

Preface

In this year, the Artificial Economics conference reaches its 9th anniversary, and the aims and topics still attract researchers to contribute to this symposium. Since 2005, the Artificial Economics conferences bring together researchers from computer science and economics and encourages multi-disciplinary research in economics. Moreover, it appears that this conference series enfold the potential of developing a growing community in this exiting field of research.

Two features might be regarded as the main building blocks of the Artificial Economics: agent-based models and the use of computational techniques to “solve” them. In particular, artificial markets or social systems, artificial networks or artificial organizations consisting of interacting, heterogeneous agents are modeled, computationally represented and simulated. The behavior of the artificial system – whatever it might be – is “observed” over time and analyzed by the researcher.

A major topic of interest is whether certain regularities show up or certain structures evolve on the macro level of the investigated systems. Hence, this leads to the question of whether or not we can observe the evolution of self-organizing behavior of the systems modeled. Self-organization turns out to have two patterns: on the one hand, there are self-regulating processes which are based on negative feed-back and which stabilize given structures; on the other hand, via positive feed-back self-augmenting processes destabilize structures and, by that, might lead to new, innovative structures.¹ The current volume of the series “Lecture Notes in Economics and Mathematical Systems” collects the papers presented in the 9th edition of the Artificial Economics, held in Klagfurt am Wörthersee (Austria). In particular, this volume contains 18 selected papers. We are very happy that, in addition, one of the keynote speakers, Klaus G. Troitzsch (Universität Koblenz-Landau), found the time summarize his keynote in a paper, which is also included in this volume. The other invited keynote speakers are Andreas Ernst (Universität Kassel) and Gerhard Friedrich (Universität Klagfurt). All three

¹Witt, Ulrich (1997) Self-organization and Economics – What is New? Structural Change and Economic Dynamics 8(4):489–507. doi:[http://dx.doi.org/10.1016/S0954-349X\(97\)00022-2](http://dx.doi.org/10.1016/S0954-349X(97)00022-2).

researchers extraordinarily contributed to the development of agent-based models in economics and the social sciences, as well as to its computational foundations.

This volume is divided into six parts. The first part addresses **Methodological Issues**. *Matteo Richiardi* bridges the agent-based modeling approach (of nowadays) with one of its antecedents, i.e. the dynamic microsimulation literature, and elaborates the potential of the latter stream of research for the development in the area of Artificial Economics. In the paper related to his keynote, *Klaus G. Troitzsch* shows – and reminds us of – the importance of (i) testing the significance of simulation results, and (ii) thinking about the variances rather than means of the results.

In the chapter devoted to **Macroeconomics**, first *Hugues Bersini and Nicolas van Zeebroeck* investigate the free market efficiency/equality trade-off by comparing two market mechanisms using an agent-based approach. They find that even though they are more efficient, the competitive (i.e., double auction based) mechanisms tend to increase inequality. *Susanna Calimani and Paolo Pellizzari* model societies where tax evasive behavior of the taxpayers occurs, and analyze the efficiency of different audit policies (of the tax agencies) which depend on the taxpayers characteristics. In their paper *Andrea Teglio, Silvano Cincotti, Einar Jon Erlingsson, Marco Raberto, Hlynur Stefansson, and Jon Thor Sturluson* deal with the current topic of real estate bubbles (as for example observable in the U.S. and in Spain), and investigate the interaction of the level of concentration of financial capital on the formation of real estate bubbles.

The third part of this volume collects four papers related to **Market Dynamics**. *Chih-Hao Lin, Sai-Ping Li, and K.Y. Szeto* investigate an investment strategy based on adaptive trading for anti-correlated pairs of stocks. *Xintong Li, Chao Wang, and Yongui Wang* address the evolution of a decentralized market with network externalities. *Lucian Daniel Stanciu-Viziteu* refines the differentiation between different types of investors (like chartists and fundamentalists). This topic has a remarkable tradition in agent-based models. Stanciu Viziteu distinguishes three types of investors which have different information and make different use of the information. *Wanting Xiong, Han Fu, and Yougui Wang* analyze how fair offers emerge in ultimatum games, and show that fairness considerations as well as adaptive learning are important in the emergence of fair behavior.

In the fourth section of this volume, those papers dealing with **Financial Markets** are comprised. *Olivier Brandouy and Philippe Mathieu* use an agent based model of an artificial stock market in order to analyze the validity of the Volume Synchronized Probability of Informed Trading (VPIN) as a measure for the potential flow toxicity in high frequency markets, and the vicious cycle that might evolve from less informed market makers reacting to flow toxicity. *A. Barazzetti, F. Cecconi, and R. Mastronardi* introduce a predictive machine learning approach based on financial news articles available in the Worldwide Web for event forecasting and trading decisions. In their paper *Michael Roos and Anna Klabunde* introduce findings on the role of trust of angel investors into startup entrepreneurs using an agent-based simulation. Inter alia, they find that neither very high nor very low levels of trust seem to be optimal from the investors' perspective. *Mitja Steinbacher, Matjaz*

Steinbacher, and Matej Steinbacher address a very current topic. They analyze the contagion potential and stability of banking system on a randomized version of the credit contagion model by examining an artificial financial system.

The fifth part of this volume investigates with artificial **Organizations**. *Doris A. Behrens, Silvia Berlinger, and Friederike Wall* employ an agent-based approach in order to analyze how well-known human decision-making biases (e.g., framing effects or the recency effect) in interaction with each other influence overall organizational performance. Utilizing agent-based simulation, *Stephan Leitner and Doris A. Behrens* challenge a well-known economic mechanism for inducing optimal investment decisions, i.e., the competitive hurdle rate mechanism, by testing its robustness in situations where forecasting errors occur. *Marco LiCalzi and Davide Marchiori* shed new light on an “old” but, nonetheless, up-to-date topic: the exploration versus exploitation trade-off. In particular, they revisit recent findings on the multi-armed bandit problem in an environments with high turbulence.

The final section is comprised of three papers related to **Networks**. *Fernando Beltrán and Farhaan Mirza* address the uptake of fibre connections to households and businesses. They model a high-speed, open access broadband network and investigate mutual network effects evolving from the interaction of both end-users and service providers. The contribution of *Sjoukje A. Osinga, Mark R. Kramer, Gert Jan Hofstede and Adrie J. M. Beulens* is a twofold one: On the one hand, the authors investigate the effect of the loss of (market-related) information in a network; on the other hand, the paper provides methodological findings, as it explicitly deals with the advancement of an existing model. Based on mathematical analysis as well as agent-based simulations *Ryota Zamami, Hiroshi Sato, and Akira Namatame* propose a model for designing network structures. In particular, they aim at designing network structures which are robust against systemic risks.

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