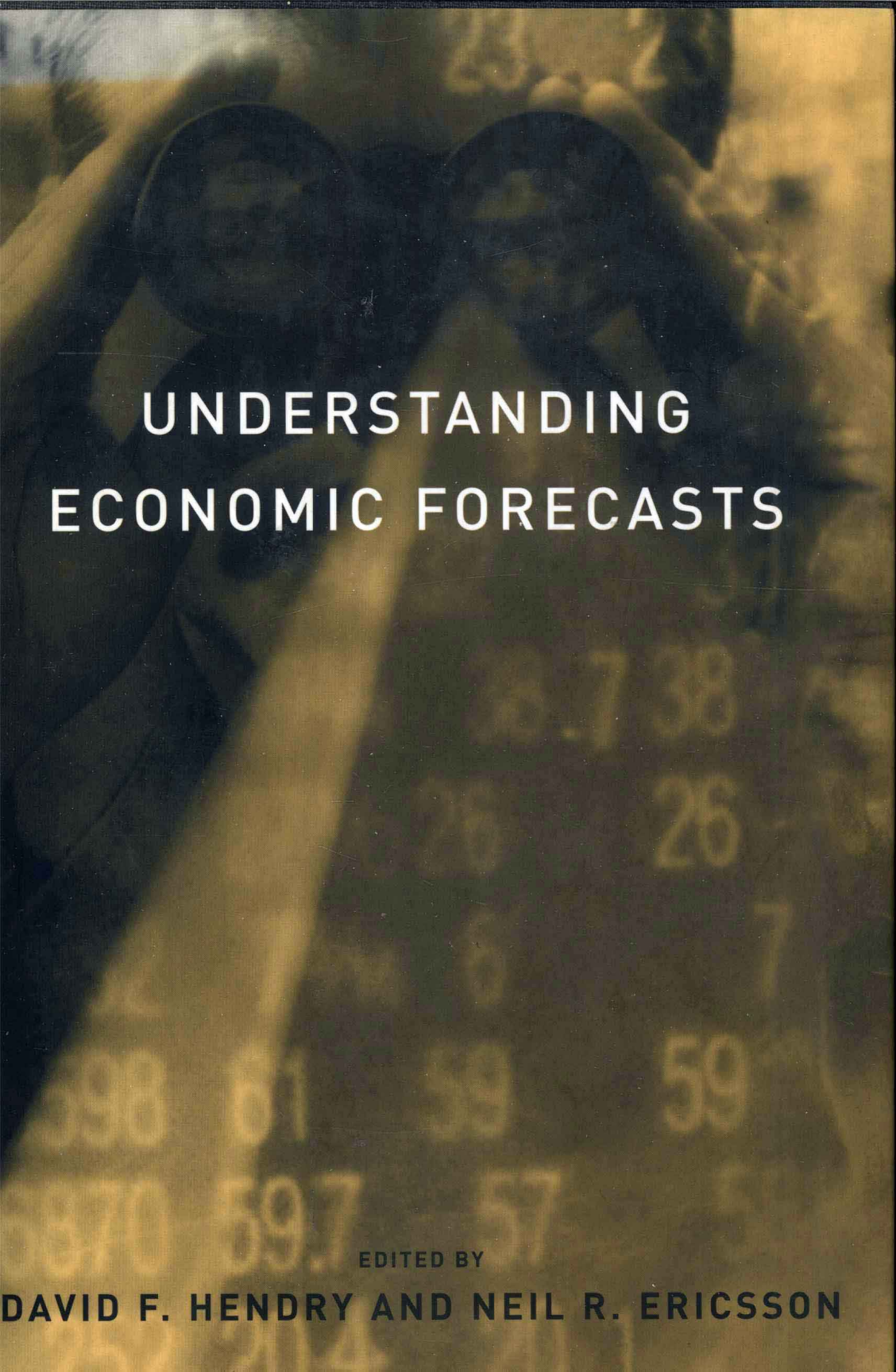

UNDERSTANDING ECONOMIC FORECASTS

EDITED BY

DAVID F. HENDRY AND NEIL R. ERICSSON

Understanding Economic Forecasts

edited by David F. Hendry and Neil R. Ericsson

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Preface

The British Association for the Advancement of Science, or BAAS, exists to communicate scientific ideas and developments to non-specialists. The Economics group ("Section F") of the BAAS has a long and distinguished history of pursuing this goal for economics, with many of the United Kingdom's most famous economists having addressed Section F at some stage. Indeed, two of Section F's recent presidents—James Mirrlees and Amartya Sen—are Nobel Prize winners.

During September 15–16, 1999, the British Association held its Annual Festival of Science at the University of Sheffield, Sheffield, England. Presentations to Section F, under the presidency of David Hendry, focused exclusively on economic forecasting. After considerable revision and editing of the papers given, the present volume resulted.

We are indebted to members of Section F of the BAAS, particularly Peter Sinclair and Donald Anderson, for their support in bringing this publication to fruition, and to several anonymous referees for helpful comments and suggestions about the chapters herein. We are also grateful to Terry Vaughn (then at MIT Press) for encouraging us to produce this book, and to Elizabeth Murry for seeing it through to completion.

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The views in this book are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System, or of any other person associated with the Federal Reserve System.

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August 2001

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1 Editors' Introduction

Summary

This chapter introduces the topic of economic forecasting and describes the various approaches taken by this book's authors.

Historically, the theory of forecasting that underpinned actual practice in economics has been based on two key assumptions—that the model was a good representation of the economy, and that the structure of the economy would remain relatively unchanged. In reality, forecast models are mis-specified and the economy is subject to unanticipated shifts. Thus, the failure to make accurate predictions is relatively common.

In the last decade, economists have developed new theories of economic forecasting and additional methods of forecast evaluation that make less stringent assumptions. These theories and methods acknowledge that the economy is dynamic and prone to sudden shifts. They also recognize that forecasting models, however good, are greatly simplified representations that are incorrect in some respects. One advantage of these newer approaches is that we can now account for the different results of competing forecasts.

In this book's chapters, academic specialists, practitioners, and a financial journalist explain these new developments in economic forecasting. The authors discuss how forecasting is conducted, evaluated, reported, and applied by academic, private, and governmental bodies, as well as how forecasting might be taught and what costs are induced by forecast errors. The authors also describe how econometric models for forecasting are constructed, how properties of forecasting methods can be analyzed, and what the future of economic forecasting may bring.

1.1 Economic Forecasting

This chapter introduces the topic of economic forecasting. Section 1.1 (the current section) discusses forecasting in general. Section 1.2 motivates the need for forecasting and clarifies several aspects of forecasting by employing an analogy to an everyday activity—taking a trip by car. Sections 1.3 and 1.4 respectively discuss methods of forecasting and ways of evaluating or judging forecasts. Section 1.5 summarizes the remaining chapters in the book.

A forecast is a statement about the future, so forecasting is potentially a vast subject. There are two basic methods of forecasting. In the first, we have a crystal ball that can "see" into the future; in the second, we extrapolate from the present. Demonstrably functional examples of the first method appear unavailable to humanity, so we focus on the second method, restricting ourselves to *systematic* forecasting rules. Even so, there exist dozens of methods of extrapolating, as well as numerous choices of what to forecast. Many important issues thus remain to be investigated.

In the last decade, interest in economic forecasting has increased markedly. New theories of forecasting and new methods of their evaluation have been developed, and much more empirical evidence has been acquired. Drawing on these recent developments, this volume explains some of the central issues in economic forecasting.

One such issue is the uncertainty associated with forecasting. As is often remarked, the problem with forecasting is that the future is uncertain. Forecast uncertainty arises from two sources: one that we know is present and for which we understand the probabilities involved, and one due to factors that we do not even know exist. In tossing a pair of dice, the two sources might correspond to the following:

- the textbook probability that a certain pair of numbers will appear face up on any given throw, and
- the uncertainty arising from not knowing that the dice are loaded.

Clements and Hendry (1999) summarize the latter type of problem by quoting Maxine Singer.

> Because of the things [that] we don't know [that] we don't know, the future is largely unpredictable. Singer (1997, p. 39)

Once the unpredictable has occurred, we can account for its effects, and so explain the past quite well. Indeed, most schoolchildren seem to learn history as if it were inevitable, rather than being a single and highly improbable sequence of outcomes of a complicated process in which contingency has played a large role. New unpredictable events will intrude in the future, making the future appear much more uncertain than the past.

Statistics seeks to render such individually unpredictable events as "regular" on average: that rendering underlies the theory of economic forecasting. For example, the age at which any individual person will die is uncertain, whereas the average age at death in a large population is highly predictable, and the latter observation forms the basis of the life-insurance industry. To achieve their objectives, statisticians create a model of the process in question, check how well it characterizes the evidence, and solve the model for its average outcome. Economic forecasting uses a similar principle: investigators develop models of the economy that seek to average over likely future "shocks" and so deliver a useful statement about the average future. This procedure works well for "measurable uncertainty"—that is, for the regularly occurring events that are individually unpredictable, but nevertheless average out. Singer's quote suggests that unmeasurable (or at least unmeasured) uncertainty is also important in explaining the actual uncertainty about the future.

To illustrate, imagine living in 1910 and predicting the average age at death of UK males over the period 1915–1918. Because the carnage of the First World War was not envisaged in 1910, any forecast would have been woefully inaccurate. Still, Germany could have decided against invading Belgium, in which case the United Kingdom might never have entered the war, leaving the forecast quite accurate. Or, the war might have taken an entirely different course, ending as quickly as the Franco-Prussian war of 1870–71. It is hard to imagine how anyone could conceive of the myriad possibilities that such cataclysms bring. Singer alludes to this second aspect of uncertainty, which is particularly difficult to model. In economics, events equivalent to earthquakes in geology seem to occur all too often, seriously throwing off forecasts. In the next section, an analogy closer to home helps further develop this background to economic forecasting.

1.2 An Analogy

This section motivates the need for forecasting and clarifies several aspects of forecasting, including the uncertainty inherent in forecasting, the effects of shifts in underlying economic behavior, and the costs of making forecast errors. To highlight the problems faced in economic forecasting, we draw on an commonplace activity—traveling by car.

Planning a car-trip typically involves consulting a map. Maps seek to represent connections between locations, but otherwise can seriously mislead: roads shown in red on a map are not red in reality, nor is the width of the roads to scale. Nevertheless, maps that accurately portray road connections are invaluable to planning a trip. The economic equivalent of a road map is an econometric model, which seeks to embody our best knowledge of the linkages in an economy. Evaluating a map's accuracy involves checking whether or not the roads do link up as marked on the map. Evaluating an econometric model is similar in principle, but not so easy in practice. Chapter 6 by Clive Granger considers some of the general issues involved in model evaluation, focusing primarily on the evaluation of a model's forecasts.

Given the distance to be driven, the road quality, the expected traffic density, the time of day for traveling, and the weather forecast, an initial estimate of the trip's time can be made. In many instances, that estimate will be sufficiently accurate to ensure arrival at the destination in good time. Many small factors will cause variation around this estimate: bad luck in being stopped at a sequence of traffic lights, lighter traffic than usual, and so on. The variability around the average journey time is measured by the variance of the forecast error or, more usefully, its square root, called the forecast error standard deviation. Chapter 5 by Neil Ericsson discusses such measures of forecast uncertainty. This particular measure—the forecast error standard deviation—can be expressed as a percentage of the journey time. A large value, such as 50%, denotes an unreliable route, where a journey may well take one-and-a-half times as long as expected.

Similarly, with economic forecasts, a large standard deviation for a forecast entails an unreliable forecast. To illustrate, consider the Gross Domestic Product (GDP), which is a widely used measure of the total output of a nation. Over the last 200 years, per capita GDP in many