Impact of different social learning mechanisms on the emergence of a Walrasian Equilibrium

Abstract

Authors: Simon Carrignon & Xavier Rubio-Campillo
Objectives: model and test how different social learning mechanisms allow or not a simple society to find an economic equilibrium.
Methods: We use a model already developed to study the co-evolution of culture and economy. In this model, groups of agents produce, consume and exchange goods and adapt their trading strategy by innovating, or by learning from someone else.
We explore this model using a variation of Approximate Bayesian Computation, that allows a fitting to idealized outcomes (FIO), to compute how likely different social learning processes lead to an ideal situation where all exchanges are made under the general equilibrium ("Walrasian equilibrium").
The likelihood of leading to this equilibrium is measured for three different learning mechanisms (neutral, success biased, and frequency-biased copy) under different sets of parameters (number of agents and goods, innovation and copy probabilities,...).

Results: We show that a neutral learning process cannot lead to any efficient equilibrium. In the other cases, an innovation process has to occur but at a relatively low rate to avoid harming the stability of the equilibrium. In most of the situations, the success biased mechanism is the most likely to lead to the expected equilibrium.

Conclusion: This study demonstrates that in a wide range of circumstances, a simple social learning process where people tends to copy the more successful, coupled with a low innovation rate, are enough to lead a society toward an efficient economic equilibrium.

Keywords: simulation, evolution, culture, economy, social learning, model, ABC, FIO