhang, Z. (1994), "Productivity Growth, Technical Progress and Efficiency Change in Industrialized Countries", American Economic Review, Vol. 84, No. 1, pp. 66-83.
16. Fare, Rolf, Grosskopf, Shawna and Lovell, C.A. (1994), Production Frontiers, Cambridge University Press, Cambridge, U.K.
17. Farrell, M.J. (1957), "The Measurement of Productive Efficiency", Journal of The Royal Statistical Society, Series A, Vol. 120, No. 3, pp. 253-282. 286.
18. FICCI (2004), FICCI Study on Bank Financing For The SSI Sector, New Delhi.
19. Gajanan, S.N. (1995), "Estimating Technical Inefficiency in Selected Indian Manufacturing using Frontier Production Functions", Indian Economic Journal, Vol. 43, No. 2, pp. 97-120.
20. Gandhi, J.C. (1967), Marketing Management in the Cotton Textile Industry of Rajasthan, Unpublished Ph.D. Thesis, University of Jodhpur, Jodhpur.
21. Gangopadhyay, S. and Wadhwa, W. (1998), "Economic Reforms and Labour", Economic and Political Weekly, Vol. 33, No. 22, pp. L40 - L48.
22. Ganguly, N. (1988), "Small Scale Sector Problem and Prospects", Yojana, Vol. 32, No. 4, pp. 1-15.

10/24/2020