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HANDBOOK OF EXPERIMENTAL ECONOMICS RESULTS

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HANDBOOK OF EXPERIMENTAL ECONOMICS RESULTS

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INTRODUCTION TO THE SERIES

The aim of the *Handbooks in Economics* series is to produce Handbooks for various branches of economics, each of which is a definitive source, reference, and teaching supplement for use by professional researchers and advanced graduate students. Each Handbook provides self-contained surveys of the current state of a branch of economics in the form of chapters prepared by leading specialists on various aspects of this branch of economics. These surveys summarize not only received results but also newer developments, from recent journal articles and discussion papers. Some original material is also included, but the main goal is to provide comprehensive and accessible surveys. The Handbooks are intended to provide not only useful reference volumes for professional collections but also possible supplementary readings for advanced courses for graduate students in economics.

Kenneth J. Arrow and Michael D. Intriligator

PREFACE

Introduction

The organization of this book and even the title reflect our views about the state of experimental economics in relation to the field of economics in general. Experimental methods in economics seem to respond to circumstances that are not completely dictated by accepted theory or even outstanding problems found in the discipline. Where the field of economics seems to make sharp distinctions, the work of experimental economics sometimes seems to produce a blur. Where traditional economics produces a sharp and precise theory, experiments may produce results that vary from strong support to little or only “partial” support of the relevant theory. The cup is often half empty (and therefore half full) with authors varying as to whether they emphasize the former (or the latter). Where traditional economics draws clear methodological lines, experiments might say little or nothing about method, or follow a different methodology. For example, when results are very robust but do not support the theory experimentalists may ask, contrary to the Friedman (1953) methodology, what assumptions of the theory failed. After all, the assumptions can embody principles useful for the construction of new models. On the other hand, an experimentalist’s reply to a critic who claims that some experiment is “invalid” or “incoherent” because the assumptions of theory were not satisfied might be that theory predictions and not assumptions represent the relevant considerations. Experimenters seem to be opportunistic, attempting to find replicable results even though the experiments might involve mixes of methodology, theory and institutions.

In a recent conference, a question was asked about where experimental methods might be more useful than field methods. The answer is that many questions of interest to economists cannot be answered by experimental methods. For example, if the question is related to the behavior of some unique economic entity or event, such as General Motors Corporation in relation to an economic downturn, then it might well be impossible to create an experiment in which the entities of interest can be put under laboratory conditions. However, there are also important questions that can only be answered by experiments. In the field it is difficult to study situations that have not occurred or institutions that do not exist because there is no natural experiment. For example, in the laboratory it is just as easy to study the effects of auction market rules that have never been observed in the economy as to study those that have. When left on her own, nature may never create a situation that clearly separates the predictions of competing models or may never create a situation that allows a clear view of the underlying principles at work. Indeed, much of the progress of experimental methods involves the posing of

new questions or the posing of old questions in a way that experimental methods can be applied. It is this sense of discovery, the discovery of how to pose a question, which the book hopes to capture through the presentation of examples as opposed to a roadmap or a guide on how to do experiments.

In many respects the title of the book reflects the spirit of adventure that experimentalists share. Rather than an attempt to focus on experiments in general and force an organization into traditional categories that do not fit, the book is called *Experimental Results* and the emphasis reflects the fact that the results do not necessarily demonstrate a consistent theme but instead reflect bits and pieces of progress as opportunities to pose questions become recognized. In this context Mayo (1996) argues that in every field of science there exists a body of knowledge known and developed by experimentalists that is unknown to the theory and to theorists. Of course knowledge of experimental results can become a foundation for new theory, but an independent body of experimental knowledge of technique and practice always tends to flourish out of practicing experience.

Where should we begin, with the individual or with the group? Economic theory seems to be governed by two separate bodies of principles. The most prominent body of theory, especially the most recent developments based on game theory, begins with the individual as the locus of principles. A second body of principles is focused on groups of individuals such as markets, voting bodies and organizations. In some respects it might seem more natural to begin the book with studies of individuals, but instead the book begins with studies that take place within a specific set of institutions. Why not follow what might seem to be a natural progression from general principles of individual choice and then focus on how those principles operate in the context of institutions? While there are elements of theory that attempt to connect the individual and the group (auction and contract theory are examples), the fact is that theory does not perform this function consistently or well.

If institutions are to play a prominent role, why not begin with categories of institutions. Parts of the book are organized along such lines but the reader will notice that the institutions are not in one-to-one correspondence with those found naturally occurring in the world around us. Instead, experimentalists have focused on “parts” of institutions and special institutions that they feel give insights to the behavior that emerges from systems of institutions. In many respects this mirrors the evolution of the study of institutions that has been taking place in economics. Hayek (1973) noticed a difference between institutions that are discovered (emergent order) and institution that are constructed (designed order). The former involved the recording of the customs and procedures that were not written but were nevertheless followed. Scholars observed such processes and committed the practice to oral, and later, written statements. Similarly, experimentalists implemented institutions in the laboratory even though they were not found in documents, but constituted the “essence” of what seems to exist in social practice. Such institutions are sometimes embodied in the laboratory procedures and only later reveal themselves as institutions worthy of independent study. On the other hand, both the constructed and the discovered institutions of Hayek are combined in the

process of institutional and process design that characterizes much of the more complex experimental work found today. That work uses elements of theory and learning from previous experiments to help create the initial new design, but neither is considered so reliable that experimentalists would use a design that had not been thoroughly tested in the new framework.

One might think that a proper organization of experiments would be classified by the applicable theories. According to such a view, one should list the theories and then proceed to list the evidence for and against them. Part of the book is indeed organized this way but it does not work as a general organizing principle. Many of the problems of interest to experimentalists and practitioners are beyond the reach of a fully articulated theory. Examples include electric power markets, spectrum auctions and the dynamics of market convergence based on individual behavior. In addition to problems of refining theories in sufficiently operational terms to produce empirical implications, there are also ambiguities in what might constitute tests. Indeed, such a “theory first” organization would be substantially at odds with many successful experimental methods. Some experiments involve what might be called a “measurement methodology” in which all variables but one are held constant and the influence of a change in one condition (the “treatment”) is measured. Measurements that coincide with the direction of predicted influence are considered to be support for the theory and otherwise the theory is challenged. By contrast, other experiments pose multiple models that can be applied to a single experiment with the methodology being focused on posterior odds and contests among a series of models (all of which might be rejected). According to some research strategies, the question is not which model is right, since there is a strong presumption that each is incorrect in some substantive sense. Instead, the question posed is which is most accurate. Econometricians who deal with field methods will certainly recognize the difference, but when scholars consider experimental methods this approach is sometimes forgotten.

Theory and institutions meet at an interesting junction when the issue is one of institutional design. In one sense the focus in experiments is on institutions unlike any that have existed in history. In another sense the focus is on theory that is sometimes very reliable but at other times might have only vestiges of accuracy in the sense that the “glass of evidence” is less than half full. These two starting points are joined by the fact in some cases, that the institutions will be applied as policy under circumstances and at a scale and environments that might be substantially different from those studied in the laboratory.

How can laboratory methods be of use? The challenge of answering that question is the domain of the test-bed methodology. In essence, three different questions are posed. The first is whether or not the institutions produce acceptable outcomes in the normative sense of what the desirable properties of a social decision process might be. This first is a “proof of principle” or “proof of concept.” The second question is more probing for it asks if the performance takes place for understandable reasons. This step is called “design consistency” because it asks if the reasons for the performance are sufficiently consistent to support the conjecture that the system would work as it is observed to

work. Tests of design consistency ask if the dynamics of the system and the behavior of individuals within the system are consistent with the theory or principles of behavior that lead to the design. The third question is one of robustness. Are the principles at operation in the simple environment reliable at larger and more complex scale in which numbers, institutions, events and general environment are different? The questions are about the robustness of the model.

The Book Organization

The papers are organized in eight major headings. In some cases the positioning of a paper under one heading as opposed to another is only a matter of judgment. The categories emerged from the papers that were submitted.

The first three of the major headings are related to markets. Each of the three areas involves substantial differences in experimental procedures due to the differences in institutions. Not only do the institutions differ but the environments also differ so different principles might be at work. The fourth section is devoted to principles of game theory. Here the focus is primarily on the underlying principles at work as opposed to applications within any particular institutional context. Section Five has as a focus the creation of new forms of social organization and their implementation. As economics and game theory mature it becomes possible to create new forms of organization and study them under laboratory conditions. This section provides summaries of how that has taken place. Section Six reflects a shift to a different set of institutions and the special circumstances presented by public goods and externalities. Section Seven examines individual behavior and Section Eight focuses on methods.

This book is a result of an invitation sent from the editors to a broad range of experimenters asking them to write brief notes describing specific experimental results that they feel are important. The challenge to each author was to produce pictures and tables that were self-contained; i.e., the reader could understand quickly the essential nature of the experiments and the results by viewing the pictures and tables and reading a short text directly attached thereto. If interested, the reader could learn more by reading the text of the report. Any reader wishing to study the subject further could then consult the references. Authors were invited according to their expertise so that a wide range of research would be represented. The idea was to create a work readily accessible to a wide range of economists, social scientists, and others.

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