

## Introduction

The methodology and analytics of model construction in the social sciences has lately attracted a good deal of interest, including valuable efforts by scholars in the economics discipline. The existing literature is extensive and important. But it tends to move in a somewhat different direction from that which is of concern in the present volume. That is, the focus of attention here exists in sharp contrast with the general scope, perspectives, and purposes of much of the literature which precedes it and which will be referred to elsewhere in this book.

The primary aim of subsequent chapters is to present a scheme of argument that throws necessary light on actual model building procedures that contribute to economic explanation. In particular, it develops and explores a five-stage model building format, including within it a number of elements having significant real-world relevance. That, in practitioner terms, permits the description of models that not only cohere in their separate elements but exhibit correspondences, or bridges, to empirical realities.

The sub-discipline of economic model building has for a long time, of course, occupied a place in analytical, as opposed to descriptive, economics. It has often existed on the level of unarticulated assumptions about the way the world works. But since the discipline of economics severed its attachment to moral philosophy and emerged to gain autonomous academic respectability, since Adam Smith enlightened economists about his pin factory and his functioning market concepts, since Ricardo and the classical economists understood the market system to function automatically at a level of high employment and economic welfare, since the neoclassicists embraced for analytical usage notions of full information, certainties of knowledge, and infinitely rapid market adjustment mechanisms — since those earlier developments, thinking about economic reality has

increasingly employed well-specified models of the ways in which systems under investigation operate. It was not necessary in previous times to articulate a full model's construction to contemplate, for example, that if there should be an increase in market demand for a commodity without any change in supply conditions, there would, in the general scheme of things, be a rise in the price at which the market cleared or equilibrated. Indeed, such imaginations, based as they were inherently on not-fully-articulated models, soon found their way into the general public consciousness, quite apart from their developing significance for analytical economics.

But what will be seen as the increasing analytical sophistication of the subject, including, as will be noted, the expanded employment of mathematics for analytical purposes, has given rise also to specific, well-designated, and relevant models aimed at a more complete understanding of market events and systems. That very development, it is of no small interest to observe, has proceeded at the same time as there has emerged some uncertainty among a number of economists as to the significance, and even the intellectual respectability, of their discipline. Such unease has been generated, in part, by criticisms that accuse the economics profession of, among other things, narrow-mindedness and a focus on irrelevance.<sup>1</sup> In light of those attacks, the growing literature on model construction in economics and the exploration of the methodological foundations that are relevant to it no doubt serve to blunt such criticism by allowing practitioners to communicate a broader and deeper sense of how their attempts at explanation relate to the real economic world and to the objectives of human betterment.

Some of the more recent contributions to this new perspective on economic modeling are contained within, or emanate from, the following: First, on the level of methodological foundations, Boumans and Davis define economic methodology as the “philosophy of science for economics.” That is, economic methodology investigates “... the nature of the assumptions, types of reasoning, and forms of explanation used in economic science.”<sup>2</sup> That includes the criteria or standards to be met when engaging in economic scientific activity and the basis and grounds whereby explanations produced by economic science may be said to explain

<sup>1</sup> See, for example, Bernstein [2], Hicks [6], Hutchison [7], Katouzian [8], Klamer and McCloskey [9], McCloskey [10], Ward [14], Woo [16], the collections of essays edited by Bell and Kristol [1], and Wiles and Routh [15], and the symposium, Has Formalization in Economics Gone too Far, in *Methodus* 3 (June 1991) pp. 6–31.

<sup>2</sup> Boumans and Davis [4, p. 1].

the economic phenomenon under investigation.<sup>3</sup> The Boumans and Davis book along with other recently published volumes such as, for example, those by Boland [3], Morgan [11], Reiss [12], and Ross [13], are, to a considerable extent, all concerned with economic methodology in that sense. Within that framework, contemporary economic methodology has moved in the direction of context-specific inquiries that relate to such topics as neuroeconomics, experimental economics, behavioral economics, and evolutionary economics.<sup>4</sup>

The present work, however, although it overlaps in certain respects with those interests, has, as has been indicated, a very different purpose and exists on a very different level. It is intended as a discussion of practical matters concerning principles of arrangement, organization, or procedure that relate to the process of the building of explanatory economic models. It identifies, in part, the steps that might be followed in actually constructing such a model and illustrates the manner in which those steps might, in practice, be carried out. Thus, by focusing on the nuts and bolts of model building, it attempts to point the way to the creation of improved explanatory models.

In the approach to the analysis of model construction that is here in view, questions arise with respect to the methodological relations that can or cannot properly be said to exist between the natural and the social sciences. For example, it is necessary to be sensitive to the meaning-content and the possible stability and explanatory significance of what might be adduced as economic laws as compared with the development and sustainability of laws in the physical sciences. Indeed, it is appropriate that, when faced with such juxtapositions, conclusions should be reached as to whether there exists an epistemological parity between the physical and the social sciences. For that reason a brief examination of relevant issues is included in Chapter 1. As indicated in the chapter, a number of salient considerations that do not warrant anticipation at this point suggest the absence of such parity and, in that regard, the resulting implications for economic theorizing are traced.

Two considerations, however, which will be seen to bear heavily on the results of the arguments to follow, warrant initial notice. The first has to do with the reality that economic activity and decisions occur in what will be referred to as real historical time. But what is involved in the phenomenon of historical time, which, in one way or another, economic reasoning must

<sup>3</sup> Ibid., pp. 1, 3.

<sup>4</sup> Hands [5, p. 72].

necessarily take into account, places a burden on analysis that does not bear on the physical sciences. That is because time, in many physical scientific formulations, is properly taken to be what will be denominated logical time. The details and the substantial significance of the difference between historical time and logical time will be elaborated in due course. It is sufficient to say for the present that in the reality-context of historical time, questions arise as to the stability over time of certain assumptions and identities generally contained in an economic analysis. In short, individual personal behavior patterns, and the analytical assumptions that are relevant to them, might be so unstable over time as to render it difficult to conclude that a true explanation of behavior and economic outcomes can be, or has been, determined. Several such considerations will be seen to bear on the inquiry into epistemological parity that was referred to earlier. And of course, the passage of historical time raises the issue of the extent to which knowledge of the past, or even of the present, can be confidently specified. As to the future, the recognition of historical time requires acknowledgment in one way or another for economic model building that the future is unknowable. A number of significant implications will be explored.

The second of the preliminary matters that warrant brief reference at this point has to do with what has been referred to as the increasing mathematization of economics as an analytical discipline. The background to that development, the reasons for it, and the nature of mathematical usage in economic argument (including model construction) will be considered at some length. In addition, it is also necessary to understand carefully on those levels the respects in which the differential calculus and other arithmetic-operations-requiring mathematical techniques that frequently find a place in economic model building may be employed in instances and cases where highly suspect results may follow. That often has to do prominently, as will be pointed out at length, with the possibly misleading deductions and conclusions that follow from the misuse of data or variable values that are measured in ordinal rather than cardinal or ratio terms. Further, an extended example of model building will be given in which the mathematics put to work appear in terms that render irrelevant the question of whether any kind of measurement is possible. Such ground has hitherto not been explored extensively in economic model building and will be seen to permit, in certain universes of discourse, models where pertinent variable values are unmeasurable or non-quantifiable. A logic of non-quantifiable mathematical relations has been developed in earlier writing and is briefly described in a simple, straightforward manner here.

In order to exhibit its potential explanatory significance it will also be adduced in the example mentioned above in which the building of a model of the structure of a firm or enterprise is set out in largely unquantified, set-theoretic terms.

In addition to what has already been said, it will be useful in concluding this introduction to provide a minimal indication of the issues that will be addressed in the first two chapters that follow. Chapter 1 provides a background view of the relations between the physical and the social sciences and the difficulty of asserting, as was previously mentioned, epistemological parity between them. Given the objective of economic model building that engages the present investigation, the principles of scientific testing and the disputes that have occurred in the development of them will be addressed. The conclusions will be seen to bear vitally on the entire enterprise of economic explanation.

Chapter 2 is concerned with a general discussion of the nature of models, their characteristics, and their relation to economic explanation. It concludes with a brief outline of the subsequent chapters, which, in part, identifies the location of the remaining topics alluded to above that do not appear in the first two chapters.

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Excerpt

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