

ESTIMATION OF PRODUCTION FUNCTIONS FOR INDIAN MANUFACTURING SECTOR: POOLING OF CROSS-SECTION AND TIME SERIES DATA*

VIJAY K. BHASIN AND VIJAY K. SETH**

THE research in econometrics was initially concentrated in the field of empirical implications of the theory of Consumer's behaviour. Later on, similar developments emerged in the field of the theory of firms. Inputs and outputs are quantifiable and it is possible to estimate the relationships among them which are based on the economist's theoretical framework. At the apex of this type of relationship stands the *Production Function*. The most crucial assumption implicit in the concept of the production function is the homogeneity of labour and capital, which leads to the problem of aggregation.¹ There are two alternative forms of the production function — Cobb-Douglas and CES — which have been used invariably. The Cobb-Douglas production function assumes unitary elasticity of substitution, whereas the CES production function assumes constant elasticity of substitution.

One of the path-breaking discoveries in recent years is, that a large part of the increase in output cannot be explained by the traditional factors of production. The 'residual' of unexplained growth has been given various names.² Solow (1957) named this residual as technological change. According to Solow, technological change can be ascertained from the 'shifts' in the production function. In the subsequent literature, many improvements were made on the notion of technological change as envisaged by Solow. These improvements are basically related to the different patterns of 'shifts' in the production function.³

* The present paper is a part of the joint work, in progress, on 'The Structure of Indian Manufacturing Industries'.

** The authors are teaching economics at The Satyawati Co-ed. College, University of Delhi, Delhi.

¹ The conditions which are necessary for the existence of an aggregate production function are dealt with in detail in the work of Green (1964).

² The residual, unexplained has been assigned various names, e.g. the contribution of human capital, contribution of technological change. The most accurate of which is undoubtedly the '*measure of ignorance*'. See, for greater details, T. Blaug and P. Streeten (1963).

³ The different types of shifts in the production function have been classified into different categories, e.g. embodied or disembodied technological change, neutral and non-neutral technological change. See for classification of technological change the works of Hicks (1935), Harrod (1948, 1961), Robinson (1938) and Salter (1960).