

On Some Characteristics of Generalized Cobb - Douglas and SMAC Production Functions

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1. INTRODUCTION

1.1 Generally two types of production functions viz. Cobb-Douglas and SMAC (Sollow, Minhas, Arrow and Chenery) are utilised for studying the relationship between output and inputs. The mathematical forms of these two production functions for well known two inputs with the effect of technological change can be expressed as

$$Y = A e^{\lambda t} L^{\alpha} C^{\beta} \quad (1.1.1)$$

$$Y = A e^{\lambda t} \left[dL^{-\rho} + (1-d)C^{-\rho} \right]^{-1/\rho} \quad (1.1.2)$$

where,

Y = Output

A = Scale parameter

$e^{\lambda t}$ = The efficiency of technology depending on time t

L = Labour

α = Weight for labour

C = Capital

β = Weight for capital

d = Distribution parameter

ρ = Substitution parameter

1.2 Cobb-Douglas production function assumed that elasticity of substitution is unity, while SMAC assumes that the respective measure is constant. It is observed that for micro level analysis Cobb-Douglas production function gives better results for cross section data than for time series data, because the large variations in capital and labour over a time, do not materialize in the assumption that elasticity of substitution between these inputs is unity. The main advantage that Cobb-Douglas production function possesses is that it does not specify a priori degree of returns to the scale but does permit data to determine it.