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ECONOMIC METHODOLOGY

UNDERSTANDING ECONOMICS AS A SCIENCE

MARCEL BOUMANS
JOHN B. DAVIS

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Preface

We see science as an inherently social activity. This applies even more to a textbook such as this, which is the product of a decade of teaching economic methodology at the University of Amsterdam, and so must be seen as a joint product of our past and current colleagues. On the one hand this is reflected in the contributions to the book by Mark Blaug, Harro Maas, and Andrej Svorencik; on the other it reflects the detailed and constructive suggestions and comments by Dirk Damsma, Floris Heukelom, Murat Kotan, Edith Kuiper, Tiago Mata, Julia Mensink Mary Morgan, Geert Reuten, and Peter Rodenburg. Earlier versions or parts of the book were read carefully by our colleagues from other institutions: Sohrab Behdad, Ted Burczak, Sheila Dow, Zohreh Emami, Nancy Folbre, Wade Hands, Kevin Hoover, Uskali Mäki, and Andrew Mearman. We are grateful for their comments and support. We of course are grateful to our students over the years. We also would like to thank Jaime Marshall, Associate Publishing Director in the College Division of Palgrave Macmillan, for his trust and encouragement.

MARCEL BOUMANS AND JOHN B. DAVIS
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Introduction

Economic methodology is the philosophy of science for economics. Philosophy of science investigates the nature of the assumptions, types of reasoning, and forms of explanation used in the sciences, and economic methodology investigates the nature of the assumptions, types of reasoning, and forms of explanation used in economic science. Yet not only do the issues and concerns that dominate today's discussions of economic methodology in many ways mirror those in contemporary philosophy of science, but economic methodology's emergence as a recognized field of economics in the 1980s was strongly influenced by reactions that were occurring at that time in the philosophy of science against logical positivism (see Chapter 1), particularly in connection with the ideas of Karl Popper, Thomas Kuhn, and Imre Lakatos.

This book uses this historical development in philosophy of science to frame its introduction to the field of economic methodology. Though there have been important contributions to economic methodology in the nineteenth and early twentieth centuries, the relatively late emergence of economic methodology as a distinct field of specialization within economics was very much associated with the philosophy of science's response to logical positivism – and then by its further response to Popper, Kuhn, and Lakatos. We believe that it is important to refer back to these historical origins to understand how many of the current concerns and issues in economic methodology came about. We also believe it is important to understand the questions that face economics as a science in light of the questions that are faced by science in general.

The structure of the book

This book is organized along both chronological and conceptual lines. It is organized chronologically in that earlier historical developments in philosophy of science and economic methodology are examined first, and later developments are shown to build on these – often as reactions or alternatives. Many of these developments did indeed occur first within the philosophy of science, but there were also important early developments in economic methodology. Thus while we often consider economic methodology through the lens of philosophy of science, we also try to set out the distinctive concerns of economic methodology.

The conceptual approach can be seen in the way we introduce many of the most basic concepts and theories of scientific explanation first and follow their various refinements, departures, and extensions in both philosophy of science and economic methodology. This reflects our view that the conceptual development gains deeper meaning when it is also seen as a historical development. It also shows that changes in thinking about the nature and goals of the philosophy of science and economic methodology from the logical positivism of the 1930s to the present need to be seen as an evolution in thinking.

There is one significant departure from this chronological and conceptual method of organization that is found in the final chapter of the book which looks at the role of value judgments in economics. The issue of value judgments in science is not absent from the twentieth-century philosophy of science, but it is rarely seen as a prominent theme. Nor is the issue prominent in economic methodology as it has developed since the 1980s. However, it is our view that the role of value judgments in economics is a crucial issue for economic methodology, and one which connects to many other central issues in the field. Accordingly, we have placed this discussion at the end of the book as a kind of capstone discussion in lieu of a conclusion. Since economics is very much a policy science (an aspect that is emphasized by its older name, political economy), we believe it to be important that the book should close on a discussion of the links between the science and specific policy recommendations.

Of course, in such a short introduction to economic methodology there has to be a degree of selectivity about the areas that are to be included. The field of economic methodology has continued to change in the years after the cut-off point for the discussions in this volume, and in some respects its 1980s origins are less visible in contemporary economic methodology than they were even a decade ago. Indeed, as economic methodology has developed as a separate field of investigation, it has taken on many more concerns specific to contemporary economic research such as experimental economics. Consequently, in order to provide a sense of some of these recent distinctive concerns, the end of each of chapter has a number of short sections – foci – that extend the discussion and provide additional applications and topics of interest. They may be skipped as desired without interrupting the main narrative of the chapters themselves.

Three comments on the nature of economic methodology

First, economic methodology should be distinguished from economic method, though the two terms are often used interchangeably. Economic methodology investigates the nature of economics as a science. To explain what this means, for the sake of convenience we will define science as the result of scientific research. The term scientific research covers various scientific practices such as classification, description, explanation, measurement, prediction, prescription, and testing. Research, then, is scientific when it meets specific criteria that are associated with these practices.

Economic methodology investigates these criteria by considering questions such as the following:

- Should all scientific activities satisfy the same criteria, or should, say, a scientific explanation be expected to fulfill different criteria from a scientific description?
- Should a distinction be made between criteria for the social sciences and those for the natural sciences?
- Where do these criteria come from: from scientific research that is generally considered to be successful, like physics?
- Is the determination of these criteria a specific task for philosophers of science or should it be determined principally by practitioners?

This book will look at these questions in relation to the investigation of the nature of economics as a science.

A useful starting point for understanding the distinction between methodology and method is to see explanations in science and economics as attempts to answering *why* questions. This means that economic methodology examines the basis and grounds for the explanations economists give to answer *why* questions about the economy. For example, economists use the shifting of demand and supply curves to answer the question of why prices change. Economic methodology attempts to understand the specific role these relationships play in an explanation.

By contrast, economic method attempts to provide answers to *how* questions, and concerns the techniques and tools that are used by economists when making their explanations and descriptions. This can be illustrated using a particular example: maximization analysis – the assumption that agents maximize some function such as utility or profit – is a particular technique or tool that is used in economics to explain or describe choice behavior. Learning about this tool is a matter of learning *how* calculus techniques provide a certain type of explanation of the choices people make. However, if we ask which criterion this use of maximization analysis addresses in producing a scientific explanation or description in economics, one would be asking a question in the field of economic methodology.

Another example can be drawn from the field of econometrics, which involves the use of mathematical and statistical tools to draw conclusions from economic data. Studying econometrics is a matter of learning *how* to employ its techniques and methods. However, an examination of econometrics from the point of view of economic methodology will take the methods of econometrics as given, and will focus instead on the question of which criteria mathematical and statistical analysis addresses in producing good explanations or predictions of economic data.

Second, economic methodology makes use of both descriptive and prescriptive approaches. *Descriptive* economic methodology aims to describe the different types of economic research practices and their results. For example, one type of explanation uses econometric models to explain relationships in economic data on the grounds that relationships in economic data reflect cause-and-effect relationships in economic behavior. In philosophy of science, descriptive methodology is often denoted as positive methodology, where 'positive' (like 'position') comes from the Latin *positus,* the past participle of *ponere* which means 'put' or 'place.' So, positive methodology concerns the question of how science is actually practiced. Note that this characterization does not necessarily mean that descriptive or positive economic methodology is value-free – an issue which we first encounter in connection with the thinking of the philosopher of science Thomas Kuhn (Chapter 4), and discuss more fully in the final chapter in terms of the relationship between values and description.

In contrast, *prescriptive* economic methodology distinguishes between good and bad explanations in economics and considers how good explanations should be formulated. For example, one view of a good explanation (that advanced by Karl Popper – see Chapter 3) is one that has survived severe testing, on the grounds that good explanations stand up to empirical data, while the rule for producing good explanations prescribes that one make every effort to falsify them. Prescriptive methodology in philosophy of science is denoted as normative methodology, and concerns the question of how science ought to be practiced. Despite this, the line between descriptive and prescriptive economic methodology has not always been drawn clearly. At the same time, since the 1980s there has been a change in the relative interest in descriptive and prescriptive approaches in the field of economic methodology, with a greater emphasis in recent years being placed on the descriptive approach. This turning point is emphasized in chronological terms in the book as we move from Chapter 3 to Chapter 4.

Third, there exists a tension in economic methodology, hinted at above, in that the philosophy of science on which economic methodology has drawn since the 1980s has been strongly influenced by reflections on the natural sciences, especially physics, whereas economics – as a social science – has many different characteristics. As a result one of the most important questions in economic methodology is whether an explanation of the status and character of economics as a social science involves issues that are significantly different from those involved in explaining the status and character of the natural and physical sciences. Some philosophers have suggested that there are no fundamental differences with respect to the nature of scientific explanation between the natural and social sciences. Others argue that social sciences in general – and economics in particular – face additional issues that affect how they arrive at acceptable explanations. This question also begins to take on a particular significance as we move from Chapter 3 to Chapter 4, and remains important through the later chapters of the book.

The aims and nature of this book

This book has two main aims:

- It aims to strengthen students' understanding of the status and character of economics as a science so that that they will be able to reason more clearly as both economists and social scientists. In this sense, economic methodology is a means to carrying out better economics and better social science.
- It aims to introduce students to the wider philosophical issues surrounding our understanding of science and, in particular, economics as a science. That is, economic methodology is an end in itself associated with human curiosity about the nature of the world and how we come to understand it.

It is important that students should also appreciate that because economic methodology is the philosophy of science for economics, the approach of this book is essentially philosophical. Unlike many scientific questions, philosophical questions often have no final and unambiguous answer. This can prove frustrating for economics students who are used to courses which aim to reach clear conclusions.

For this reason economic methodology offers a slightly different view of what it means to achieve mastery of the subject matter: in this particular context "getting it right" means achieving an understanding of the different types of assumptions and reasoning that are involved in economic explanations, determining the respective merits of these explanations, and examining how we justify our conclusions in this regard.

Finally, this book provides an introduction to economic methodology that will give students an understanding of the common ground across which economic methodologists have traveled. Of course, methodologists have used different paths to cross this common ground, reflecting their different starting points and the changing nature of economic methodology and philosophy of science since the 1980s. Because of this, and also because of the changing nature of economics itself, present-day economic methodology is a highly diverse and increasingly complex area of investigation. It is important that students remain aware that economic methodology is in a constant state of development. In these pages we have done our best to record what we believe constitutes the common ground that has been traveled so far.

A story about the famous physicist Werner Heisenberg illustrates how we see ourselves as carrying out this task. Heisenberg is chiefly associated with what has come to be known as the Heisenberg uncertainty principle in quantum mechanics, namely that an electron's position and velocity cannot be determined simultaneously. On one occasion Heisenberg was hurrying to a lecture he was due to give at Cambridge University, when was stopped by the police for speeding. Asked if he knew how fast he was going, he replied that all he could say was where he was at that moment. This book hopes in a similar manner to state where economic methodology is at this moment.

How to use this book

The book is based on a seven-week course that has been taught for more than a decade to bachelor's-level students of economics by a large number of different individuals in the History and Methodology of Economics Group at the University of Amsterdam. Most of these students had completed at most only a small number of economics courses, and thus the challenge has been to teach both basic philosophy of science and economic methodology to individuals who are only just beginning to consider the role of explanation in economics.

In the course of our teaching we have used a variety of books, articles, and other resources. We have found that most of the available materials were too specialized, assumed too much background knowledge, or were too difficult for students beginning their studies, not only at the bachelor's level but also often even for postgraduate students with a sound knowledge of the field.

As a result a few years ago we decided to write our own accessible introduction to the subject. The text has been revised on a number of occasions to reflect our teaching experience. This version, written by Boumans and Davis, is written with a single voice, but builds on the contributions of many group members. Our experience with students at the University of Amsterdam is that, once they have started to come to grips with the particular nature of the subject, they are generally able to gain a reasonable understanding of the field and its relation to the philosophy of science, even if some issues remain difficult.

The seven chapters of the book allow one chapter to be covered each week in this short term format, but also allow the book be used in longer courses when supplemented with or when accompanying other materials.

The focus sections at the end of each chapter provide extensions of the material, and may be used as starting points for further discussion. Indeed we have left the links between the focus sections and the chapters themselves loose enough that they may be addressed as desired. The main thread of the book is to be found in the chapters themselves, and we thus recommend that the chapters be followed in their chronological/conceptual order.

The book includes a number of features that are designed to offer further help to readers. A glossary of important terms is to be found at the end of the book (see pp. 195–9), and each of these terms appears in bold when it first appears. Each chapter is also followed by a set of study questions that are intended to help students test their understanding of the chapter. Many of these questions have been used in examinations at the University of Amsterdam. The readings cited at the end of the chapters also include a brief annotation to explain their relevance to the chapters. These readings act as historical signposts to the development of the subject and offer opportunities for further studying the field of economic methodology.

Relevant readings

Bird, Alexander (1998) *Philosophy of Science*, London: Routledge.

A comprehensive introduction to philosophy of science, but only as applied to natural science.

Blaug, Mark (1992) *The Methodology of Economics, or How Economists Explain*, 2nd edn, Cambridge: Cambridge University Press.

Originally published in 1980, it is the first book on economic methodology, creating the field, but only from a Popperian–Lakatosian perspective.

Davis, John, D. Wade Hands, and Uskali Mäki, eds. (1998) *The Handbook of Economic Methodology*, Cheltenham: Edward Elgar.

Although it is called a handbook, this is more like an advanced level encyclopedia. A very useful supplement to this textbook.

Dow, Sheila (2002) *Economic Methodology: An Inquiry*, Oxford: Oxford University Press.

An introduction to economic methodology by a leading post-Keynesian economist.

Hands, D. Wade (2001) *Reflection without Rules: Economic Methodology and Contemporary Science Theory*, Cambridge: Cambridge University Press.

An advanced-level survey of recent developments in economic methodology and a survey of contemporary science theory.

Hausman, Daniel, ed. (2008) *The Philosophy of Economics: An Anthology*, 3rd edn, Cambridge: Cambridge University Press.

A collection of classic texts in philosophy of economics with a comprehensive introduction by Hausman. It includes several texts that are also discussed in this book.

Chapter 1

The Received View of Science

> When we run over libraries, persuaded of these principles, what havoc must we make? If we take in our hand any volume of divinity or school metaphysics, for instance, let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames, for it can contain nothing but sophistry and illusion.
>
> (David Hume, *An Inquiry Concerning Human Understanding*)

> Sauberkeit und Klarheit werden angestrebt, dunkle Fernen und unergründliche Tiefen abgelehnt. In der Wissenschaft gibt es keine "Tiefen," überall ist Oberfläche ...
>
> (Purity and clarity are aimed at, dark distances and unfathomable depths declined. In science there are no "depths," all over is surface...)
>
> (*Wissenschaftliche Weltauffassung: Der Wiener Kreis/A Scientific Worldview: The Vienna Circle*)

We begin our study with a discussion of a famous interwar movement in the philosophy of science that set the stage for many of the developments that were to occur over the course of the following half-century. What came to be known as the **received view**, also the standard view, derives from the **logical positivist** program in philosophy of science, a broad philosophical movement that originated in Berlin and Vienna in the 1920s and was to last into the 1950s in the United States. In the first half of the twentieth century the logical positivists dominated thinking about philosophy of science. Indeed, much of the current direction in philosophy of science is, in important respects, a reaction against the views of the logical positivists, as we shall see later in this book.

The first key document in the development of logical positivism was the 1929 manifesto of the Ernst Mach Society, *A Scientific Worldview: The Vienna Circle* (*Wissenschaftliche Weltauffassung: Der Wiener Kreis*). The members of what came to be known as the Vienna Circle and signatories to the manifesto included the philosophers Rudolf Carnap (1891–1970), Moritz Schlick (1882–1936), and Viktor Kraft (1880–1975), the sociologist Otto Neurath (1882–1945), the mathematician Hans Hahn (1879–1934), and the physicist Philipp Frank (1884–1966). The label "logical positivism" offers a fair description of the Vienna Circle's philosophical program, since the members actively sought to combine aspects of **logicism** (by which is meant that all scientific language, including mathematics, is an extension of logic) and **positivism** (which meant **empiricism** – in particular, the idea that knowledge arises out of sense experience).

Analytic and synthetic *a posteriori* propositions

The main aim of the logical positivist program was to **demarcate** scientific knowledge, to distinguish science from pseudo-science, and to remove any kind of metaphysical or imagined content from scientific knowledge. Their demarcation rule was to accept only **analytic** and **synthetic *a posteriori*** propositions or statements as scientific knowledge. Analytic propositions are tautological – that is to say, they are true by definition. For example, the statement "All bachelors are unmarried males" is true by definition. Moreover, valid mathematical and logical propositions are analytic. For example, "1 + 1 = 2" and "A → A" (where the logic symbol "→" means "implies"). All other, non-analytic, propositions are called **synthetic**. If these propositions are shown to be true by empirical research, they are called synthetic *a posteriori* propositions. Examples of such statements might be: "My neighbors' dog is aggressive" and "The colour of the coffee I am drinking is light brown." They are true in light of our experience of the real world.

The eighteenth-century German philosopher Immanuel Kant (1724–1804) also introduced a third category of propositions whose truth is not shown by empirical research and which are not true by definition. These were called **synthetic *a priori* propositions**. According to Kant, this category included propositions such as Newton's laws and the proposition that the geometry of our space is Euclidean (for example, that the sum of the angles of a triangle is 180°). Kant regarded these propositions as being universally true.

However, Kant's assertion that such propositions were universally true was to be challenged by developments in mathematics and physics at the end of the nineteenth century and the beginning of the twentieth century. First it was shown that non-Euclidean geometries are mathematically possible and, subsequently, contrary to the teachings of Newton, Albert Einstein's general relativity theory assumed a curved physical space, a theory which would be later confirmed by Sir Arthur Eddington's observations during the solar eclipse of May 29, 1919. These scientific breakthroughs were crucial events for the logical positivists, but also for philosophers such as Karl Popper (Chapter 3) and Thomas Kuhn (Chapter 4), and they will therefore be discussed in more detail in these respective chapters.

As a result of these scientific developments, the logical positivists denied the existence of synthetic *a priori* propositions in science, and asserted that all propositions that are not true by definition should be subjected to investigation by empirical research. Their intention in doing so was, as mentioned above, to purify science of all "metaphysical" or philosophical claims about the world that were neither analytic nor synthetic *a posteriori*. Indeed their experience in Germany and Austria in the period between the two world wars reinforced this goal, since that period was one in which a variety of propositions referring to "Nation" and "Nature" and the like were claimed to be true about the world without evidence, and were used to justify all kinds of xenophobic and discriminatory social policies in those countries.

In their program the logical positivists drew on the work of earlier philosophers, in particular David Hume (1711–1776) and Ernst Mach (1838–1916). These two thinkers had stressed the importance of empiricism, which is the view that experience, especially from the senses, is the only source of knowledge. For the logical positivists, empiricism consisted of two related theses: (1) all evidence bearing on synthetic statements derives from sense perception, in contrast to analytic statements, which are true by definition; and (2) **predicates** are meaningful only if it is possible to tell by means of sense perception whether something belongs to their extension, that is, predicates must be empirically verifiable. Predicates include expressions such as 'is red,' or 'went home.' In grammar a predicate is a part of a sentence or a clause stating something about the subject, such as the predicate 'went home' in 'John went home,' or 'is red' in 'This tomato is red.' The extension of a predicate is the set of all those things of which the predicate is true, e.g. the set of all red things. As a result, the proposition "This tomato is red" is meaningful because by looking at it, one can *see* that this proposition is true.

So, the logical positivist's interpretation of empiricism was that synthetic statements must be meaningful. A synthetic statement is meaningful if it can be judged to be true or false by sense perception, or in other words, when it is empirically verifiable: a non-analytic statement is meaningful only if it is empirically verifiable. This criterion for meaningfulness was called the **verifiability principle**. Note that as a result of this principle, various statements in ethics and religion must be considered meaningless in science. For example, the statement "God created the world in six days" has no scientific meaning.

The ultimate goal of the Vienna Circle, which was stated most clearly in their manifesto *A Scientific Worldview*, was to purge science of all propositions that contain terms that are not meaningful. They believed that the only aspects of the world about which we can acquire scientific knowledge are those that are directly accessible by sense perception (that lie on the "surface" of things). They therefore felt that scientific theories should be formulated so that the bearing of empirical evidence is precise and transparent (the "purity and clarity" that they are aiming for). The logical