BAYESIAN ANALYSIS OF CROSS-PREFECTURE PRODUCTION FUNCTION WITH TIME VARYING STRUCTURE IN JAPAN

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Abstract

The objective of this paper is to examine the performance of post-war Japanese economy using a production function of economic growth model. The basic framework is a variation of aggregate production function used by Solow (1956), Mankiw, Romer, and Weil (1992), etc. We consider the Cobb=Douglas production function with private capital, public capital, human capital and labour as inputs, so production for prefecture i at time t is represented by

$$Q_i(t) = K_i(t)^{\alpha_i} G_i(t)^{\beta_i} H_i(t)^{\gamma_i} [A_i(t)L_i(t)]^{1-\alpha_i-\beta_i-\gamma_i} \quad (i = 1, 2, \ldots, m),$$

where $Q_i(t)$ is output, $K_i(t)$ is the stock of private capital, $G_i(t)$ is the stock of public capital, $H_i(t)$ is the stock of human capital, $L_i(t)$ is the size of the labour force and $A_i(t)$ is a productivity index which summarizes the level of technology. The above model can be expressed in a form of linear model under the logarithmic tranformation. A set of Bayesian models is constructed by using smoothness priors for values related to $A_i(t)$ and non-informative priors for the parameters α_i, β_i and γ_i. Furthermore, Monte Carlo filter and smoother approach is applied to estimate the parameters. We show the effects of the private capital, the public capital and the human capital on output by analyzing the values of these parameters. The related result was firstly reported by Kyo and Noda (2005).

References:

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