Turowski, Krzysztof. 2026. "Book Review: *The Tangle of Science: Reliability Beyond Method, Rigour, and Objectivity*." *Quarterly Journal of Austrian Economics* 29 (1): 76–83.
https://doi.org/10.35297/001c.157645.

BOOK REVIEWS

Book Review: *The Tangle of Science: Reliability Beyond Method, Rigour, and Objectivity*

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JEL Classifications: B41 Economic Methodology, B53 Austrian, Y30 Book Reviews (unclassified)

https://doi.org/10.35297/001c.157645

Quarterly Journal of Austrian Economics

Vol. 29, Issue 1, 2026

The Tangle of Science: Reliability Beyond Method, Rigour, and Objectivity
Nancy Cartwright, Jeremy Hardie, Eleonora Montuschi, Matthew Soleiman, and Ann C. Thresher
Oxford University Press, 2022; xii + 272 pp.

Although Nancy Cartwright, one of the most eminent contemporary philosophers of science, is deeply engaged in methodological discussions of economics (e.g., in Cartwright 2007), it may be surprising to find a review of one of her works in a journal devoted to Austrian economics. Indeed, Cartwright often referred to Otto Neurath, the famous logical empiricist and the main target of Ludwig von Mises's 1920 essay (Mises 1990) that introduced the famous calculation argument, as one of her intellectual heroes (e.g., Cartwright 1999, 124; 2008, 118; see also Cartwright et al. 2008). And despite her overall engagement with the philosophy of economics, she has touched on the ideas of the Austrian school only tangentially, comparing the methodological views of Carl Menger and John Stuart Mill once (Cartwright 1994).[1] Thus, a question naturally arises: What can an Austrian learn from a philosophical perspective so seemingly completely alien to ours?

Moreover, it has been said of Cartwright that her mode of argumentation is quite original and can be described briefly as "Here are some phenomena. Try looking at them this way" (Kitcher 2023, 88). Readers familiar with the Austrian school's methodological works and the comprehensive, systematic approach of economists like Mises and Murray Rothbard may find Cartwright's perspective widely divergent. Her style differs markedly in its focus and scope, and that itself can pose a challenge for those used to a more unified framework. Yet, surprisingly, there is a lot to learn, not only by

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1 Interestingly, in that article she hinted at several issues that were overlooked by more "insider" readers of Menger and that have recently been elaborated at length (e.g., in Scheall 2022; Slenzok 2023; Turowski 2023; Slenzok and Turowski 2025).

contrast to, but also in agreement with Cartwright. And her newest book, *The Tangle of Science*, coauthored with four other philosophers of science, provides us with numerous examples supporting this claim.

It does not diminish the creative input of the other authors, often clearly responsible for particular ingenious arguments, to assert that Cartwright sets the overall vision for the project. And it is important to view the book as part of a larger philosophical project that she has outlined in previous books. For her, science is a multifaceted enterprise, not confined only to theories and experiments, but also including "bridging principles, models, classification schemes, methods (innumerably many across the sciences), practices, concept development and validation, measures, evaluations, devices and materials, model organisms, statistical analyses and other applications of mathematics, including approximation techniques, data curation, classification, and dissemination, narratives etc." (Cartwright et al. 2022, 46). In this view one also does not regard knowledge and explanation as the sole aims of science, but instead emphasizes their relativity, often in connection with practical concerns and applications. Moreover, science does not depict a unified reality as its object, but rather reveals to us a "dappled world," that is, the one that is intelligible to us, but with "a vast variety of features, most of which cannot be captured under concepts that could be regimented into systems of relations and measurement procedures that look anything like those of modern mathematical theories in physics" (Cartwright 2022, 166). This pluralist vision, combined with a distaste for the formal rigor especially identified with pure mathematical formalism, statistics, and protocols such as randomized controlled trials,[2] forms the Cartwrightian framework in which the book analyzes the particular philosophical questions.

The main question of *Tangle of Science* is why science is so remarkably reliable in practice, and what underwrites that reliability. The answer provided by Cartwright and her coauthors comes in three parts. First, they dispense with three traditional answers: scientific method, rigor, and objectivity. Next, they outline their own answer, which connects the reliability to the titular tangle, that is, the "rich interwoven net of scientific creations that constrain and support each other—the concurrent, mutually feeding back and forth, developing network of ideas, concepts, theories, experiments, measures, bridge principles, models, methods of inference, research traditions, data and narratives, etc. etc. that make up a scientific endeavour, with its long tentacles out into other similarly rich tangles that it rests on and that can in turn rest on ingredients from it" (Cartwright et al. 2022, 5). Finally, they illustrate their claims using a range of case studies from different sciences, such as physics

2 Also heavily used in economics—for example, by 2019 Nobel Prize winners Abhijit Banerjee, Esther Duflo, and Michael Kremer.

(gravitational waves)[3] and political science (democratic peace). Unfortunately, they include virtually no examples from economics apart from a few sparse mentions of the construction of price indices (48–49, 112).

Indeed, from an Austrian perspective some of these claims may sound at once congenial and deeply erroneous. In one sense, they mirror the Hayekian critique of scientism understood as the belief that there is a single method of science, often identified with the method of the natural sciences, that is the most successful and most technology conducive. The authors push the argument further, shifting attention away from the idea of a single, universal scientific method and instead arguing that justificatory work actually depends on a plurality of context-specific methods and practices, woven together into the background tangle of local knowledge, practices, instruments, models, and norms, and not on a single, high-level recipe for success. As they also emphasize, general methodological remarks are usually vague enough that they do not indicate how to conduct research (22). For an Austrian acquainted with praxeology as the method of economics (or rather, the method of *theoretical* economics) (Rothbard 1976), that might sound like the manifesto of a pluralist-relativist, in which many methods are on a par at the outset. Yet there is a sense in which the authors are right. It was Carl Menger (1985, 27) who pointed out that "between the establishment of a methodology and the satisfactory development of a science there is an immeasurable gap which only the genius of its scholars can bridge over."

And indeed, one economist imbued with a proper methodology might be completely barren, just repeating old claims, whereas another, even if working from more dubious assumptions, might make more progress. The advantage of the former is his ability to sift through the errors of the latter ex post. One may note in passing that this was exactly the approach practiced by Rothbard. Instead of simply discarding up front the particular theories of various economists as methodologically unsound, he tackled their economic reasoning in order either to assimilate it into the corpus of Austrian economics (as he did with Frank A. Fetter's theory of rent) or to uncover its particular flaws and omissions (e.g., in case of non-Austrian theoretical explanations of business cycles).

Similarly, rigor illustrated, for example, by the formal probabilistic properties of randomized controlled trials fares no better, since we are interested in the extrapolation of results beyond the carefully controlled study population (e.g., to other institutional environments). And one can add to this from an Austrian viewpoint that infatuation with mathematics can also mislead one into reifying convenient mathematical properties as economically meaningful ones, or into discarding those economic topics minimally amenable to

3 Curiously enough, this chapter was placed as the sole appendix instead of being a regular chapter.

mathematical treatment (e.g., entrepreneurship). In practice, analyses hinge on the particular institutional framework and a proper thymological assessment of the relevant factors in play.

It is also hard not to agree on a certain level with another Cartwrightian claim: that the proper level of description also often depends on the aim at hand. To use an example: We may concede that sometimes a simplification of production goods into giant blobs of "labor" L and "capital" K may be acceptable to explain some general phenomena without invoking the principles of methodological individualism, subjectivism, or the time dimension of production. On the other hand, we know this is highly unsuitable, for example, in the analysis of business cycles, as it abstracts from the whole structure of relative prices and interest rates, among other important aspects. However, it is often sufficient to use a less-crude simplification, such as the Hayekian triangle, to convey the logic of a particular economic process. It is not necessary to have a complete structure down to single goods which are divisible further only into homogeneous units, or to include a richer institutional structure (e.g., the financial sector), or to depict complex dependencies between industries. Yet if we want to explain any particular business cycle event, it is probably necessary to fill in these blanks. And to be fully convincing to a broader public, we would need not only a coherent, properly grounded theory, but also ways to assess the relevance of the factors illustrated by observed empirical facts and economic statistics. If we turn to the analyses of historical business cycles (Rothbard [1963] 2000; Newman 2015; 2016), we indeed see Austrians working in that fashion—and there is no reason to avoid regressions or fancy modeling techniques, provided they are interpreted through a proper theoretical lens.

Cartwright et al. (2022, 6–7) distinguish the three main features of the virtuous tangle: It should be "rich (there are lots of pieces and of many different kinds), the pieces are entangled (the pieces relate to each other and to the product in a variety of different ways, and these are the 'right' ways for the job), and long-tailed (the pieces figure in support tangles for other scientific products in other domains that are succeeding at other difficult jobs, including successful interactions with the empirical world)."

These requirements sound pretty natural to an Austrian: The first two could be illustrated most notably by Rothbard's ([1963] 2000) *America's Great Depression*, a landmark case study providing a theoretical explanation, descriptions of groups of interest, a selection of notable political facts, and tables with macroeconomic statistics, all combined in a unified narrative concerning an important historical episode. And the third naturally follows from the claim that economics is one among many sciences about human action (Rothbard [1962] 2004, 74). One can point, for example, to a great deal of public choice research (James Buchanan, Gordon Tullock, Richard

Wagner) or certain strands of sociology (Alfred Schütz, Raymond Boudon) which, for the most part, share the same set of research tools with Austrian economics.

One could charge this review with advocating some sort of Austro-punkism (Salerno 2009), conflating sound Austrian school methodology with fashionable external—and completely alien—philosophical ideas. But that depends on how far one goes with the authors in their pluralistic and nonfoundationalist perspective. One also does not need to put much emphasis on such products of science as indices,[4] and can still retain the primacy of theory while acknowledging that scientific advancement may be a convoluted process, including rethinking the conceptual framework.[5] Or one can just assess that the theory development within the Austrian school is so advanced that the highest marginal advantages lie elsewhere, in building an "Austrian virtuous tangle": doing historical case studies and institutional research, reappraising recent mainstream works in light of Austrian theories, or even working on Austrian-informed formal models or statistical analyses of various sorts.[6]

One also does not need to drop truth in favor of reliability as a scientific principle (Cartwright et al. 2022, 8). The latter may be too weak a requirement in certain areas. Even a perfect agreement on economic data (or rather, as Deirdre McCloskey likes to call them, "capta") and indices would be insufficient to explain a crisis unequivocally beyond a reasonable doubt, as one can point to myriad accidental causes, ranging from regulations and power politics to changes in international trade flows—and always get away with one's preferred theory. Truth as a property may be limited to theories and propositions, but that is a reason to discuss them separately from other products of science—and issues related, for example, to the ceteris paribus clause should not turn our eyes from this. Similarly, it may be pointed out that by regarding theories as merely one type among many products of science, the authors lose an important distinction between theory and history—even if they are right that the application of theories is never a straightforward, off-the-shelf move.

Unfortunately, the major drawback of the book is its impressionistic style of writing. Sometimes the presented arguments are only sketched, and the examples are presented in rather uneven lengths. The book conveys its main ideas, presenting them forcefully through stylized examples, but may leave

4 Though it is worth noting that one of the more interesting debates over the validity of Austrian business cycle theory as an explanation of the Great Depression included a lengthy discussion of what the money supply consists of. See Salerno (1999; 2000) and Timberlake (2000).

5 One can think of bitcoin as an impulse to rethink, for example, what nonmonetary uses are necessary for a currency's monetary regression to hold.

6 As examples of the first two approaches, one can point to works of Łukasz Jasiński on the US market for medical services (Jasiński 2021; 2023; 2025), Alicja Sielska on the wage gap (Sielska 2023), and Mateusz Machaj on the quantity theory of money and the post-COVID inflation surge (Machaj 2024).

the Austrian reader wondering at the most interesting moment: Is such a perspective really as good and as fruitful in particular cases as the authors claim it to be? This remains an open question. Overall, the Cartwright et al. perspective is illuminating and worthwhile, though not wholly convincing. The book succeeds in shedding light on often-neglected facets of scientific practice, but for Austrian readers it serves rather to complete the methodological landscape than to paint it anew.

Submitted: November 26, 2025 CDT. Accepted: December 29, 2025 CDT. Published: February 20, 2026 CDT.

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