

The economy as an evolving complex system IV, by Maria Del Rio-Chanona et al. (Santa Fe Institute Press, Sante Fe, NM, 2026), pp. vii + 1118.

These two new volumes from the Sante Fe Institute are the definitive starting point for anyone interested in how complex systems science can inform economics. They could be used as a textbook for a graduate course and would certainly be an excellent grounding for a graduate student looking for a way to contribute to this literature. The chapters offer an overview and history of the field and then dozens of sharp, accessible entry points to the application of complex systems theory and agent-based modelling (ABM) to a range of issues from finance and growth to climate change and microsimulations. Most chapters offer examples how the complex systems perspective complements or sometimes even upends the neoclassical approach. They typically provide historical overviews of how the systems perspective has developed in a subfield, what simple models were first proposed and how they have advanced, and how the results of these models relate to empirical data. One of the most impressive chapters for me was the one on the Canadian central bank's use of agent-based models (ABMs) to chart its way through COVID.

Two refreshing qualities of this volume are its interdisciplinarity and preference for complementarity and synthesis rather than argument and division. Complex systems theory emerged in the natural sciences, so it's no surprise that perspectives from there appear in this volume. But there are also contributions from computer science, politics, philosophy, and behavioural psychology, among others. Economics is a notoriously insular disciplines, which does it no favours. It is nice to see the Sante Fe institute charting a more open and integrationist path. This comes through also in its interaction with neoclassical economics, or rather its distinction between the equilibrium-based, rationality optimiser models of neoclassical models and the disequilibrium, boundedly rational models of complex systems theory. As Durlauf, McMillan & Page (p. 259) put it in their chapter:

We therefore see little current value in attacking economics from a complexity perspective or in positioning complexity economics as somehow correct and neoclassical economics as wrong. These are two classes of models. Individually, each is useful and wrong. Collectively, they are more useful and less wrong.

I wish more critics of neoclassical economics adopted this attitude. Many of the chapters explore the limits of ABMs historically, and how these are gradually being transcended as improvements in computing power, machine learning, and data availability allow for the creation of ever more realistic models. The book is delightfully humble while also showing off some very powerful advances.

There were three things I would have liked more of in the book. The first is a bit more content on *thinking* in terms of complexity not just *modelling* it. Some elaboration of themes like feedback loops, emergent phenomena that are greater than the sum of their parts, and nonlinearities in long term outcomes would be valuable. I think this would be especially relevant to microeconometrics, where the field seems to be moving in the opposite direction of getting ever more linear in its approach under the influence of randomised control trials, DAGs, and an insistence on strict causal inference. In the public policy context where so many outcomes are the product of structural determinants and large and overlapping complex systems like the health, welfare, and criminal justice systems, this strikes me as wrongheaded. It's not that the randomista paradigm is wrong, just incomplete. Much like ABMs can complement equilibrium models, complex systems thinking can complement counterfactual causal inference. Notably,

the “hierarchy of evidence” that predominates in applied microeconometrics, with randomised-control trials on top, is repudiated by a complex systems perspective, which suggests the need a variety of evidence to secure both internal and external validity. I see an open door here to connect with recent commentaries arguing for greater appreciation of structural determinants of outcomes in microeconometrics (e.g. Stevenson 2023).

Relatedly, I would have loved more on the welfare and power side. The chapter on inequality from a complex systems perspective, and the closing chapter on developing a new ontological stack for economics from a systems perspective had so much gold they left me wanting more. Both emphasise that individual characteristics do not arise *de novo* but are at least in part the product of social systems. This goes back to one of the earliest ABMs – Schelling’s model of race-based residential segregation. Some of these systems are structured such that they are characterised by reinforcing feedback effects that push agents into worse off positions. The authors call these “basins of attraction” and provide examples like Jim Crow laws and other government policies that trap African Americans in disadvantage. However, they go further to underline that these structural features are often political in nature and the product of deliberate actions by other agents in the system. These dynamics are tricky for static equilibrium approaches like median voter models to capture. They are also largely outside the purview of traditional welfare economics, which is more concerned with distributional matters and rather fictive lump sum transfers. Complex systems perspectives provide useful extensions and a more wholistic picture.

Finally, I would have liked some more discussion of why complex systems perspectives remain, as the authors acknowledge, somewhat on the fringes of economics. The authors come from some of academia’s most illustrious institutions, so the field is obviously gaining influence. But complexity remains rarely taught in undergraduate curricula, especially relative to linear perspectives, nor is it core to graduate programs, and it doesn’t seem to have penetrated some of the domains to which it is most relevant, like impact evaluation. Why is this? I would have relished some discussion of how to teach complexity and perhaps some war stories of how to convince sceptical or intransigent economists of its importance to the discipline. Overall though, a top shelf book and one that should be read by all economists.

Works Cited:

Stevenson, M. T. (2023). Cause, Effect, and the Structure of the Social World, *Boston University Law Review* (103): 2001–2047.