Empirical Modeling in Economics

In these three essays, Professor Granger explains the process of constructing and evaluating an empirical model. Drawing on a wide range of cases and vignettes from economics, finance, politics, and environment economics, as well as from art, literature, and the entertainment industry, Professor Granger combines rigor with intuition to provide a unique and entertaining insight into one of the most important subjects in modern economics.

Chapter 1 deals with Specification. The process of specifying a model is discussed using deforestation in the Amazon region of Brazil as an illustration. Chapter 2 considers Evaluation, and argues that insufficient evaluation is undertaken by economists, and that models should be evaluated in terms of the quality of their output. In chapter 3, the question of how to evaluate forecasts is considered at several levels of increasing depth and using a more sophisticated, technical approach than in the earlier two chapters.

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Empirical Modeling in Economics
Specification and Evaluation

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Contents

Foreword by G.C. Harcourt  page vii
Acknowledgments  xi

1 The specification of empirical models  1
2 The evaluation of empirical models  33
3 Comments on the evaluation of econometric models and of forecasts  61

Index  97
It is a privilege and a pleasure to write a foreword to the published version of Clive Granger’s 1998 Marshall Lectures which I much enjoyed listening to. Granger has made fundamental contributions to modern econometrics, both to its conceptual underpinnings and to its techniques. In the lectures he brought to bear wisdom accumulated during 40 years of teaching and research to discuss the conceptual difficulties associated with empirical work in economics. He has always argued that the bridge between economic theory and applied economics should be a sturdy structure, across which it was both necessary and safe for practitioners to go in both directions. He is also one of those, unhappily all too rare, highly imaginative and creative persons who are never afraid to ask (seemingly) simple questions, nor to give simple answers. He is undogmatic and open-minded, with as firm a grasp on fundamental economic principles as on approaches to and techniques in econometrics, not a few of which are his inventions. To cap it all, he is splendid company, as much at home in a coffee
In the first chapter Granger discusses the practical optimum way of analyzing the economic and social impact of deforestation in the Brazilian portion of the Amazon rain forest. He sets out the pros and cons and the incoherencies in the measurement of the variables to be used, the measurement of which is derived from a large data set of differing quality. His discussion of what the raw measures may mean is an object lesson for anyone who wishes to critically approach and use a data set. The same may be said of how he teases out from the context the appropriate models to be used – what exactly is supplied and demanded, for example.

In the second chapter, on the evaluation of empirical models, Granger bases his wide-ranging discussion mainly on two examples, Robert Hall’s random walk theory of consumption expenditure and Daniel Suits’s estimation of the elasticity of demand for watermelons. He is concerned with the crucial issue, how do we evaluate evaluations? His own philosophy is clearly stated – most economic research should not be considered to be like pure mathematics (at which, nevertheless, Granger himself is quite a dab hand) but should be associated with clear-cut and precisely stated objectives. His principle conclusion is that evaluation should be related to the quality of the output of research, using economic measures – down-to-earth, sensible, and relevant. In the chapter, as well as showing command over what he is...
writing about, he also provides examples which take in the writings of current Cambridge teachers together with those of Alfred Marshall and Maynard Keynes. He also mentions Marshall’s Uncle Charles in Australia who lent Alfred the funds which allowed him to become an economist (by reading for the mathematics tripos at St John’s). In a footnote Granger says that just before he gave the lecture, he was told that the background to the loan was not as graphic, nor was Uncle Charles as altruistic, as Keynes originally had him. I must confess to being the party-pooper responsible for telling Clive this.

Chapter 3 (which is additional to the original lectures) is more technical. It is concerned with developments on the frontier of modern econometrics. Granger has considerately divided the chapter into sections, with general explanations of issues and tasks preceding the accounts of specific technical research. The same basic philosophy underlies the discussions and the results reported – that models should be useful to decision makers so that we must always evaluate the quality of the outputs of models and not merely the apparent quality of the models themselves. Most of the examples concern forecasting of one sort or another and constitute a plea for other workers to take on board, if they have not done so already, the ideas and developments reported here. As Granger says, much of the discussion is highly technical but it is relieved by a dry wit and gems of common sense, for example, that cost functions used to evaluate different methods may be asymmetric. Thus, the
costs of being 10 minutes early for a flight (or a lecture) are quite different from those of being 10 minutes late.

May I recommend the chapters that follow for their wisdom, common sense and relevance? An added bonus is that they may also serve to introduce those readers who have not met Clive, or heard him in person, to one of the most engaging and likeable characters in our trade.

G.C. HARcourt
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Acknowledgments

I would like to thank the faculty of the Department of Economics and the University of Cambridge for doing me the honor of inviting me to give the Alfred Marshall Lectures in 1998. I would particularly like to thank Professor Bill Brown, who was Chair at the time of the invitation, Professor Partha Dasgupta, who was Chair when I gave the lectures and hosted my visit to the Department, and to Professor M. Hashem Pesaran and Dr. Amarta Sen, Master-of-Trinity, who arranged and allowed me the comfort of staying at Trinity College. I would particularly like to thank Dr. Geoff Harcourt for making me, and many other visitors, feel so welcome in the Department and for writing an introduction about the lectures.

The Marshall Lectures themselves discuss, at a level suitable for senior undergraduates at Cambridge, how an empirical economist approaches the task of constructing a model and then how such models can be evaluated. As an example, I have used results obtained by a group, including myself, who considered the dynamics of the deforestation
process in the Amazon region of Brazil. This was a one year National Science Foundation funded project involving Lykke Andersen, Lily Huang, Eustaquio Reis, and Diana Weinhold, which achieved a lot. It was unfortunate that we could not get a second year of funding.

To the Marshall Lectures I have added a further essay on the evaluation of forecasts using a more sophisticated level of mathematical argument. I have taken this opportunity of putting into context several pieces of research with which I have been involved in the last few months, including work with Dr. Mark Machina and Professor M. Hashem Pesaran.

Finally I would like to thank Michael J. Bacci for undertaking the task of preparing the manuscripts with a continuously positive approach.

I hope that the ideas presented will influence others to think further on these and related topics.

CLIVE W. J. GRANGER
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