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Editorial

Michael Neugart and Frank Westerhoff*

Editorial – Special Issue on “Advancing Agent-Based Economics”

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Agent-based modeling (ABM) has become a crucial computational methodology in economics and finance, allowing researchers to simulate and analyze the complex interactions and adaptive behaviors of agents within economic systems. For example, see the survey papers presented in the handbooks edited by Tesfatsion and Judd (2006), Hens and Schenk-Hoppé (2009), Chen, Kaboudan, and Du (2018), and Hommes and LeBaron (2018), the survey by Axtell and Farmer (2024), or the papers published in a special issue of this journal edited by LeBaron and Winker (2008). ABM's origins are deeply rooted in interdisciplinary research, drawing from mathematics, physics, biology, computer science, economics, and finance. Through ABM, researchers can explore emergent economic phenomena, such as the boom-bust cycles of financial markets, technology diffusion, business cycles, and firm size distributions, which arise from the interactions of heterogeneous agents. And this approach has proven to be a powerful tool for studying these phenomena across various markets, with a focus on the microfoundations of agents' behaviors and the environments in which they interact. Significant progress has been made in understanding speculative markets driven by agents' expectation formation, technology diffusion in growth models that account for short-term economic fluctuations, labor markets where workers possess heterogeneous skills, operate under diverse institutional environments, and are possibly embedded in social networks, among many other domains. The current special issue on “Advancing Agent-based Economics”, comprising four papers, adds to this line of research.

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Czupryna and Schaff (2024) present a formalized agent-based model to explore the relationship between Schwartz's higher-order values and economic performance at both individual and collective levels. The authors examine how the distribution of values such as self-enhancement, self-transcendence, openness to change, and conservation among a population influences economic behavior and outcomes. By calibrating the model with data from the European Social Survey, the study reveals that values like openness to change and self-enhancement are positively associated with individual economic output. In contrast, values such as conservation negatively correlate with collective economic performance. The model also shows that differences in value distributions can explain disparities in economic outcomes and income inequality across populations. This research contributes to the understanding of how underlying cultural values can shape economic behavior, providing insights for policymakers to consider these factors when designing economic policies that aim to improve collective economic outcomes and reduce inequality.

Kotb et al. (2024) introduce a behavioral mixed-frequency macro-financial model that integrates daily-generated financial data and quarterly-observed real economic variables to explore the interactions between the stock market and the real economy. The model addresses the challenge of temporal aggregation, where high-frequency financial data are available, but real sector data are only collected every quarter. The key contribution is in demonstrating how monetary policy can be more effective by responding to high-frequency stock price updates rather than solely relying on delayed real economic indicators like output and inflation. The authors show that a proactive policy response to stock prices can enhance stability in both the financial and real sectors, particularly under conditions of bounded rationality and heuristic-based decision-making by agents. However, the model also highlights the potential trade-off, as such policies may lead to increased variability in the policy rate. This research provides important insights for policymakers on the benefits and limitations of incorporating high-frequency financial data into monetary policy design.

Mignot, Pellizzari, and Westerhoff (2024) examine the impact of fake news on asset price dynamics using an extension of the seminal Brock and Hommes (1998) asset-pricing model. The authors demonstrate that fake news significantly distorts the perception of asset dividends, increasing the risk and cost associated with fundamental trading. This distortion leads to a decrease in the steady-state price of the risky asset and a higher market share of agents who rely on technical trading rules. The paper highlights that these changes can destabilize markets, triggering wild price fluctuations, particularly below the asset's steady-state price. Furthermore, the research shows that small exogenous shocks, combined with fake news, can lead to abrupt transitions from stable to unstable market dynamics. The findings emphasize the need for policymakers to understand the potential for fake news to induce market instability and encourage fraudulent activities, suggesting that effective countermeasures are essential to maintaining market integrity.

The paper by Reinwald, Leitner, and Wall (2024) contributes to the understanding of performance-based pay in situations where information access is limited, specifically within the framework of the hidden action problem. The authors introduce an agent-based model to relax some idealized assumptions traditionally associated with this problem, such as perfect information and rationality. By incorporating limitations on the information available to both the principal and the agent, the paper explores how these constraints affect the sharing rule, the agent's effort, and the resulting utilities for both parties over time. The findings reveal that the optimal sharing rule does not always emerge under conditions of limited information and that the principal's utility is relatively robust to changes in memory, while the agent's utility is more sensitive to the principal's information limitations. This research provides insights into the complexities of designing incentive schemes in real-world scenarios where decision-makers operate with bounded rationality and imperfect information.

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