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Wilson, David S. and Alan Kirman (eds): *Complexity and evolution: toward a new synthesis for economics***MIT Press, Cambridge, Massachusetts, 2016, XI, 395 pp, Cloth, £41.95****Gian Italo Bischi¹**

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During the last decades, economic modelling has been witnessing a paradigm shift in methodology, and the recent economic and financial crisis has strengthened this trend. In fact, despite its notable achievements, the standard approach based on the paradigm of the rational and representative agent (with unlimited computational ability and perfect information), fails to explain many important features of economic systems, and has been criticized on a number of grounds (see e.g. [Simon 1984](#); [Kirman 1992, 1993](#)).

At the same time, a growing interest has emerged in alternative approaches which allow for factors such as bounded rationality and heterogeneity of agents, social interaction and learning in the presence of multiple and interacting individuals who operate on various spatial and temporal scales. Furthermore their behaviour is governed by adaptive evolutionary processes based on simple “rules of thumb” (or “heuristics”) and “trial and error” mechanisms, that may give rise to (sometimes unexpected) emerging macro behaviours. Moreover, the empirical literature and experimental economics, as well as behavioural economics that merges such approach with issues and methods borrowed from psychology and neurosciences, provide further support to this approach (see e.g. [Hommes 2013](#); [Kahneman and Tversky 1979](#); [Camerer 2010](#)). This stream of “emerging literature” demonstrates how in practical situations such evolutionary processes, observed in economics, finance and social sciences, can lead to disequilibrium situations, path dependence, irreversibility, discontinuity as well as other nonlinear and complex phenomena. Socio-economic systems are therefore viewed as “complex evolving systems” with boundedly rational interactive agents. Aggregate economic outcomes are then interpreted as “emerging properties”.

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Such new points of view in the studies in economics and other social sciences are now becoming a new paradigm that involves both theoretical and empirical approaches, two aspects that are becoming increasingly correlated, as should be in empirical sciences like economics. Unfortunately, theoretical and empirical results have not been sufficiently related in the classical approach to economics, being based on the ideal features of *Homo oeconomicus*, a fictitious being acting according to an axiomatic approach, mainly inspired by the methods of classical mechanics of the end of 19th century.

The new paradigm is much more interdisciplinary, taking its strength from two widespread approaches that have in recent years entered many different fields, from physics to biology, from environmental sciences to history and philosophy up to psychology: evolutionary theory and complex sciences, both dealing with highly interconnected nonlinear adaptive systems.

Of course, this also involves new mathematical methods, ranging from dynamical systems (deterministic and stochastic) to game theory (with particular emphasis on evolutionary games) as well as new economic and social interpretations of the results. This requires collaborations among scholars with different backgrounds: economists with applied mathematicians, biologists and social scientists with experts on numerical methods and software and so on. This implies that a complete exposition of such a new approach often requires the collaboration (and cross-fertilization) of several authors that can provide a multiplicity of points of view.

Indeed, in the referred book leading scholars examine evolution, complexity and behavioural theories in order to explore their possible impacts on economics, described in terms of interacting individuals and institutions which are modelled as intrinsically dynamical systems. The contributors discuss a synthesis of complexity and evolutionary approaches, as well as evolutionary behavioural economics and the evolution of institutions, with several practical applications.

The selected researchers that contributed to the book offer a design for renovating economics and constructing a fully integrated approach to human psychology, behavior and society. The result is a readable book, suitable for a course in economics and also ideal for self-study by practitioners who want to better understand some of the more complex ideas characterizing current achievements in this area. Directions for future research are indicated, as well as the possible integration of different methods and concepts from complexity and evolutionary theories, in order to acquire an alternative and deeper understanding of economics, institutions and public policy. Of course, several open problems and controversial issues are also discussed, thus giving a clear image of a not yet established (we would say “evolving”) new paradigm for the study of social sciences.

Indeed, even if real economic systems are composed of agents that follow *simple* rules, the difference with physics and biology is that these rules constantly change because humans can learn, and their institutions are themselves the products of fast-paced cultural evolution and slower-paced genetic evolution (e.g., [Arthur et al. 1997](#); [Kirman 2010](#)). So, in order to understand complex systems that are composed of multiple, rapidly adapting agents, generalities must be limited. Each system, to a large extent, is unique. Path dependence and hysteresis effects are important, in contrast to the ahistorical assumptions of general equilibrium economics. The book *Complexity*

and Evolution. Toward a New Synthesis for Economics conveys the clear idea that if it is true that generally complex systems are inherently difficult to predict, this principle applies even more to complex human socioeconomic systems. A consequence is that people should learn to live with such uncertainty, as it cannot be eliminated. Indeed, this is one of the features of postmodern spirit of increasing uncertainty, relativism and chaos that relates economics, mathematics, physics, literature and philosophy of the late 20th century, and even more in this beginning of the new millennium.

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