

# Ecological Modeling of Macrobbehavior

## A micro-macro linked ABM-CGE approach with applications to rural development

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### Abstract

We propose an agent-based model of belief formation of individual agents in the framework of fundamental uncertainty. Agents have to make a binary decision which has direct consequences for agents' individual utility. Agents' beliefs of the state of the world are crucial in determining agents' choices. Agents receive decentralized signals which are informational regarding the state of the world, but signals are noisy. Therefore, agents have an incentive to communicate with each other. However, communication can be biased. Simulation analysis show that communication networks are important determinants of the dynamics of belief formation and of agents' decision-making. We identify specific network structures that closely mimic optimal decision-making based on a perfect rational Bayesian updating. Thus, communication networks can be interpreted as social capital. Empirically a mismatch of belief formation strategies and the true informational value of agents' communicated opinions might occur, i.e. collective belief formation via communication is not always efficient. This basic ABM-model of belief formation is incorporated into a micro-macro linked farm-household-CGE model where farms' individual capital, land and labor market decisions are derived from their beliefs regarding future prices and technological progress. First simulation results show that realized structural change in the farm sector crucially depends on communication network structures determining farmers' beliefs.

*Keywords: ABM-CGE-Model, belief formation in networks, Rural development*

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