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# Review of Nicholas Bardsley, Robin Cubitt, Graham Loomes, Peter Moffatt, Chris Starmer, and Robert Sugden's *Experimental economics: rethinking the rules*. Princeton: Princeton University Press, 2009, 384 pp.

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Experimental economics has brought about the most extraordinary changes to economics. Not so long ago the economics profession simply could not see the purpose or relevance of laboratory experiments, but over the past thirty years their number has grown continuously and experimental economics has become one of the most exciting fields of economics.

As is often the case with new areas of research, methodological reflection has lagged behind the rapid growth in, and the various applications of, experimental tools and results. Methodological debate may have been further restrained by the strong scepticism toward laboratory experimentation in economics: experimental economists may have felt they had to wait for more favourable timing to openly address legitimate critiques and acknowledge the limitations of the experimental method.

Now that experimental economics is firmly established, the time is ripe for experimental economists to finally address fundamental methodological issues, or else risk prematurely consolidating their methodological conventions around insufficiently debated and scrutinised rules. This concern is the driving force behind *Experimental economics: rethinking the rules* (*EE*). As the subtitle of the collective enterprise suggests, *EE* sets out to offer a critical assessment of the rules of experimental economics, built on the work and reflections of six highly regarded and experienced experimental economists.

This is not to say that readers will come away thinking that experimental economics is an uncontroversial field of research. While a set of common practices can be identified around well-defined and well-established principles and procedures, methodological disputes between practising experimental economists do exist which at times imply more fundamental divergences about the attributes of economics

experiments and what can be learned from them. After reviewing the main methodological tenets of experimental economics, the authors indeed conclude that "none of them should be accepted uncritically as part of 'the' methodology of experimental economics" (Bardsley, et al. 2009, 333). That experimental economics does not have a unified and uncontroversial set of methodological rules is not taken as problematic. The authors convincingly argue that experimental economics benefits from a flexible set of rules, which allows experimental designs to be tailored to the objectives of investigation. This is the key message of *EE* and, in my view, the major contribution of this collective endeavour.

*EE* brings together the various methodological reflections its authors have produced in recent years, resulting in a comprehensive and up-to-date account of experimental investigation in economics. The distinction between the use of experiments as tests of theories and the pervasive, but unacknowledged and unaddressed, use of experiments as tools for investigating empirical regularities organizes the book. Both issues raise specific methodological issues which are addressed in detail. While the use of experiments as tests of theory calls for closer examination of the relation between experiment and theory (chapters 2 and 3), the use of experiments as tools for investigating empirical regularities requires more careful analysis of the relation between the laboratory and the real world environment to which empirical observations potentially apply: the 'external validity' of economics experiments (chapters 4 and 5). Two additional topics are discussed in separate chapters: the use of task-related incentives to induce economic motives in experimental subjects, probably the most rigid convention of experimental economics (chapter 6); and the statistical analysis of experimental data, perhaps the most neglected issue in methodological discussions (chapter 7). *EE* presents the major methodological questions pertaining to experimental practice in a clear and accessible way, illustrating the issues at stake with various case-studies from experimental economics while offering the authors' position on ongoing debates, except when the authors fail to obtain a consensus position among themselves, providing further evidence of the contentious nature of experimental economics.

Economics experiments have been prolific in generating so-called 'anomalies', i.e., patterns of judgment and choice that are inconsistent with the traditional model of utility maximisation and the neoclassical assumptions of unbounded rationality, unbounded self-interest, and unbounded willpower. Economists have since introduced amendments

to standard rational choice theory to account for such observed behaviour, for example by introducing revisions to the axioms of expected utility theory to make the demands of rationality less stringent, or by introducing other-regarding motives into individual utility functions. A different strategy downplayed the relevance of these results to economic theory, arguing that the experiments that produce the challenging results do not belong to the domain of economic theory: contexts where decision-makers have incentives to deliberate and have opportunities to learn by experience (e.g., Binmore 1999).

Bardsley and his co-authors present a framework for addressing such contentious issues around the implications of experimental tests for theory (pp. 64-71). The goals are twofold: to promote laboratory tests by extending the testing conditions for theory; and to promote adequate interaction between experiment and theory by imposing restrictive conditions on admissible responses to disconfirming tests. The authors argue that any laboratory environment that fits within the "base domain" of an economic theory (defined by the possible phenomena to which an application of the theory seems reasonably unambiguous) should be presumed to provide legitimate testing conditions for that theory (e.g., a theory that refers without qualification to choice under uncertainty is held to apply to any choices experimental subjects make in the laboratory in conditions of uncertainty). Laboratory environments are particularly convenient because they can be purposefully designed to fit within the base domain of relevant theories, establishing a direct correspondence between laboratory constructs (e.g., experimental lotteries) and the formal concepts of the theory (e.g., prospects in expected utility theory).

The laboratory can no longer be expected to offer adequate test conditions if it differs from the "intended domain" of a theory (defined by the phenomena the theory is deemed to predict or explain). For example, tests of equilibrium predictions that specify equilibrating mechanisms, say arbitrage, must implement them, otherwise they fail to belong to the theory's intended domain. But, the authors stress, disconfirming evidence cannot be dismissed by simply pointing out that the laboratory conditions do not fit the intended domain of the theory. Reasons must be given as to why differences between the laboratory and the intended domain of the theory should be relevant, which must be suggestive of new testable hypotheses (p. 77). If empirically supported, defenders of a particular theory must accept the subsequent contraction

of its domain of application. Experimental tests beyond a theory's intended domains are nonetheless encouraged because they allow us to better map and understand the contexts where a theory succeeds and fails. The authors then apply the framework to cases of responses that have downplayed the relevance of disconfirming evidence, pressing economists to carry out these tests and acknowledge the implications of their defences for the domain of application of standard economic theory.

The discussion of theory testing is placed within the framework of the Lakatosian methodology of scientific research programmes (MSRP). Following the descriptive and prescriptive functions of the MSRP, the authors organise experimental work in the larger frame of scientific research programmes, which allows for defining experimental research programmes according to underlying commitments and conventions, and propose the Lakatosian prescriptions for experimental economics. While the authors acknowledge that the performance of research programmes is not and cannot be fully captured by the Lakatosian criteria of theoretical and empirical progress demanding the successful prediction of novel phenomena (pp. 106-114), these standards are taken as generally valid prescriptions to deal with scientists' inevitable a-critical attachment to a set of fundamental presuppositions (a programme's 'hard core'), and thus the risk of scientific communities "slipping slowly from science to prejudice" (p. 139). The authors then analyse research on individual decision-making under risk along these lines, and conclude that "the experimental method has played an effective and positive role in challenging existing theory, and enriching the evidential base against which theories can be judged" (p. 139). And they consider that the effective interplay between theory and experiment is "a common and very positive characteristic of all the major programmes of experimental research in economics" (p. 139).

No doubt the assessment of the role of experiments as tests of theory must focus on the fruitfulness of the dialogue between theory and evidence, and on the role of underlying commitments therein given the well-known difficulties entailed by the Duhem-Quine thesis that undermine the confirming (or disproving) force of empirical tests. However, the appropriateness of the MSRP as a prescriptive framework is problematic for reasons already identified in non-experimental research programmes, such as the arbitrariness involved in the definition of scientific research programmes and the exclusive focus on

'novel facts' to measure scientific progress.[1] Indeed, as the statements quoted above suggest, the authors' appraisal of economics research programmes is based on a somewhat flexible examination of the relation between experiments and theory rather than on a careful and exhaustive identification of the actual novel facts discovered in economics labs.

The insufficiency of the Lakatosian criteria of progress is also patent in the concluding chapter of *EE*, where the overall positive appraisal of experimental research is based on its contribution to the revision of economists' most ingrained beliefs—namely the status of rationality assumptions—which has increased economists' interest in building more realistic models of economic behaviour; and the overall contribution of the experimental method to initiating the transformation of economics into an empirical science (pp. 343-344).

A tension thus informs *EE*. While concerning themselves with economists' long-term attachment to background assumptions, Bardsley and his co-authors do not spell out the detrimental impact that economists' pre-commitments have had on experimental economics. Regarding the conventions of experimental economics, in particular, although on the one hand experimental economics is taken to use an insufficiently debated and scrutinised methodology, on the other hand its practice, both in theory testing and in the investigation of empirical regularities, is deemed to have been fruitful.

It might be argued that the conventions of experimental economics may have been adequate to carry out particular research programmes, but that designs that deviate from these standards have nonetheless been implemented and that it has been the latter which have contributed most to the revision of economists' most ingrained beliefs and to transforming economics into an empirical science. But this claim is not made. One can then but wonder about the urgency of revising experimental economics rules and of the plea for a more methodologically pluralist experimental economics.

Even though early experiments had theory testing as their stated goal, their results inspired the design of novel experiments to explore the new phenomena produced by experimental means. Gradually the discipline started "to treat experimental observations as part of the material that it is to explain", marking a "momentous methodological step" in a discipline that has long been considered as a hypothetico-

[1] See Hands 2001, 286-296, and references therein.

deductive science (p. 167). Economics experiments have in this way acquired a life of their own, generating a list of 'stylized facts' which are now being used as an empirical basis for the (re)construction of economic theory. In sum, experiments have become what Bardsley and co-authors call "exhibits", i.e., replicable experimental designs that reliably produce interesting results (p. 156).

Experimental economics has by now a substantial list of exhibits and associated regularities. As a result of experimental research, economists' practice is thus shifting from highly abstract and formal theorizing towards empirical investigations, which need not be understood in relation to some pre-existing theory and whose results can be organized as experimentally observed robust regularities (p. 195). But while exhibits are more autonomous from economic theory than experimental tests, they must establish a closer relation with the world outside the laboratory. The use of experiments as tools for investigating empirical regularities requires that experimental economists be able to justify the relevance of the regularities observed in the simple and artificial circumstances of the laboratory for improving our understanding of real world phenomena, i.e., the external validity of economics experiments.

This topic has been neglected by the pioneers of experimental economics, who have evaded the issues at stake by focusing on the testing role of experiments. They have claimed, in what *EE* labels the "blame-the theory" argument (p. 155), that the unrealistic features of the laboratory (i.e., the lack of external validity) are ultimately attributable to the theory under test because an experiment must be at least as 'realistic' as any theory is.

Even though the orders of abstraction of economic theory are much higher than those of economics experiments, where experimental participants engage in particularly interesting economic problems, the laboratory is necessarily a simple and artificial social context. The simple and artificial conditions of the laboratory offer particularly convenient circumstances for scientific inquiry because they allow experimenters to manipulate and shield their objects of study from the interference of factors that may have an effect on, but are not part of, the study. In fact, it is the high control that economic experimenters can exert over laboratory conditions that allows them to create situations in the base and intended domains of economic theories and thus to test them. But this control may be problematic in inductive inquiry, for it

may render the laboratory worlds substantially different from real world environments.

Bardsley and co-authors recognize that an economics experiment is a fairly simple and artificial situation and discuss in great detail various types of artificiality (e.g., isolation, omission, contamination, and alteration) and suggest how to circumvent some of them. The artificialities of omission and contamination, for example, are not taken to be particularly problematic because they can be dealt with in experimental design, by adding or eliminating the omitted or the extraneous factor. The artificiality of alteration poses a more difficult challenge, however. While the critiques of isolation, omission, or contamination question the influences of the laboratory on the object of study, the criticism of alteration questions whether the object of study can actually be observed in the laboratory (p. 226).

The authors recognise that the laboratory may be inadequate to study some classes of phenomena. They give the example of relational phenomena, which depend on relations with other phenomena and on people's perceptions that those relationships are satisfied. This is the case for tax compliance and evasion, which evokes a relation between citizens and government permeated by citizenship duties which cannot be recreated in the lab. Even though experiments can never bear on the nature of the relation in question (e.g. citizenship duties), they may still provide some useful insights into these kinds of phenomena. Experiments that replicate the analytical structure of the decision-problem (e.g., requiring subjects to report their endowments on the basis of which they pay experimenters a 'tax') may improve our understanding of the problem-situation (e.g., perceptions about the probability of being caught under-reporting). Thus, while the characteristics of laboratory experimentation constrain the kind of social phenomena that can be investigated by experimental means, the relevance of economics experiments is ultimately an empirical issue and, relying here on the work of Francesco Guala (2005), one that may require establishing the quality of the experimental analogy and checking the similarity between the lab and the real world situations to which experimental results are supposed to apply (pp. 234-235).

But a careful justification for the use of experiments in inductive science is still missing. Bardsley and co-authors do not put forward an argument that justifies the ability of economics experiments to provide meaningful knowledge of real-world situations, and thus the use of

economics experiments in inductive inquiry, as they do for the use of experiments in theory testing. They do not spell out what in their view are the epistemic attributes of experiments that allow economists to learn about real world economic behaviour. This is somewhat unexpected given the overall optimistic tone regarding the desirability of an inductive turn in economics and the role of economics experiments in bringing about such a change. The detailed analysis of the various sources of artificiality nonetheless provides rich material for those who might be interested in further exploring the still most challenging issue of experimental economics: the possibility of learning about real world economic behaviour from laboratory experiments.

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