SOE 20: Economic models III

Time: Wednesday 17:30–18:15   Location: H36

SOE 20.1   Wed 17:30   H36

National growth as part of the natural sciences and EU divergence — •Hans G Danielmeyer and Thomas Martinetz — Institut für Neuro- und Bioinformatik, Uni Lübeck

We use our natural theory of macroeconomic growth for little projects that may reverse the disintegration of the EU.

The theory's analytic solutions reproduce the per capita leading G7 nation's data without fitting parameter for the educational and technical infrastructure, annual working and spare time, GDP and life expectancy. Economic equilibrium between demand and supply is provided by industrial engineering with technical progress. The inherited and educated human capacities synchronize technical progress for half a millennium with the mean G7 life expectancy. Since all long-term parameters are biologic constants of the human species the theory has forecasting power.

The OECD publishes the classical data for EU nations with traditional policy recommendations. Every inconsistency with the natural theory identifies a national problem. The idea is that a small group of young SOE members divides the provided OECD reports, inserts the OECD data into the G7 plots of the natural theory, and compares the OECD recommendations with the recommendations following from the nation's position in the plots.

The results will be reported in SOE 2017.

SOE 20.2   Wed 17:45   H36

A Demographic-Economics Agent-Based Model:the Relationship between Economic Sustainability and Population Dynamics — •Yuting Lou — The University of Tokyo, Japan

This study sets up a bottom-up approach to the issue of population economics. We build an original demographic-macroeconomics multi-agent model (DEMM), which simplifies the macroeconomic dynamics into three core modules: producing, trading with neighbors and distributing, but with the coupled dynamical population structures. Based on thousands of simulations by tuning the control parameters (tax rate and innovation), we construct the phase diagrams for the pure economic dynamics in DEMM, whose core mechanism follows the law of jungle, i.e. in an anti-diffusional positive feed-back style. Without

population dynamics, the society may have sustainable good economics with high GDP and low poverty rate, along with other four phases featuring different relaxation time and poverty level. Several main factors such as production efficiency, demand saturation, education efficiency and compulsory education are discussed. With the population dynamics, the phase diagrams are distorted in most cases and the society are waning towards extinction without poverty or towards massive poverty without extinction. Except for that the birth/death rate fluctuates in an alternate way, which may lead to prosperity followed by depression in both aspects of population and economics, there will be no rescue from the extinction and poverty.

SOE 20.3   Wed 18:00   H36

Phase transitions and relaxations in an agent-based macroeconomic model — •Wenzhi Zheng[1] and Yu Chen[2] — [1]Teasic137@gmail.com — [2]Chen@k.u-tokyo.ac.jp

An economic system can give rise to very rich and complex phenomena which often puzzle theorists and policy makers. In economic history, although periods of prosperity, recession and depression can be identified in hindsight, it is difficult for us to confirm whether those economies have reached, or are approaching the equilibrium. In other words, the large fluctuations suffered by these economies might be only a transient regime. In this research, we construct a minimal agent-based macroeconomic model to study the equilibrium states and the relaxation towards the equilibrium. We find that there exists a phase transition between a sustainable economy, characterized by high production, long-term profitability of firms and wealthy households, and a bankrupt economy, characterized by low production, short-term profitability of firms and poor households. The phase transition is controlled by the combination of the profitability of firms and the welfare indicator. Furthermore, we find that the heterogeneity of firms strongly influences the relaxation towards the equilibrium. In the model economy consisting of heterogeneous firms, the relaxation near the critical point is featured with stronger fluctuations and longer relaxation time. Under the circumstances, policy makers and stakeholders may miss the forest for the trees: being unable to perceive the global trends while desperately trying to deal with the small scale fluctuations or to catch up with the local trends.