Total Factor Productivity

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Labour productivity itself and its growth rate cannot give unbiased information on the total productivity and its dynamics. It's possible to conceptually derive the total factor productivity within the theory of production function and growth accounting. The contribution defines the total factor productivity as a weighted sum of productivity of four production factors, K input of fixed capital, L input of labour, E input of energy consumption, M input of material consumption. Empirical approach based on a derived transcendental logarithmic (translog) production function employs as a starting point direct econometric application of this production function. Using the econometric estimate of a translog production function, total factor productivity is subsequently derived and, as the next step, measured.

The translog production function is the second order approximation to unknown aggregate production function, using Taylor series. In growth accounting approach, the aggregated input of production factors is obtained as weighted sum of inputs expressed in value terms. Usually, only labour and capital inputs are included. It is common to use time series data expressed in constant prices, taken in the middle of the time series. By definition the sum of input weights equals to one. Direct econometric estimates of the translog production function were obtained by using special technique of empirical estimates used in the cases of multicollinearity – the ridge regression. Therefore, the question of stability of estimated parameters of the production function remains to be thoroughly assessed. Apart from the issues of econometric applications, it is also important to dispose of the long time series statistical data while these time series should be consistent. As to the time trend representing effects of Hicks neutral technical change our result may indicate that the technical change is in reality not Hicks neutral and that the effects are embodied in the inputs of capital and labour.