

Cambridge professor: Over-mathematization locks economics into irrelevance

By RONG ZHI

In today's mainstream economics, a highly uniform research paradigm has come to dominate the field: Mathematical modeling has effectively become the sole benchmark for academic evaluation. Whether publishing in top journals, training economics students, or hiring and promoting faculty, demonstrating the sophistication of mathematical models—rigorous theorem proofs, complex econometric analyses, and intricate simulation algorithms—is treated as the mark of “scientific rigor.” By contrast, research that seeks to understand how actual economies work through case studies, interviews, or other empirical approaches but does not rely heavily on mathematical tools is often marginalized. This “model-first” culture has resulted in a pronounced disconnect between economics and real-world economic life, while also sharply narrowing methodological diversity within the discipline.

Tony Lawson, Emeritus Professor of Economics and Philosophy at the University of Cambridge, has been critiquing this over-reliance on mathematical formalism in mainstream economics for nearly half a century. In a recent interview with CSST, he discussed how economics has become divorced from social reality through its fixation on refined models and called for a fundamental reform grounded in “social ontology.”

A matter of ontology

CSST: In recent years, criticism of mainstream economics' over-reliance on mathematical formalism has intensified, pointing to an imbalance between “mathematical rigor” and “relevance to real-world issues.” What manifestations of this trend concern you the most, and what do you view as the main drivers behind over-mathematization?

Lawson: The trend in question has been in play since at least the early post-WWII period when, in the face of the McCarthyite “witch hunts” in the United States, fearful university administrators and funders allocated resources to mathematical modelers who made no pretense to address real world issues, let alone criticize the prevailing economic system. And for a range of reasons, mathematical modelers have held on to power and influence since.

Since then, there have been attempts by heterodox economics to seek relevance, with fluctuating degrees of effort and success. But as over time, most economists have been trained as mathematical modelers, and typically only modelers get

jobs in most economics faculties, and only modeling papers are accepted in journals regarded as prestigious, the sorts of self-styled “heterodox” economists that manage to survive are mostly themselves modelers. They are modelers who erroneously suppose that the lack of relevance of the discipline has nothing to do with the mathematical emphasis *per se* and more to do with how mathematical modeling was done. So, they call themselves heterodox by doing, say, agent-based modeling rather than econometrics, or reach certain sorts of policy conclusions. The problem with modeling is a matter of ontology and for ontological reasons, mathematical modeling in economics is almost always irrelevant however it is done and whatever the assumptions or findings.

Why do I suggest the relevant critique of economic modeling is ontological—to do with the nature of social material? I have shown over and over again that social reality is, in a specific sense, open, with depth, and inherently relational in process, amongst other things. However, the sorts of methods that economists use presuppose that social reality is correspondingly closed, comprising systems of event regularities, and consisting everywhere of systems of isolated atoms; that under the same conditions X always acts in the same way Y, as is required to formulate mathematical relations of the form “whenever X then Y.”

Clearly, the requirement of isolation is the antithesis of the observed real-world relationality of social phenomena, and the requirement of fixed atoms is the antithesis of social phenomena being in transformative process. So not only has economic modeling never provided insight, there is good reason to think that, in most situations anyway, it never will.

So, for such ontological reasons, I think the “mathematical rigor” and “relevance to real-world issues” in your question are essentially incompatible. I also believe it is misleading to tie the word “rigor” to “mathematical” as if it cannot also apply to attempts to achieve “relevance to real-world issues.” I think rigor is bound up with coherence and clear and tight reasoning. Economists' modeling exercises are often a device to avoid this.

The prevailing situation is due less to any current “drivers” as to lock-in. There are many people, not just economists, who wrongly suppose that serious or scientific research must be mathematical in nature. The problem is that the economics academy has for a long time been locked into modeling. It is so wholly composed of economic modelers,

where most feel very insecure in the face of the continued failure of modeling projects to provide insight, that alternatives to modeling are not tolerated for defensive reasons (in case their successes serve to undermine the modeling emphasis—in contrast successful academics are always open to challenges).

So, in the main, it is only newcomers of this modeling orientation or disposition that are encouraged and selected. At the same time, critical thinkers prefer to go elsewhere, and mainstream economists in the academy who believe that modeling is essential make it almost impossible for critical thinkers to enter anyway. So, as I say, the economics academy is locked into irrelevance.

Modelers themselves seem happy enough to get the kudos that comes from fellow modelers for showing mathematical prowess, so that lack of relevance to them seems just to be accepted as a necessary fact of being an “economist.” Other than the few economists that squeeze in despite retaining an interest in relevance—and even these are often mistakenly accepted because (like myself) they have degrees in mathematics—few are bothered by the state of the discipline.

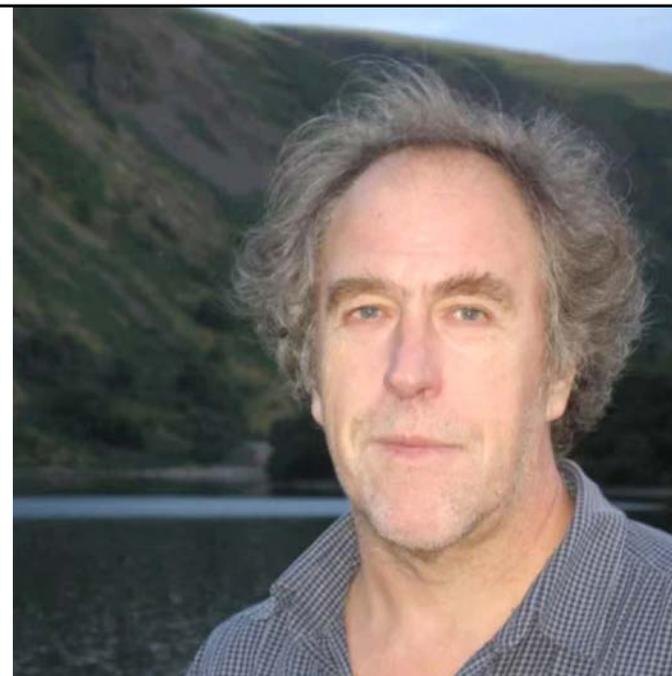
All manifestations of this situation, whether viewed as a trend or otherwise, are concerning in that the academic discipline of economics is consigned to irrelevance, whilst the resources allocated to it are essentially wasted, whereas they could be used to the benefit of the wider community both to support projects concerned to provide insight and to give economics students a meaningful education.

Clarifying nature of social reality

CSST: Which emerging or non-mainstream research paradigms—such as behavioral economics, complexity science, agent-based modeling, evolutionary economics, or qualitative methods like case studies and interviews—hold the potential for addressing the shortcomings of over-mathematization?

Lawson: Behavioral economics, complexity science, agent-based modeling, and most of evolutionary economics are modeling-oriented and so more of the same: distorting an open, relational, and processual world to make it conform to closed system of isolated atoms. Thus, they are just as hopeless as all other forms of economic modeling, whereas methods like case studies and interviews will always be relevant but usually far from sufficient.

The basic problem with relying on any mathematical modeling methods of the sort used by economists is



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that they are inappropriate for social analysis given the nature of social reality. Employing them is like using hammers to cut the grass or to clean up spilt milk. Relevance starts with determining the nature of the object of study—the nature of the social stuff to be investigated, that is, with doing social ontology—and tailoring methods to it.

So, approaches to economics that pursue social ontology in an explicit, systematic, and sustained fashion have the most chance of achieving relevance. This is the hallmark of the Cambridge Social Ontology Group.

CSST: How can economics integrate insights from other disciplines—such as psychology, sociology, history, ecology, or even physics—to develop more realistic and human-centric analytical frameworks? Could you offer a compelling example?

Lawson: Such disciplines as psychology and physics deal with materials of a different nature to social phenomena and have their own tailored methods. Of course, if, like physics, psychology, chemistry, and biology, we allow the natures of the materials studied to determine disciplinary boundaries, it follows, or so I have often argued, that there is only a need for just one social science.

At most, economics, law, sociology, history, ecology, politics, human geography etc., are divisions of labor in a single coherent social science, differentiated mainly as the sorts of questions pursued. All these “divisions” deal with the same sort of material, i.e., with social phenomena characterized by depth, relationality, and process, and occurring in open systems. All are in time and space.

However, modern academic economics currently, and for many decades now, has differentiated itself artificially and arbitrarily from other branches of social sciences precisely by its insistence that mathematical modeling methods be everywhere employed.

Methodological diversity essential

CSST: Do new technologies like big data, machine learning, and

artificial intelligence intensify a “technique-driven” competition in modeling, or do they provide novel and more effective tools for understanding complex economic systems?

Lawson: Any tool can be used where it is relevant to the nature of material under investigation. The developments listed certainly provide more opportunities for those concerned with mathematical formalism for its own sake. But those that prioritize relevance can use any tools available if there are good ontological reasons to believe they are relevant.

The ontological argument does not lead to leaving tools out of the toolbox. All methods can be included in the toolbox. Rather, the ontological argument is about always seeking to choose or fashion a tool or method so that it is relevant to the task, rather than insisting that mathematical tools must always be used whatever the context, even before we know the nature of the tasks or objects of study.

CSST: What fundamental changes in academic evaluation—journal review standards, tenure and promotion criteria, and research funding allocations—would help encourage more diverse forms of high-quality research?

Lawson: The whole set-up in the academy would have to be restructured. Currently, most academic economists, including Nobel Memorial Prize winners, know only how to model. If relevance were made a requirement, they would become redundant. So, I guess change would need to be gradual if it were to be accommodating and caring, but likely imposed from the outside if it is to be efficacious.

Most importantly, there is a need to abolish the existing “research assessment exercises.” In the United Kingdom, at least, these are carried out by a team of economists, all of whom are mathematical modelers who only award “points” to mathematical contributions or contributors. Methodological diversity is thereby rendered almost impossible in most economics faculties.