

EAEPE RA [Q] Complexity Economics

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The economy can be seen as a complex adaptive system. Many approaches to economics have adopted this point of view - both recent ones and those in longstanding heterodox traditions. While the earlier contributions emphasized the interdependent, evolving and adaptive nature of economic systems, recent advances have added an extensive array of formal methods and empirical results. The potential that this creates for evolutionary economics and evolutionary political economy is formidable.

The concept of complexity is closely connected to that of evolutionary systems. Evolution is bound to occur at the “edge of chaos”. Evolutionary systems require both conservation of information and diversity generation. Simple systems cannot provide diversity generation. Chaotic systems do not provide stability or conservation of information under the slightest disturbance. In complex systems, there is an adaptive balance between forces that act towards order and those acting towards disorder. Specifically, for economic systems, this would be expected to generate novelty and drive the processes of their evolution.

Not only are economic systems constantly evolving, changing, adapting to a variety of internal and environmental developments. They also consist of massive numbers of heterogeneous entities themselves that are subject to behavioral dynamics and that interact in non-trivial ways. Economic systems are constantly evolving, changing, adapting as a result of the nonlinear decentralized interaction of their heterogeneous elements. The inclusion of evolutionary dynamics, stochastic dynamics - distributions instead of fixed numbers - and network theory is expedient in furthering our understanding of the economy as a complex adaptive system. Recent advances in computational methods and much improved computer systems are what allows us today to take this path. Agentbased simulation and other numerical methods are increasingly common.

Focus of the research area

The research area aims to provide an arena within the EAEPE in which the state of the art in economic complexity may be discussed and advanced. This includes recent advances of methods in complexity economics and economic models using such methods. But it also extends to the ontological and epistemological foundations of the field as well as its history of thought.

The research area will place particular importance on facilitating the exchange of ideas between the various literature traditions that have tackled the field of economic complexity. This is to happen both within the research area, in events organized by it, and in collaboration with other research areas that also touch on the field of complexity economics (see below).

Possible contributions

The research area welcomes contributions ranging from studies of scaling laws in socio-economic datasets and multiplex-networks to stock-flow consistent and agent-based simulations of growth and innovation to epistemological considerations and methodological assessments of the potential of machine learning. Of course, these are just examples. What unifies them is the focus on complexity science.

To define the scope of the research area in a more comprehensive way:

1. *Results based on applications of complexity-science methods.* We invite work presenting novel findings in evolutionary economics based on the application of methods of complexity science. This includes methods from network theory, stochastic dynamics, evolutionary dynamics, dynamic systems, agentbased modeling and simulation, machine learning, and other numerical methods. We do, however, encourage contributors to consider carefully whether to submit such work to this research area or to research area dedicated to the specific branch of economics (e.g. innovation economics, institutional economics) or the specific methodological field (e.g. simulation, networks).
2. *Methodological advances in complexity economics.* We invite work on new or improved methods in complexity science and the demonstration of their application to economics.
3. *Ontological, epistemological, and history of thought contributions.* We invite work considering the ontological or epistemological foundations or dedicated to the history of thought in the field of complex systems in economics.
4. *Interdisciplinary approaches in complexity science.* We invite interdisciplinary work as long as there is a focus on economic and complexity aspects. This includes topics of interdisciplinary nature between economics, sociology, anthropology and other social sciences, but also topics intersecting with ecology, biology, psychology and the sciences. As complexity science is a field with strong interdisciplinary orientation, the research area welcomes contributions reflecting the extent of the variety of the field.