Agent-based Computational Economics – Spring 2018

Tuesday 12:15 – 14:00 W8-107 starting on April 10, 2018

Attention: there will be no course on June 5, June 19 and July 3 (to compensate course hours are 1:45 per unit)

Instructor: Prof. Herbert Dawid, (phone 106 4843, email hdawid@wiwi.uni-bielefeld.de)

Content:

This course provides an introduction to agent-based modelling in Economics for Master and Doctoral students. It covers methodological and conceptual foundations of this approach, key aspects of designing and analyzing agent-based economic models and selected examples from the literature of agent-based analyses in different domains of economics. The focus of the course is on modeling and economic aspects rather than on technical issues related to model implementation and analysis. Students are expected to have a solid background in Economics. Programming experience is a plus but not required to follow the course.

Exam:

Oral exams will be organized at the end of the semester, exact dates will be determined individually.

Course Overview

Motivation and Prelude: Complexity and Economic Modeling

1. Foundational Issues

    i.   Heterogeneity and Aggregation in Economic Modeling

    ii.   Interaction, Market Exchange and Computational Complexity

    iii. Bounded Rationality, Heuristics, Behavioral Rules

2. Model Design and Analysis

    i.   Approaches for Designing Behavioral Rules

    ii.   Learning of Agents, Adjustment of Rules

    iii. Calibration, Validation and Empirical Grounding

    iv.   Analysis of Simulation Output

3. Market- and Industry-Level Analysis

    i.   Models of Industry Dynamics: 'History-friendly Models'

    ii.   Financial Market Models

4. Agent-based Macroeconomics and Policy Analysis

    i. Credit Networks, Contagion and the Financial Accelerator

    ii. The Eurace@Unibi Model, Analysis of EU Policies

General Texts and Books:

Dawid, H. (2015), "Modeling the Economy as a Complex System", in B. Alves Furtado, P.A.M. Sakowski, M.H. Tovolli (Eds.), "Modeling Complex Systems for Public Policies", IPEA, Brasilia, pp. 191-216.

Dawid, H. and Delli Gatti, D. (2018), "Agent-based Macroeconomics, forthcoming in Hommes C, LeBaron B (Eds.): *Handbook of Computational Economics, Vol. 4 - Heterogeneous Agent Models*, Amsterdam: Elsevier.

Delli Gatti, D., Gaffeo, E., Gallegati, M., Giulioni, G., Palestrini, A. (2008). *Emergent Macroeconomics: An Agent-Based Approach to Business Fluctuations*. Springer: Berlin.

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Miller, J.H. and S. E. Page (2007), Complex Adaptive Systems: An Introduction to Computational Models of Social Life, Princeton University Press.

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List of References for the Course Slides

1) Prelude and Foundational Issues

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2) Model Design and Analysis

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Arifovic, J.and J. Ledyard (2010), "A Behavioral Model for Mechanism Design: Individual Evolutionary Learning", Journal of Economic Behavior and Organization, 78, 374-395.

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3) Market- and Industry-Level Analysis

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4) Agent-based Macroeconomics and Policy Analysis

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