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Nonlinear Hicks model with CubicInvestmentFunction. Further results

The Hicks model, on the basis of which the new model will be constructed, due to its simplicity and descriptive nature is a good starting position for studying various ways of modelling the consumption stream and explaining the morphological features of economic cycles.

In this paper, a new (nonlinear) rule for consumption was introduced. This modification extends the model described in [1, p. 55]. After this modification we are able to answer the following question: What happens if (due to statistical, observational, or expectational influences) the actual realisation of a standard behavioural assumption slightly diverges from theoretical ideal? Additionally, it was assumed that fraction of savings is spent after being saved for one period.

The proposed nonlinear model of the business cycle has none, one or two equilibrium points. With the proposed nonlinear model local stability of a fixed point may be lost while global stability continues in the form of convergence to periodic, quasi-periodic or chaotic attractors. Introducing a non-linear rule for consumption into the Goodwin-type model enormously increases the potential complexity of its dynamics. The effect of variations of parameters on stability as well as on the degree of complexity of the dynamics of the system need not be monotonic. It can be used to explain volatility of the GDP caused by the deterministic economic rules.

References

[1] R. Kruszewski, *Nonlinear Hicks model with cubic investment function*, in: Functioning and Development of Enterprises, ed. J. Duda, I. Skalna, Kraków 2019, 55–62.