One of the major topics in macroeconomic theory is the coordination mechanism through which a large number of agents exchange goods in decentralized economies. The mainstream theory of efficient markets fails to provide an internal coherent framework and rules out, by construction, the interaction among heterogeneous agents. A rigorous micro-foundation for macro models can overcome this limitation and provide more reliable policy prescriptions. This book develops an innovative approach to the analysis of agent based models. Interaction between heterogeneous agents is analytically modelled by means of stochastic dynamic aggregation techniques, based on the master equation approach.

This book offers a systematic and integrated treatment of original concepts and tools, together with applications, for creating an alternative micro-foundation framework for a widespread adoption among the profession and by graduate students. In order to make the material accessible to graduate students, every non-standard mathematical tool or concept is introduced with a suitable level of detail. All the logical passages and calculations are explicit in order to provide a self-contained treatment that does not require prior knowledge of the technical literature.

Corrado Di Guilmi is Senior Lecturer at the University of Technology Sydney. His research interests include agent-based modelling, complex system theory, and post-Keynesian economics.

Simone Landini is Researcher at IRES Piemonte, Turin. His research interests include mathematical methods for socioeconomic and regional sciences, political and financial economics, agent-based modelling and complex systems theory.

Mauro Gallegati is Professor of Advanced Macroeconomics at the Università Politecnica delle Marche, Ancona. His research interests include heterogeneous interacting agents, growth and business fluctuations, financial fragility and complexity.
Interactive Macroeconomics

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The book is divided into four parts: the first presents the stochastic aggregation and macro-dynamics inference methods, based on the stochastic evolution of the microeconomic units; the second applies these inferential techniques on macroeconomic agent-based models; the third provides conclusions and stimulates further developments; the last part contains technical appendices.

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Interactive Macroeconomics
Stochastic Aggregate Dynamics with Heterogeneous and Interacting Agents

Corrado Di Guilmi
Simone Landini
Mauro Gallegati

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