

# Preface

Econometrics is the application of mathematical, statistical, and computational methods to economic data. Econometrics adds empirical content to economic theory, allowing theories to be tested and used for forecasting and policy evaluation.

The ultimate goal of economics in general—and of econometrics in particular—is not only to describe the economic phenomena, but also to improve them, i.e., to make production, distribution, and consumption of goods and services more efficient and more fair. To be able to effectively control economic phenomena, it is important to understand the causal relation between them. In view of this importance, the main emphasis of this volume is on casual inference in econometrics.

Analysis of causal inference is one of the most difficult tasks in data analysis in general and in analyzing economic data in particular: when we observe that two phenomena are related, it is often difficult to decide whether one of these phenomena causally influences the other, or whether these two phenomena have a common cause.

To get a good understanding of causal inference, it is important to have models of economic phenomena which are as accurate as possible. It is therefore important not only to further improve traditional econometric models, but also to consider nontraditional economic models, such as Computable General Equilibrium (CGE) models (that properly take into account non-economic factors such as government regulations and tax policy), fuzzy models (that take into account expert knowledge formulated in imprecise natural-language terms), and models obtained by using nonparametric techniques of machine learning (in particular, neural networks) and data mining, techniques that uncover the general dependencies from the data itself—instead of the usual assumption that the model belongs to a certain predefined parametric family of models.

This volume contains several state-of-the-art papers which are directly or indirectly related to causal inference in econometrics. Some of these papers directly deal with causal inference. Others deal with models that seem promising for the

future analysis of causal inference. These papers provide theoretical analysis of the corresponding mathematical, statistical, computational, and economical models.

Several other papers describe applications of the related econometric models and techniques to real-life economic situations.

We hope that this versatile volume will help practitioners to learn how to apply new econometric techniques, and help researchers to further improve the existing models and to come up with new ideas on how to best detect and analyze causality in economics.

We want to thank all the authors for their contributions and all anonymous referees for their thorough analysis and helpful comments.

The publication of this volume is partly supported by the Chiang Mai School of Economics (CMSE), Thailand. Our thanks to Dean Pisit Leeahtam and CMSE for providing crucial support. Our special thanks to Prof. Hung T. Nguyen for his valuable advice and constant support.

We would also like to thank Prof. Janusz Kacprzyk (Series Editor) and Dr. Thomas Ditzinger (Senior Editor, Engineering/Applied Sciences) for their support and cooperation in this publication.

January 2016

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Causal Inference in Econometrics

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2016, XI, 638 p. 106 illus., 15 illus. in color., Hardcover

ISBN: 978-3-319-27283-2