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Russo, F.

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BOOK REVIEWS

Kevin C. Elliott and Ted Richards, eds. *Exploring Inductive Risk: Case Studies of Values in Science*. New York: Oxford University Press, 2017. Pp. xiv+277. \$99.00 (cloth); \$40.00 (paper).

Inductive risk is typically defined as the chance or possibility of getting it wrong, because of the inductive character of the inferences made in scientific or policy settings. This is a topic in philosophy of science that was raised in a seminal paper of Carl Gustav Hempel written in 1960 and that has recently regained due attention. The revival of inductive risk in contemporary philosophy of science is mainly owing to the valiant work of Heather E. Douglas in *Science, Policy, and the Value-Free Ideal* (Pittsburgh: University of Pittsburgh Press, 2009). *Exploring Inductive Risk* is a valuable contribution to this line of research: it provides a useful introduction to the topic, discusses a number of specific topics for which inductive risks are relevant, and lays out paths for future research. All in all, the volume is valuable both to specialist readers and to novices. The editors, Kevin C. Elliott and Ted Richards, deserve much praise for putting together a coherent, informative, and thought-provoking collection of papers.

Elliott and Richards gather papers that are thematically organized. They present, in the introductory chapter, the rationale behind the organization and order of the contributions, together with a synopsis of each paper. Overall, the reader gets the consistent message that inductive risks are pervasive and in need of thorough analysis. The editors, initiators of this editorial project, cunningly use the occasion to introduce the topic, its historical roots, and its relevance in contemporary scientific practice. Each chapter emphasizes some specific aspects of inductive risks, but all concur to this main message.

Following their very same order, here are some (brief) highlights. The first part, "Weighing Inductive Risk," includes a contribution on inductive risk in drug regulation (by Jacob Stegenga) and one on high-energy physics (by Kent W. Staley); while drug regulation is a field in which it is difficult to deny the presence of inductive risks, Staley makes a convincing case that even areas

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that we think less prone to value-judgment mistakes are instead so. The second part, “Evading Inductive Risk,” presents three cases problematizing the question whether inductive risks pertain to scientists’ or policy makers’ judgment. Each paper covers a different area: dual-use research and the case of the genetic modification of the H₅N₁ virus (by David B. Resnik), climate science and specifically the way the Intergovernmental Panel on Climate Change (IPCC) works, and how climate is modeled (respectively, by David M. Frank and by Joyce C. Havstad and Matthew J. Brown). The third part, “The Breadth of Inductive Risks,” contains papers, as the title suggests, that aim to expand on Douglas’s original proposal. One contribution (by Robin Andreasen and Heather Doty) examines studies in gender and racial inequities and analyzes the points in the scientific process at which inductive risks arise; another paper (by Anya Plutynski) looks at mammography screening programs, putting into question a number of choices made by scientists in planning and assessing such programs; the third paper in this part (by Roger Stanev) examines a number methodological aspects in cardiovascular trials and leading to inductive risks; the last paper in this part (by Robyn Bluhm) discusses inductive risks in trials not so much related to the conclusions one draws but to choices one makes at the design stage. Two papers compose the fourth and last part, “Exploring the Limits of Inductive Risks.” The first, by Justin Biddle and Rebecca Kukla, take issue with theoretical aspects of Douglas’s original position; specifically, they propose a categorization of risks that may arise in scientific research, one in which inductive risks receive a much narrower definition. Instead, using a case study on atrazine (an endocrine disruptor), Jack Power argues in favour of the Hempelian characterization of inductive risks. The editors conclude the book with a chapter that sketches what they believe are the important lines of research to be developed in the future.

There is no question that all the papers in the volume have been written with great competence both about the science they discuss and about the philosophy they develop. It is worth noting that the main concept—inductive risk—is multiply defined in the volume. This is at the same time an advantage and a limitation of the book. The editors provide, in the introduction, a thorough contextualization of inductive risk, from its first discussions in the 1960s until the recent debates after Douglas’s contribution. Then, each chapter starts by explaining what inductive risk is. The advantage is that chapters can be read independently, as the reader does not miss important information contained elsewhere. The disadvantage is that, reading the book cover to cover, one may experience quite a lot of repetition. And yet, while the main references and contributions to inductive risk consistently recur, I found it informative to see how each chapter provided a slightly different reconstruction of the state of the art.

At times, new references or side debates were mentioned, tailored to the specific questions asked and case studies analyzed—so in the end, repetition bears, in this case at least, an extra advantage, and the result is a very rich volume.

I am not aware of another book that assembles in one place such an informative introduction to the problem of inductive risk and so many cutting-edge discussions on the topic. In this sense the book serves an important role in the debate in philosophy of science, but also in other fields that are likely to be concerned about inductive risk. Nevertheless, as the book does not have the pretension to cover all areas in which arguments from inductive risk are important, relevant, or urgent to address, there is much space left for the community to build on these arguments and take the debate further.

Given the high level of engagement with the practice of the sciences, one might wonder how such a book might get the attention of scientists and policy makers. It was remarkable that several chapters, after providing informed and thorough descriptions of specific scientific practices, and showing the critical points at which inductive risk arises, often glossed by saying something along the lines of “this is not to say that this is bad science but . . .” This was repeated often enough for me to notice, and it prompted two types of consideration.

The first is about the threshold between the degree of conceptualization needed and the direct application to specific case studies. How refined, clean, and polished should an account of inductive risk be before we get scientists and policy makers in the discussion? This question arose in my mind especially while reading the last part of the book, in which the limitation to the ‘standard view’ on inductive risk is discussed. In fact, despite all the idiosyncrasies, the chapters in earlier parts of the book seem instead to share a common understanding of inductive risk, from which they build specific analyses of case studies. I do not think the problem is confined to the concept of inductive risk, though; one may in fact ask the very same question when working out a conceptualization of, say, causality, mechanism, or evidence that suits science in practice.

The second is more general, and it concerns the role of philosophy in the discussion of science and scientific method. This is clearly a *vexata quaestio* and again not specific to the inductive risk debate. While I did appreciate the respect these commentators showed for the science they were analyzing, I was left wondering what these philosophical discussions were practically contributing to lowering inductive risk in the cases under consideration. Should we—in more general terms—strive for a philosophy of science that is ipso facto more normative?

These are clearly open questions, and attitudes are likely to differ among members of the community. Reading this rich and inspiring collection was,

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for me, another occasion to reflect on these issues while learning a lot about the philosophy of inductive risk.

Federica Russo, *University of Amsterdam*