# Preface

Econometrics is a branch of economics that uses mathematical (especially statistical) methods to analyze economic systems, to forecast economic and financial dynamics, and to develop strategies for achieving desirable economic performance.

An extremely important part of economics is finances: A financial crisis can bring the whole economy to a standstill and, vice versa, a smart financial policy can drastically boost economic development. It is therefore crucial to be able to apply mathematical techniques of econometrics to financial problems. Such applications are a growing field, with many interesting results—and with an even larger number of challenges and open problems.

This book contains both related theoretical developments and practical applications of econometric techniques to finance-related problems. The main objective of econometric analysis is to predict the effect of different financial strategies on the economics. To be able to make successful predictions, we need to understand the causal structure of economic and financial phenomena, develop quantitative models of these phenomena, and test these models—by making sure that they provide correct predictions of observed phenomena. In solving all these problems, additional challenges emerge from the need to take into account the data-rich character of the current information environment. The resulted issues of testing, prediction, and cause are handled in several chapters of this book.

In many situations, it is possible to design adequate models by using existing mathematical techniques—usually techniques from mathematical statistics. However, often, models constructed by using the traditional techniques do not allow accurate predictions. In such situations, new techniques are needed. A similar situation happened in physics in the early twentieth century, when the traditional statistical techniques turned out to be not very adequate for describing microscale phenomena. To adequately describe these phenomena, physicists came up with techniques of quantum mechanics. Recently, it has been shown that ideas motivated by quantum physics can also help in the description of economic phenomena; several related chapters are also included in this book.

While physics-motivated ideas can be very helpful, these ideas can rarely be directly applied to economic phenomena, because our objectives in physics and

economics applications are usually very different: While in physics applications, we aim for revolutionary changes—such as transistors, space exploration—in economics, we usually want to avoid drastic changes and oscillations, we want to achieve a solid robust sustainable growth. We want to reach a dynamic state of economics in which external influences should not lead to drastic changes. In mathematics, a state that does not change under a certain operation is known as a fixed point. Thus, the study of fixed points is an important part of econometrics. Several related chapters form a special section of this book.

This book also contains applications of both traditional and novel econometric techniques to real-life economic problems, with a special emphasis on financial and finance-related problems.

We hope that this volume will help practitioners to learn how to apply various state-of-the-art econometric techniques to finance-related problems, and help researchers to further improve the existing econometric techniques and to come up with new techniques for financial econometrics.

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 Banking University of Ho Chi Minh City, Vietnam. Our thanks go to the leadership and staff of the Banking University, for providing crucial support. Our special thanks go 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 2018

Ly H. Anh
Le Si Dong
Vladik Kreinovich
Nguyen Ngoc Thach

http://www.springer.com/978-3-319-73149-0

Econometrics for Financial Applications

Anh, L.H.; Dong, L.S.; Kreinovich, V.; Thach, N.N. (Eds.)

2018, XIII, 1081 p. 176 illus., Hardcover
ISBN: 978-3-319-73149-0