Nicholas Olenev

A Ramsey type model with an endogenous production function for study of economic systems

ABSTRACT

The Ramsey model of economic growth is well known and studied. Frank Plumpton Ramsey constructed the model in 1928 to find by calculus of variation "how much of its income should a nation save?" It was a kind of a central planner's problem for maximizing levels of consumption over successive generations. Later in 1956 Robert Solow and Trevor Swan independently construct an exogenous growth model in attempt to explain long-run economic growth by capital accumulation, population growth, and technological progress. The Solow model successively fitted available data on US economic growth. Later in 1965 David Cass and Tjalling Koopmans give significant extensions of the Ramsey model to adopt it for description of a decentralized dynamic economy. The main difference of Ramsey-Cass-Koopmans model from the Solow-Swan one is that the choice of saving rate in the first one is endogenized and so it may not be constant along the transition to the long run steady state. In 2007 I have used a modification of Ramsey type model for open economy with CES production function to fit statistical data on Russian economic growth 2000-2006. This model predicted a crisis of Russian economy in 2008 by estimation the time of exhaustion of free production capacities. Later in 2009-2014 George Kamenev and I used this model to analyze a problem of forecasting stability by the identification sets method: a visual approach to identifying model parameters based on the construction and visualization of a multidimensional graph of the identification error function, as well as of sets of quasi optimal parameters. In above mentioned models neoclassical aggregate production functions are used/ Usually it was a Cobb–Douglas type function or CES function. But to have real contact with microeconomics it is better to use an endogenous production function. And such function we have. In 1986 Nicholas Olenev, Igor Pospelov and Alexander Petrov were constructed a new production function based on micro description for a model of investing policy of firms in market economy. It is a kind of vintage capacity model. This endogenous production function depends of growth rate of economy and gives new implications. The presented work gives some first results of applying the model with our production function to analyze the economies of different countries and their ability to economic growth.