

1 *Objectivity in Economics and the Problem of the Individual*

Scientific knowledge is social both in the ways it is created and in the uses it serves.

Longino (1990, p. 180)

In its excessive quest for generality, utility-maximising rational choice theory fails to focus on the historically and geographically specific features of socio-economic systems. As long as such theory is confined to ahistorical generalities, then it will remain highly limited in dealing with the real world.

Hodgson (2012, p. 94)

And one might almost say that these foundation walls are carried by the whole house.

Wittgenstein (1974, sect. 248)

1 Objectivity in Economics: The Mainstream View from Nowhere Science Conception

Might mainstream economics be a science bubble? The long history of science is filled with examples of dominant, influential approaches that were later shown to be based on mistaken conceptual foundations, and a case can be made that this is so of mainstream economics. Sciences, like other world views, historically evolve, change, and get superseded. In the history of science, worries often first emerge when significant evidence cannot be readily accommodated within an approach or must be strenuously interpreted to fit preexisting conceptual commitments. The emergence of behavioral economics might signal the beginnings of such worries regarding mainstream rational choice theory. Yet in the long run, the issue is whether a science approach somehow produces objective science. This raises the question: What does objectivity in science involve and what basis is it thought to have in mainstream

economics? Most of this chapter addresses this issue, and at the end, I return to the science bubble question.

The first influential use of the term “mainstream economics” was in seventeenth edition of Paul Samuelson and William Nordhaus’ *Economics* textbook (Samuelson and Nordhaus, 2001). Since then, there has been considerable discussion regarding what “mainstream” means. Some have emphasized the differences between neoclassical or orthodox and heterodox economics (Lawson, 2003, 2006; Dequech, 2007–2008; Lee, 2009; Mearman, 2011; Jo et al., 2017; Dow, 2021). Others have emphasized how new approaches in economics have shifted economics in varying ways and degrees away from an exclusively neoclassical economics toward a more multisided economics that draws on both traditional heterodoxy and increasingly other social science disciplines, and how these new research strategies contest many fundamental neoclassical principles and assumptions (Colander, Holt, and Rosser, 2004, 2006; Rodrik, 2015; Angner, 2019; Crespo, 2020b; Bögenhold, 2021; De Vroey and Pensieroso, 2021; Primrose et al., 2022; Ross, 2022; Truc, 2022).

I share many of the ideas in these two approaches but differentiate mainstream and non-mainstream approaches according to whether they employ closed or open conceptions of science. This distinction – originated by Ludwig von Bertalanffy (1968) – has been used in a number different ways in history and philosophy of science and more recently used effectively in economics to characterize different schools of thought (Dow, 2004; Chick and Dow, 2005; see Davis, 2023a) and in Critical realist philosophy of economics (Lawson, 1997, 2003, 2023). I add to this the distinction between a “view from nowhere” conception of science and a “view from somewhere” conception of science. I then associate these two conceptions and views with two alternative ways of looking at research practices in economics.

Objectivity in science is far from being an issue that concerns most mainstream economists, but if called upon to address it they might rest their defense of economics’ objectivity as a science on what are often regarded as the mainstream’s principle research practices:

- reductionist modeling;
- mathematical formalization;
- limited relations to other disciplines;
- value neutrality.

If then asked to explain why these practices make economics an objective science, they might say that they make economics like the physical and natural sciences that secure objectivity by enabling scientists to, as it were, “stand outside” their subject matter in a disinterested way.

This is the famous “view from nowhere” idea in science (Nagel, 1986; Sugden, 2018; Reiss and Sprenger, 2020). The rationale behind it is that objectivity in science depends on scientists being independent of their subject matter. Economics’ principle practices, then, would presumably produce this independence. It would follow, were this stance indeed to produce objective science, that the contents of mainstream economics, including the *Homo economicus* doctrine and the full range of analysis dependent upon it, would provide an objective representation of economic life – just as if economists saw the nature of world as it is in itself clearly through a glass window.

Yet this is not the view of science that many physical and natural scientists hold. Their idea is that objectivity in science involves a “view from somewhere” and scientists instead “standing inside” their subject matters in an interested way. For example, astronomers, preeminently physical, natural scientists, are able to investigate a wide range of the electromagnetic spectrum not visible to the human eye because they have developed a number of specialized “viewing” technologies designed to allow them to also “see” the infrared, ultraviolet, radio, gamma, microwaves, and X-ray bands of the spectrum. That is, *what* science sees in the world depends on *how* scientists see, where this depends on their understanding of how their investigation influences what they see. Scientists always stand inside their subject matters, and the idea that they could stand outside them is a fiction that distorts their representation of the world and impedes their investigation.

In mainstream economics, I argue, this creates two false impressions about the economy: first, that what mainstream economists say exists in the economy is all that there is to be seen; second, that the economy appears to be a relatively deterministic system independently there to be discovered. The two corresponding effects of this misconception are: The first blinds us to the full range and complexity of human values and the different roles they play in economic life and society; the second, contrary to human freedom, imposes fatalism on economics regarding how people direct their lives and how economies can be constructed to promote human well-being and social goals. I argue, then, that both effects derive from the *Homo economicus* doctrine

that I have argued is foundational to mainstream economics and the lynchpin of its view from nowhere understanding of economics as a science (Davis, 2003b, 2011).

a Mainstream Economics' Value Blindness

The mainstream *Homo economicus* doctrine narrows people down to being self-regarding or essentially self-interested, isolated individuals, who only interact at a distance from each other through markets, and for whom direct interaction is an “externality” that can make markets inefficient. The means by which it does this narrowing down is its commitment to value blindness. Central to this, and the foundation of its utility maximization understanding of individual behavior, is the concept of subjective preference. Preference is of course a value concept, but though there exists extensive thinking about of the nature of value and valuing in science, literature, philosophy, and human thought generally, the only value the mainstream sees is subjective preference. This, it defines quite rigorously via rational theory's standard axioms that reduce value to a single, abstract relation. Only then does it makes sense to say people maximize utility, since were we to acknowledge the many different ways and things people value, it would make little sense to say people maximize just one thing.¹

Thus, all one is permitted to say/see when we speak of the many ways people value things is captured by the ordinal preference relation. All different motivations people might have for why they prefer one thing to another, how much so, how any one set of preferences relates to other sets of preferences, and how preferences are related to different kinds of values (ethical, prudential, personal, aesthetic, attitudinal, etc.) are all set aside with the claim that because preferences are subjective, nothing else can be said about their content.

This commitment to an abstract, logical representation of the preference concept is rarely explained or justified. Most rational choice

¹ There are a variety of recent views in economics and philosophy of economics about what preferences are, ranging from simply choices without psychological characteristics (Gul and Pesendorfer, 2008) to “total comparative evaluations” more like judgments than desires (Hausman, 2012, p. x). Economists, however, generally seem to take preferences to essentially be desires (Angner, 2018) without much consideration of what their nature is and how as values they relate to other kinds of values.

theory practitioners do not recognize that it involves a philosophically controversial epistemological stance. Nor is there much methodological or historical discussion in economics regarding what gets assumed in this logical turn.² Why, we should ask, does rational choice theory need to be “rational” in this specifically logical way? What, moreover, are the grounds for this narrowing of the concept of value?

In twentieth-century philosophy, the idea that concepts and theories need logical formulation is associated with logicism, a Platonist philosophical view resurrected in the early twentieth century and associated with Gottlob Frege and Bertrand Russell’s effort to reduce mathematics to logic and Ludwig Wittgenstein’s early logical approach to philosophy. Though Kurt Gödel overturned their larger ambitions, the conviction that philosophy and science required logical foundations was influential, and a succession of individuals now seen as the founders of modern economics – Ragnar Frisch, John von Neumann and Oskar Morgenstern, Jacob Marschak, Kenneth Arrow, Gerard Debreu, Paul Samuelson, and others – subsequently transferred this vision to the interpretation of neoclassical economic theory in developing the axiomatic foundations of what became rational choice theory. In contrast to earlier neoclassical thinking dating back to the late nineteenth century that treated preference as a broad, heuristic concept, preference became a concept that depended upon very specific logical formulation. People’s rational behavior then reflected that they possessed “stable, well-ordered preferences.”³

Rational choice theory has this history at its foundation. Though now it is commonly thought the theory implies people are rational in terms of their reasoning capacity, what “rational” really means is that their behavior can be explained in term of a set of logical axioms that allows us to say they have stable, well-ordered preferences. Not questioned is whether there are scientific reasons to think this, what philosophical commitments this involves, what their possible epistemological limitations might be, and whether there are conceptual and theoretical consequences of this commitment for economics as

² There are important exceptions (see especially Weintraub, 2002; Giocoli, 2003; Moscati, 2018). See Hands (2001) for the early and later twentieth-century history of methodology and philosophy of economics.

³ See Hansson and Grüne-Yanoff (2022) for the history of development of the preference concept in economics.

a science – all despite the evident narrowing of the concept of value that this produced.

For proponents of the theory, then, rather than engage these questions and enter into discussion over what kind of concepts economics should rest on, particularly regarding one of the most human of all concepts, better to say that economics is simply about people's preferences rigorously understood, distance the preference concept from the broader idea of value, and say values in the broader sense are “non-scientific” and do not belong in economics. Value concepts, then, are “non-scientific” specifically because they lack precise logical foundations. Given this, one is then left to devote oneself to mathematically modeling behavior in rational choice terms. This ties “progress” in economics to “[t]he development and use of mathematical models [that now] is indeed representative of what large parts of economics does as a modelling science,” and means that “theoretical progress is no longer what economists primarily aim to achieve” (Boumans and Herfeld, 2023, 224, 225). In terms of recent behavioral economics reasoning, this is a kind of confirmation bias in which the theory can never be falsified or overturned.⁴

A basic principle of science this move violates is to close off the development of a science to new information. Scientific theory constantly undergoes change and development as it accommodates new kinds of information, as occurred when astronomers and physicists changed their theory of what we can see when they developed new technologies that replaced seeing by human vision alone with what can be seen in the electromagnetic spectrum. It is ironic, then, that until quite recently mainstream economics barred experiments as a technology of investigation, claiming that they offered nothing new to be seen that rational choice theory did not already explain. Now of course experimentation is widely practiced in economics, and how choice is “rational” has become an issue. Why, then, should most economists continue to defend the theory?

One possible rationale is that were preference relationships allowed to be more complicated incorporating many kinds of values, the whole

⁴ As Mary Morgan has put it in her “world in the model” examination of economics’ postwar modeling practice: “As models replaced more general principles and laws, so economists came to interpret the behavior and phenomena they saw in the economic world directly in terms of those models” (Morgan, 2012, p. 3).

apparatus of predictable equilibrium, supply-and-demand relationships could break down, taking much of mainstream thinking with it. Then what would economics have to offer as a presumably objective science? I return to this issue in the following section in connection with the mainstream's fatalism problem. But ultimately, I believe, the deep rationale for the mainstream's narrow conception of preference/value rests on its narrowing the ontological conception of the person to what fits the idea that people are essentially self-regarding or self-interested, isolated individuals who interact mostly at a distance from one another through markets. I comment briefly on the Platonist philosophical instincts that undergird this view.

We can characterize the mainstream's narrow conception of preference/value, embodied in rational choice theory and the practice of reductionist modeling, as an abstract essentialism – the philosophical view that what science investigates can ultimately be reduced to sets of abstract essences underlying the phenomena we observe. Plato elaborated this view long ago in his *Republic* (1941), arguing that society ought to be governed by “philosopher kings” who alone can see and fully apprehend these essences (or his transcendent Platonic forms). These “philosopher kings” tell us what we cannot see, and tell us what we ought to see, which only they can truly see. For the mainstream, this hidden underlying essence of value is the abstract preference relation (the basis of risk-free and risky choice analysis). As the essence of value, it secures economics' objectivity as a science, and thus the discipline's and economists' “philosopher king” role in producing a well-governed society explained in terms of the market mechanism – all as encapsulated in *Homo economicus* doctrine.

Plato's theory treated the everyday phenomena we observe as imperfect representations of the underlying essences on which they depend. What we ordinarily see is at best an approximation of those underlying essences. The error of the ordinary person for the abstract essentialist is to take the way the phenomena appear as meaningful and producing valuable information. What they should see were they able to grasp the hidden, underlying essential relationships is that empirical research in economics can ultimately only confirm rational choice theory. Experiments, should they contradict this, must be redone because they must somehow be mistaken. For example, if people sometimes appear to be altruistic, this somehow still needs to be shown to be really just utility maximizing behavior.

If people are believed to exhibit present bias and weakness of will rather than behave rationally, this can only be because their “true” inner preferences have not been correctly identified.

Consider now how mainstream value blindness goes hand-in-hand with a fatalism about economic life and ultimately a rejection of human freedom. I address this in connection with how the mainstream’s view from nowhere imposes a particular conception of time upon economic life.

b Mainstream economics’ fatalism and the problem of time

When we increase the number and kinds of values we say operate in economic and social life, human behavior becomes considerably more complex. In contrast to the mainstream reduction of value to one form that produces a single set of behavioral relationships, when different types of values interact in multiple, often in unexpected ways, human behavior becomes less predictable and equilibrium-like and more indeterminate. Indeterminacy is not same thing as human freedom, but it is a reason to suppose it exists whereas arguing that behavior is highly predictable and determinate puts human freedom in question. As Elizabeth Anscombe put it: “The truth of physical indeterminism is thus indispensable if we are to make anything of the claim to freedom” ([1971] 1981: 146).⁵

Indeed, if people are generally predictable, which a reduction of human values to preferences and the logic of preferences allows one to say, then there is no need to even use a freedom concept or say people behave “freely” other than to appeal to popular sentiments. Given that most people believe freedom exists in some form, it is not surprising that the concept is used informally in economics, as in the claim that economics is “choice” theory. Here, then, I argue that underlying the mainstream view is an understanding of time in which people really do not have choices.

The meaning and nature of time is a largely neglected subject in the methodology of economics, so we need to turn to philosophy to understand some of the main issues involved (see Gale, 1967; Emery, Markosian, and Sullivan, 2020). A key issue concerns the difference between the past–present–future temporal sequence and the

⁵ She went on to add: “The physically undetermined is not thereby ‘free.’ For freedom at least involves the power of acting according to an idea...” (*Ibid.*). Drakopoulos in a pair of publications (2022, 2023) shows how the standard view’s historically narrowing the preference concept to rule out interpersonal comparisons of utility serves its “conceptual resilience.”

before-after temporal sequence.⁶ The former involves tensed statements, where what is said to be true changes with the passage of time – known as a dynamic temporal idea. For example, one could say “Napoleon is alive” is true when he was, but can no longer say it is true after he was not. By contrast, the latter involves tenseless statements, where what is true is always true and not affected by the passage of time – known as a static temporal idea. For example, it will always be true that Napoleon died in 1821 and after the Battle of Waterloo.

Aristotle addressed one thing that mattered about the difference between these two ways of thinking in his famous future sea battle problem (known as the problem of future contingents), arguing that fatalism derives from trying to explain time in human affairs in tenseless, before-after terms (Aristotle, 1984). Imagine, he said in an early thought experiment, that at some date, it is true that a possible future sea battle can be avoided. If we think only in tenseless, before-after temporal terms, it would then also need be true in the future that it could be avoided. That is, when we say what is true is always true, this is not affected by the passage of time, and thus we must suppose a future sea battle will be avoided as predicted. But of course the passage of time overturns many predictions, and it can turn out that a predicted future sea battle ultimately cannot be avoided. The problem is that employing the before-after, tenseless, static time idea in connection with human affairs implies fatalism, or that it treats the future as predetermined and implies people lack the freedom to affect how it plays out. Aristotle concluded that in human affairs, we must think about time in tensed, dynamic past–present–future terms where something can be true at one time but cease to be true at a later time.⁷

Note that mainstream economics’ *Homo economicus* maximization analysis employs a tenseless, before-after, static temporal thinking. If it is true that individuals maximize utility at any one time, since utility maximization in a risky choice world concerns what will happen in

⁶ Called, respectively, the A-series and B-series (McTaggart, 1908; cf. Gale, 1967, pp. 65–85).

⁷ Aristotle’s critique of fatalism stood in opposition to a long tradition of belief in his time that the course of human events was divinely predetermined, as in the plays of Sophocles. That belief has periodically reoccurred in history and is associated with claims – sometimes by those in positions of power – that human affairs will proceed in some inevitable, even tragic, way.

the future, their expectations and beliefs about the future must also be true. If they were not, they would not maximize utility. Thus, the *Homo economicus* maximization view assumes what is true at one time is tenselessly always true, the future is predetermined, fatalism applies to human affairs, and choice never really occurs. Utility maximizing individuals must choose as they do.

However, if we instead think about time in tensed, dynamic past–present–future terms, where something can be true at one time but not at a later time, this would mean that what individuals expect and believe about the future could be true when they determine it to be so, but not be true after they act upon it. This is inconsistent with utility maximization, since it implies that maximizing utility today may not maximize utility. But it is not inconsistent with understanding individuals as constantly adjusting their behavior with the passage of time, doing as well as they can in the present, but acting on the assumption that things that are true might later not be, thus finding out they are often wrong about the future, thus needing to change what they think is true, and accordingly never really maximizing anything.

The mainstream, then, locks in its before–after, static temporal utility maximization thinking with its comparative static model of equilibrium adjustment. In that model, an equilibrium in which all individuals utility maximize can be upset by some unforeseeable exogenous shock. Individuals then adjust to shocks by determining what will again maximize utility. But that the world has changed does not imply it was not true they maximized utility before a shock. They did, but their expectations and beliefs about the future formed in the past are discontinuous with those they form after the shock. Thus, as if in an entirely new world, they can then again truly maximize utility based on their new expectations and beliefs about a new future, and it is not the case that what was true at an earlier time has ceased to be true at a later time. The world just unexplainably changed.

This comparative statics reasoning draws on the mainstream's abstract essentialism. The idea of an exogenous shock, a concept that really has no real temporal meaning, eliminates the passage of time, and makes the only temporal sequence possible the before–after static temporal understanding. In fact, this is really less a temporal idea and more a simple ordering idea. Like Plato's philosophy that defines reality in terms of timeless abstract essences, it tells us the passage of time is essentially unreal, and the phenomenon of time passing people say

they experience is only an imperfect representation of the underlying nature of time as a simple ordering.⁸

Aristotle, who had a different understanding of science more like modern scientists' view from somewhere understanding, rejected Plato's transcendent forms or abstract essences view from nowhere conception, and instead sought to explain the phenomena as we observe them. He saw our predictions are often wrong, concluded fatalism was wrong, and argued that understanding human affairs required the past–present–future temporal sequence and the passage of time idea. This science thinking is also present in non-mainstream economic approaches that incorporate such phenomena as path dependency, hysteresis, irreversibility, and the idea that the economy is an institutionally rich, complex, evolving system. I add to this that employing the dynamic understanding of time also requires we give up *Homo economicus* conception for an understanding of individuals who are socially embedded with many kinds of values and historically embedded in continually adjusting their behavior in a changing economy – an adaptive individual conception.

This alternative understanding of the economy and individuals, taken up in more detail in Chapter 4 and the following chapters and implies a different view of what makes economics an objective science. I characterize it as an open science view from somewhere conception, and compare it in Section 2 to the mainstream's closed science view from nowhere conception.

2 Objectivity in Economics: A Non-mainstream View from Somewhere Science Conception

The open science idea is associated with the open science movement and the goals of reducing barriers to participation in scientific research and increasing worldwide access to its results to make scientific production more transparent, socially collaborative, and sustainable (OECD, 2015-10-15; UNESCO, 2021). Though the open science movement operates with a collection of different principles seen to generate open science, and though there are different competing theories of what

⁸ McTaggart, who was also a proponent of thinking in terms of the before–after B-series, also claimed time was unreal, but instead argued for it on modern idealist grounds.

open science involves and how to foster it, I focus on one of the principles associated with open science – open methodology – and interpret open science from an epistemological or methodological perspective as a view from somewhere conception of science that relies on two main heuristic principles. Open sciences:

- (i) employ provisional entry points subject to reevaluation in relation to the scientific frameworks they produce;
- (ii) develop according to how the entry point–frameworks relationship evolves over time through an interplay of empirical and theoretical investigation.

These entry points are scientists' views from somewhere which reflect their understanding of the state of a science at any one time. As illustrated by the history and development of the evolution of the electromagnetic spectrum, the openness of a science can be interpreted as a matter of making it possible for *how* the different ways in which scientists see the world to influence and determine *what* they see, and then for *what* they see to drive scientific investigation of new ways for *how* they might see the world.

In that history of the evolution of the electromagnetic spectrum, early scientists had theories of the visible light spectrum, but having observed that white light breaks up into different colors when seen through glass prisms, it was inferred that the means or technology for how we see influences what we see, and this ultimately required that what the spectrum involves be redefined in ways that went beyond its human visibility understanding. In the nineteenth century, then, new technologies led to the discovery of infrared and ultraviolet radiation beyond the two ends and boundaries of the visible light spectrum. This initiated the redefining of what was “visible” that ultimately produced a theory of what became the electromagnetic radiation spectrum. This theory then led to the development of additional technologies that made possible the discovery of X-rays, gamma rays, radio waves, and microwave as further forms of radiation, which in turn allowed further refinements in the theory of the spectrum.

Objectivity in science, accordingly, is not a matter of applying and reapplying the same set of scientific principles, continually elaborating and redefining their existing meanings, with observation of the world organized around always confirming those same principles.

That type of view employs a closed view from nowhere science conception. Rather, it is a matter of how scientific principles evolve as they are put to use in the world, and how this may lead to discoveries of new phenomena that lead to the reconceptualization of those principles. That is, scientific ideas and technologies coevolve and at any one time presuppose an historical view from somewhere. I characterize this type of view as an open view from somewhere science conception.

Table 1.1 compares the two kinds of science conceptions in terms of their epistemological basis, their form of development, and their temporal nature.

How do these two science conceptions differ, then, in regard to their principle practices? Table 1.2 characterizes the practices that open and closed science approaches in economics employ with respect to types of modeling, methodological forms of analysis, relationships to other disciplines, and positions on values. Whereas the principle practices of mainstream economics are reductionist modeling, mathematical formalization, limited relations to other disciplines, and value neutrality, the principle practices of open science economics approaches are

Table 1.1 *Characteristics of open and closed science*

| Science conception | Epistemological basis | Form of development | Temporal framework |
|--------------------|-----------------------|---------------------|--------------------|
| Open | Reflexive | Two-way | Dynamic |
| Closed | Essentialist | One-way | Static |

Table 1.2 *Open and closed science practices*

| | Types of modeling | Methodological forms of analysis | Relationships to other disciplines | Positions on values |
|--------|-------------------|----------------------------------|------------------------------------|--------------------------|
| Open | Complexity | Mixed methods | Strong | Embraces value diversity |
| Closed | Reductionist | Mathematical formalization | Limited | Claims value neutrality |

complexity modeling, mixed methods analysis, strong relationships to other disciplines, and emphasis on diverse values.⁹

The practices the mainstream closed science conception employs have the *Homo economicus* individual conception as their underlying basis. The practices that open science economic approaches employ have as their underlying basis a socially and historically embedded individual conception. I discuss the latter's practices from this vantage point.

a Complexity Modeling in Economics

Adopting a broader account of what motivates people's actions and choices in explanations of economic behavior takes us beyond the preference-based, deterministic accounts of how markets and economies work that the mainstream employs. While this means there is less predictability in economic explanations, it also creates a larger role for human freedom in descriptions of people's behavior and expands economics' policy space beyond the narrow scope of mainstream welfare efficiency analysis. Seen as an open science practice built around the two heuristic principles above, complexity modeling rejects the essentialist modeling of the mainstream, incorporates reflexivity in the form of feedback relationships, represents economics systems in a two-way and two-level manner, and explains the economy as dynamic and evolving.

The complexity literature in economics and science is now voluminous.¹⁰ Here, I simply draw on Herbert Simon's early paradigmatic model of a complex system that succinctly illustrates its basic properties (Simon, 1962). Using the idea of what he called a "nearly decomposable system" (474), he showed how such a system operates using as an example how a building's temperature system works as a complex system. First, individual rooms in the building have independent

⁹ I have chosen types of modeling, methodological forms of analysis, relationships to other disciplines, and positions on values as the basis for my comparison of open and closed science conceptions in economics to reflect the dominant influence of mainstream economic thinking on what constitute research practices that produce objective science.

¹⁰ For recent contributions in economics, see Tesfatsion (2002), Tesfatsion and Judd (2006), Velupillai (2010), Chen and Wang (2011), Kirman (2011), Hommes (2013), Colander and Kupers (2014), and Arthur (2015). Rosser (2021) provides an extensive review of the state of the literature.

temperature systems. Second, these individual room temperatures are only “nearly decomposable” from one another because they are affected by the rooms’ proximity to one another. Third, because the overall building temperature is different from individual room temperatures, individual room temperatures adjust to this, but their interactive effects cause the overall building temperature to change, which again affects individual room temperatures, etc.

The feedback relationships involved thus reflexively move in two directions between two levels of the system, and the process of temperature determination continues indefinitely. Here is how Simon characterized this:

Roughly, by a complex system I mean one made up of a large number of parts that interact in a nonsimple way. In such systems, the whole is more than the sum of the parts, not in an ultimate, metaphysical sense, but in the important pragmatic sense that, given the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the properties of the whole. (Simon, 468)

When we model the economy as a complex economic system, this two-way interaction operates between its microlevel, where agents form expectations and interact, and its aggregate macro-level, where we see the overall effects of that interaction. Mainstream models suppress these two-way reflexive feedback effects by ruling out that “the whole is more than the sum of the parts” and by making it “a trivial matter [for agents] to infer the properties of the whole.” Agents’ expectations are either assumed to be “rational,” meaning that they fully (and unrealistically) comprehend the effects of everyone’s choices on the economy as a whole, or their micro-level interaction is examined in isolation from its possible effects on the economy as a whole. This makes it possible to assume agents maximize utility in tenseless temporal terms, so that what is true at any given point cannot be upset by what happens later. The economy then ceases to be a dynamic, evolving system, and can be formalized in a highly determinate way.

Realistically, however, “it is not a trivial matter [for agents] to infer the properties of ... whole” economic systems, so agents must continually adapt their behavior and their interaction with other agents causes the overall systems they occupy to change over time. In temporal terms, what may be true when they act need not be true later when their interaction produces its effects on the overall economy. As these

overall effects feedback on agents, they must adapt to their new circumstances. Thus, agents are adaptive, and as Simon said, they “satisfice” rather than maximizing utility (Simon, 1956). They may guide their behavior by various rules or principles that have been effective in the past when the economy changed slowly, but they may also abandon these rules or principles and adopt others, but when it changes more dramatically.¹¹

Thus, economic agents – and individuals – change with the passage of time just as the economy changes with the passage of time, and consequently they need to be seen to be socially and historically embedded. Indeed, the economies they occupy are not just market processes, but social systems with inherited institutional, legal, and cultural characteristics that make it far from “a trivial matter to infer the properties of the whole” associated with entire economies. These are the entry points of complexity modeling as an open science practice with a view from somewhere understanding of economics as an objective science.

b Mixed Methods Methodological Analysis and Economics’ Relationships with Other Disciplines

I treat mixed methods methodological analysis and economics’ relations to other disciplines together because they tend to go hand-in-hand when we contrast open and closed conceptions of science in economics. Mainstream economics and other social sciences, then, clearly differ in regard to both the scientific methods they employ and in their respective degrees of openness to methods employed in each other. Other social sciences have adopted some of economics’ quantitative methods, but economics has adopted few of other social sciences’ methods. Instead, mainstream economics in the postwar period has increased its reliance on mathematical formalization as a method of representation and investigation, and has all but given up the qualitative methods it shared with other social sciences before the war.

To take methods of analysis first, mixed methods research is a methodologically pluralist, pragmatic approach to scientific investigation that combines different quantitative and qualitative methods – for example, surveys and numerical data – in the collection of evidence,

¹¹ This adjustment in decision rules is excellently demonstrated in the Santa Fe artificial stock market analysis (see Palmer et al., 1999).

its analysis, and in the development of theory (Starr, 2014). The main rationale for mixed methods research is that increasing the kinds of evidence and thus the means of analysis sciences employ increases their investigative capacities and reduces the risk that theories are built upon only one, possibly limited source of evidence. Since having different kinds of evidence that different methods produce usually does not generate sharp theoretical inferences, mixed methods research offers a different strategy for theory elaboration. In effect, it creates a forum for theory development in which the contributions of different types of evidence are evaluated and debated in terms of their different theoretical implications. This makes the relationship between evidence and theory open-ended and allows for a continual comparison of entry points and theoretical outcomes.

How, then, does science actually proceed on this more open basis? One influential view draws on the metaphor of triangulation. Should different methods produce a collection of similar theoretical results, this gives further direction regarding what sorts of theories should be investigated (Denzin, 1970; Downward and Mearman, 2007). To put this in terms of the epistemological basis of open science (Table 1.1), the evidence produced by different methods and the theory possibilities they generate reflexively determine one another. To put this in terms of the modeling characteristics of open science (Table 1.2), this calls for a complexity modeling approach that combines different kinds of evidence that (as Simon put it) “interact in a nonsimple way.”¹²

In contrast, in mainstream economics’ closed science terms, its essentialist epistemological basis (Table 1.1) combined with its reductionist type of modeling (Table 1.2) limits its methodological form of analysis almost exclusively to mathematical formalization. This tends to reinforce its existing theoretical commitments, since placing research weight on further refinements in formalizing theory limits the possible impact that other methods of investigation might have on the interpretation of theory. Thus, the tension between evidence and theory whereby empirical entry points and theory continually act upon and change one another is eliminated.

¹² Models, then, are analogous to recipes in which different types of ingredients are combined according to one’s explanatory goals rather than some pre-given logical template (Boumans, 1999).

We can distinguish these two science visions according to whether their principle motivation is the representation of ideas or the discovery of new ideas (Schickore, 2018). In the philosophy of science, there is a long-standing distinction between the context of justification and context of discovery (Reichenbach, 1938). Both are part of science, with discovery a constant source of scientific advance and justification a registering and organizing of what that advance is believed to involve. Yet, the specific set of practices a science adopts can tip the balance between the two either toward building existing theory or developing new theory. Emphasis on mixed methods favors the latter; mathematical modeling favors the former.¹³

When we now consider disciplines' relationships to other sciences, we see that when a science borrows from other sciences which uses different methods of investigation, this influences the kinds of evidence it incorporates and thus the weight it places on discovery. Further, since the different methods that different sciences employ reflect the different kinds of phenomena they investigate, borrowing methods from one another also introduces "new" phenomena into a science. This makes its evidence–theory relationship more open-ended. In terms of the Table 1.1 contrast between open and closed conceptions of science, its form of development is dynamic and two-way when it borrows from other sciences rather than static and one-way when it is reluctant to do so.

This is a way to look at the recent uneven rise of heuristics and biases behavioral thinking in economics. The "new" phenomena economics has begun to borrow from psychology – behaviors that have reference points and are influenced by the context of choice – have been described as choice "anomalies" because they do not fit the reductionist modeling method rational choice theory employs. These "new" phenomena have in many cases been introduced through experiments that as a nonstandard method also still have a relatively limited place in mainstream economics. Thus, it can be argued that its closed view from nowhere conception of science acts as a barrier to its further development limiting the role of behavioral thinking in economics. This may change in the future as the overall impact of

¹³ One way to think about the tension between discovery and justification that builds on Reichenbach is to say "science in the making" is inherently "messy" while the job of philosophy is to replace that thinking with a more ordered account of what it achieves (Schickore, 2020, pp. 484–485).

new kinds of evidence introduced into economics changes it. Yet, this would put at risk its idea that choice is rational with the deep essentialist epistemological basis and the *Homo economicus* view of the individual this relies on. Thus, it is also possible that the mainstream view will ultimately simply be superseded by a new sort of economics with different epistemological foundations and practices. This recalls the question of whether mainstream economics might be a science bubble. Before turning to that question, however, Section c discusses the mainstream's "value neutrality" practice.

c "Value Neutrality" versus Expanding Economics' Value Spectrum

"Value neutrality" as a practice identifying acceptable types of modeling bars ethical or normative values on the grounds that objectivity in economics requires it be positive and free of such values. Even welfare economics and efficiency judgments can be seen to be nonnormative if taken only to register different possible states of affairs and not engage their normative content. Of course, economists say welfare and efficiency ought to be promoted, but for most this only implies people's preferences should be satisfied, because this is seen as descriptive of the behavior people are said to have. Thus, preference satisfaction in itself has no ethical content.¹⁴

Yet, preferences are still values, so "value neutrality" also means that out of the wide array of human values only the preference value concept should be included in economics. This combination of exclusion of other kinds of values and reduction of the value concept to the preference concept is important to framing the mainstream's essentialist, closed science view from nowhere terms. Further, as a practice "value neutrality" also has a special status compared to these other three practices. Reductionist modeling, formalization, and limiting relationships to other disciplines concern how economics is done, but "value neutrality" concerns what it is about. Thus, one could give up *Homo economicus* and still maintain these other three practices, but if one gave up *Homo economicus* and adopted a richer conception

¹⁴ Indeed, the theory ignores the difference between "bad" preferences – immoral, cruel, violent, self-harming, etc. – and "good" ones. This is where the neutrality idea gets its meaning.

of the person it is unlikely one would be able to maintain “value neutrality.” That is, “value neutrality” is both necessary to the *Homo economicus* doctrine and also an implication of it. Thus, while these other three practices have fairly wide scientific use, the mainstream’s essentialist reduction of all value to preference and its exclusion of millennia of thinking about the diversity of human values is exceptional in social science. What could possibly justify this?

For Aristotle, essentialism was simply a fundamental philosophical mistake and manifestation of intellectual *hubris*. He saw Plato’s transcendent forms as an excess and exaggeration of philosophical thinking about science that blinds us from seeing the phenomena science investigates, and that elevates an elite group of “philosopher king” scientists who say what we can and cannot see. In modern philosophy, the later Wittgenstein also criticized his earlier essentialism and saw it as a fundamental error in and abuse of philosophical thinking. He attributed it to an almost religious predisposition people have to believe something simple is always “hidden” beneath the multiplicity of phenomena. His advice, then, was rather than start by asking what is “common” behind all the instances of something being investigated, look instead to see what their many interrelationships were.

Don’t say: ‘There *must* be something common ... but *look and see* whether there is anything common at all. – For if you look at them you will not see something that is common to *all*, but similarities, relationships, and a whole series of them at that ... a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities, sometimes similarities of detail. (Wittgenstein, 1953, para. 66)

What, then, might we see when we examine the “complicated network of similarities overlapping and criss-crossing” in the wide array of human values? And, if “value neutrality” is required for *Homo economicus*, what does making the wide array of human values central to economics imply about what individuals are? I suggest three things.

First, given the wide array of human values reflects the multiplicity of human social relationships. People should be seen to be social beings with a variety of social identities, not asocial, atomistic bundles of preferences whose connection to one another is mechanically through markets. Second, just as people’s social relationships can conflict, so their various values can conflict, in contrast to how the axiomatic interpretation of preferences makes people’s preferences logically

consistent and ensures smooth substitutions on indifference curves. Third, despite the mainstream's effort to exclude ethical values from economics, an inspection of human history shows that ethical reasoning and debate over what people ought to do is pervasive and a fundamental aspect of people's behavior, economic and otherwise.

Yet, if mainstream economics is as removed from the social world as these points imply, if people are socially and historically embedded individuals rather than utility maximizing *Homo economicus* ones, and if at root of all this is the mainstream's essentialist view from nowhere conception of economics as a science, might mainstream economics be science bubble? I turn to this question.

3 Might Mainstream Economics Be a Science Bubble?

I previously addressed this question using a financial market boom-bust model (Davis, 2017b). Here, I begin by framing that argument in a broad philosophy of science perspective that draws on the history of science and its record of successes and failures. The idea, then, that a science could be like a bubble is suggested by Thomas Kuhn's famous scientific revolutions view (1962/1970). He argued sciences are built upon paradigmatic foundations – idealized conceptual structures – but these foundations are often only weakly constructed and can thus be fragile. Scientific knowledge thus accumulates over time across paradigms, each of which at the time of its development produces one limited vision of that accumulating knowledge.

The history of science shows, then, that successful science paradigms have been consistently abandoned and replaced when new paradigms were constructed upon new foundations. A short list of superseded theories includes in astronomy, the Ptolemaic geocentric theory of the universe and the nebular hypothesis of the solar system's origin; in biology, spontaneous generation, Lamarckism, Mendelian genetics, and recapitulation theory (ontogeny recapitulates phylogeny); in chemistry, alchemy, caloric theory, and phlogiston theory; in physics, Aristotelian theory, Newtonian classical mechanics, and a long list of atomic theories; in geography, flat earth theory, and expanding and contracting earth theories; in psychology, phrenology, and stimulus–response behaviorism. All were thought correct and widely held at one time.

Kuhn did not explain either what fragility in a science's foundations involves or what precipitates their examination and abandonment.

Karl Popper (1959; 1934) had earlier argued that the claims of science are always fallible and potentially subject to falsification should they be contradicted by empirical evidence. However, when empirical evidence was sufficient to do this was unclear since sciences employ a variety of auxiliary assumptions that can be adjusted to protect them from seemingly falsifying evidence. Imre Lakatos (1970) consequently argued that scientific research programs could always insulate their key propositions, their “hard cores,” to withstand empirical refutation. Thus perhaps paradoxically, a science could possess fragile conceptual foundations and still endure for long periods of time – though as the history of science shows still ultimately fail were those foundations weak. In effect, such approaches are like science bubbles, exhibiting dramatic expansion in a scientific community but also vulnerable to a collapse in support. What, then, might explain the dynamic by which they survive for a time and then finally fail?

Since bubbles were originally associated with financial phenomena where in many examples in history questionable assumptions prevailed for a period of time only to later fail, often spectacularly, we can look to financial bubbles to model this dynamic of survival and failure. The model that the well-known financier George Soros developed is particularly interesting, because he studied under Popper, adopted Popper’s fallibility principle, and added a reflexivity or feedback mechanism principle to produce a dynamic of adoption and abandonment of an investment. Thus, he described a financial bubble as a boom-bust process in which a positive feedback upswing phase in an investment proceeds for a time under a “misconception” regarding the merits of that investment until it comes to be seen as such, after which that investment comes to be seen as over-valued, a negative feedback disinvestment downswing phase takes over, the investment collapses, and the bubble breaks (Soros, 2013).¹⁵

If mainstream economics, then, is a science bubble, and investment in mainstream principles has the same sort of historical dynamic, roughly the first half of the twentieth century through the 1970s can be seen as a period of continued investment by economists in the foundations of mainstream thinking – equivalent to a positive feedback boom

¹⁵ This very highly cited paper appeared in a special issue of the *Journal of Economic Methodology* in which other papers in the issue discussed its methodological meaning and significance.

phase – and the time since then with the appearance of new research programs in economics that contest many fundamental mainstream assumptions (see Colander, Holt, and Rosser, 2006) can be seen as the beginning of a period of increasing disinvestment by economists in those foundations – equivalent to negative feedback bust phase. The “belief reversal” this involves (Davis, 2020a) depends on it being recognized that some “misconception” underlies the assumptions that gave rise to the boom phase. What might that “misconception” be?

What I previously argued (Davis, 2017b) is that mainstream economics’ chief “misconception” is that it treats economics as if it is a natural rather than a social science. The mainstream view from nowhere conception of economics’ objectivity, then, would provide a further interpretation of this natural science “misconception” in that it associates economists’ purported posture of disinterestedness with “value neutrality” as a scientific practice. Thus, if the boom-bust model tells us something about mainstream economics, we need to look for evidence that there exists the beginning of a negative feedback disinvestment bust phase motivated by the conviction that it is a “misconception” that economics is like a natural science and in particular by its commitment to “value neutrality” as a scientific practice.¹⁶

Consider, specifically, the 1980s emergence of heuristics and biases behavioral economics, often seen as one of the most significant developments in recent economics. Its key assumption is that people’s environments influence their choices, or that the context of choice and its reference points matter (Kahneman and Tversky, 1979). Thus, research in this scientific program investigates the many ways in which *how* people make choices influences *what* choices they make – a view from somewhere conception of economics that rejects the mainstream’s view from nowhere understanding of pure choice theory built upon a set of abstract axioms governing preferences – most importantly the independence axioms.

Many mainstream economists would no doubt hesitate to say “we’re all behavioral economists now” (Angner, 2019), yet the rapid growth of behavioral reasoning in economics can nonetheless be seen as a process of disinvestment in the fundamental “hard core” principles

¹⁶ In Davis (2020a), I associate this negative feedback disinvestment process with belief reversals seen as phase transitions on the order of “Minsky moments” in a complexity theory approach with reflexive agents.

of mainstream economics, and as a negative feedback bust phase that regards it as a “misconception” that economics is essentially a natural science. Indeed, when the context of choice matters, people’s values matter and thus “value neutrality” becomes untenable. Yet if “value neutrality” is untenable, so also is the “hard core” lynchpin of mainstream theory, *Homo economicus*. When context of choice matters and people’s values matter, people cannot be seen as socially and historically *unembedded* individuals.

Most mainstream economists of course do not concern themselves with methodological and historical arguments such as this. In the past, economists were not reluctant to make claims about the foundations of postwar economics, but now few comment on the state of economics or participate in the increasing number of debates about whether there is change in economics. At the same time, a large recent survey of economists’ opinions about the state of economics captures considerable ambivalence regarding its direction and character (Andre and Falk, 2021). Perhaps, uncertainty about the state of economics is a sign of concern about possible coming change.

This is one way to understand the recent “empirical turn” in economics (Hamermesh, 2013; Angrist et al., 2017). Data-driven research, innovation in statistical econometric techniques, case-specific experimentalism, etc., can all be pursued without making explicit or even thinking about one’s theoretical commitments, so if confidence in the foundations of mainstream economics has declined, the whole subject can be avoided while still recognizing the existence of “change” in economics. Yet, given the oligopolistic structure of the economics profession (Fourcade et al., 2015; Heckman and Moktam, 2020; Hoover and Svorenčík, 2023), it is also possible to say that long-standing theoretical commitments in mainstream economics may continue to survive in unexamined fashion – Kuhn’s fragility thesis.

Note that one thing the failed, superseded sciences listed above arguably shared was an essentialism about collections of “hard core” principles that could not be overturned by evidence the phenomena might provide. That is, as effectively view from nowhere closed science approaches, they built fragility into their practices. That commitment to essentialism that I have argued is central to mainstream economics’ conception of economics as an objective science could then become the last disinvestment in the mainstream paradigm.