

## PREFACE

When I wrote the book *Methods of Moments and Semiparametric Econometrics for Limited Dependent Variable Models* published from Springer in 1996, my motivation was clear: there was no book available to convey the latest messages in micro-econometrics. The messages were that most econometric estimators can be viewed as method-of-moment estimators and that inferences for models with limited dependent variables (LDV) can be done without going fully parametric.

Time has passed and there are now several books available for the same purpose. These days, methods of moments are the mainstay in econometrics, not just in micro-, but also in macro-econometrics. Many papers have been published for semiparametric methods and LDV models. I, myself, learned much over the years since 1996, so much so that my own view on what should be taught, and how, has changed much. Particularly, my exposure to the “sample selection” and “treatment effect” literature has changed the way I look at econometrics now. When I set out to write the second edition of the 1996 book, these changes prompted me to re-title, reorganize, and re-focus the book.

This book, or the second edition of the book from Springer in 1996, differs greatly from the 1996 book in three aspects. First, I tried to write the book more as a textbook than as a monograph, so that the book can be used as a first year textbook in graduate econometrics courses. Second, differently from the 1996 book, many empirical examples have been added and estimators that work well in practice are given more coverage than the others. Third, the literature have been updated, or at least, the relevant new papers have been cited so that the reader can consult them if he/she desires so. These changes resulted in more than doubling the book length.

One may classify econometrics into two: micro-econometrics dealing with individual data, and macro-econometrics dealing with (aggregate) time-series data. Micro-econometrics may be further classified into “cross-section micro-econometrics” and “panel-data micro-econometrics”; an analogous classification can be done for macro-econometrics. In 2002, I published a book entitled *Panel Data Econometrics: Methods of Moments and Limited Dependent Variables* from Academic Press; for me, this leaves “*cross-section micro-econometrics*” to cover in micro-econometrics, which is what this book is mainly about, although panel data models are also examined occasionally.

One of the “buzz word” in micro-econometrics these days is “treatment effect.” This topic has been studied extensively in epidemiology and medical science as well as in some social science disciplines. Treatment effect framework is, in fact, nothing but “switching regression” in micro-econometrics that was popular some time ago: the effect of a binary treatment is of interest, and if there is any treatment effect, we get to see two different (i.e., switching) regimes depending on the treatment. In 2005, I published a book entitled

*Micro-Econometrics for Policy, Program, and Treatment Effects* from Oxford University Press. Hence, despite its prominence, treatment effect will be discussed at minimum, if at all, in this book.

Closely related to treatment effect is “sample selection” where the sample at hand comes from only one regime while our interest is on both or on the “averaged” regime. I am planning to write a book on sample selection in the near future, and thus the coverage of sample selection in this book will not be extensive. Sample selection is a fairly well-confined topic in micro-econometrics, and the non-extensive coverage in this book would not distort the overall picture of micro-econometrics.

The book consists of three parts in the main text, with each part having a number of chapters, and three appendices. The first part (Chapters 1 and 2) in the main text is for methods of moments for linear models, the second part (Chapter 3–6) is for nonlinear models and parametric methods for LDV models, and the third part (Chapter 7–9) is for semiparametric and nonparametric methods. Appendix I contains one section on mathematical and statistical backgrounds, and eight more sections of appendices for Chapters 2–9. Appendix II has further supporting materials. Both appendices are technical, digressive or tentative, and Appendix II is more so than Appendix I in this regard. Most things the reader may feel missing while reading the main text can be found in the appendices, although what is available in the appendix is not specifically mentioned in the main text. Some interesting topics are put in the appendices to avoid lengthening the main text too much and thus discouraging the reader prematurely.

Appendix III provides some GAUSS programs. I tried to select only simple and numerically stable (i.e., reliable) programs. All programs use simulated data. Although I wrote this book so that the readers can write their own programs, STATA commands are occasionally referred to, in case the reader may think that the procedure under consideration is difficult to implement and not available in ready-made econometric packages.

As in my other books, small sample issues and matters of “second order importance” will not be discussed much, because econometricians will be making mistakes of large magnitude, if any. With this being the case, paying attention to small sample improvement and low-order precision seems not so meaningful. Of course, ideally, one should avoid mistakes of both large and small magnitudes, but saying that would be ignoring econometricians’ budget and time constraints; politicians might feel comfortable saying that, but not most economists.

Some glaring omissions in this book’s coverage include weak instruments, factor analysis, stochastic frontiers, measurement errors (or errors in variables), semiparametric efficiency, auction-related econometrics, spatial dependence, demand system analysis, sampling, and missing data and imputation which are closely related to sample selection. Also it would be nicer to have more detailed coverages of duration analysis, multinomial choices, “bandwidth-dependent” semiparametric methods for LDV models, and so on. All of these require much more time and efforts on my side, and cover-

ing them would mean this book not seeing the daylight for another several years—perhaps next time.

The target audience of this book are graduate students and researchers. The entire book may be covered in two to four semesters—one semester for each part plus the appendices—but covering essential topics selectively while omitting the optional starred topics (and some others) may be done in two semesters. Most estimators and tests have been tried with real or simulated data except some in the appendices. The reader will find intuitions for how estimators/tests work as well as various tips for hand-on experiences. About empirical examples in this book, it would be ideal to choose the “best” empirical examples for a given estimator/test. But, unfortunately, my time constraints prevented me from doing that; rather, most examples were chosen more or less “randomly”—i.e., I happened to run into, or just remember, the example when the topic was written about.

In this book, theoretically oriented readers will find an overview on micro-econometrics, and applied researchers will find helpful informations on how to apply micro-econometric techniques; there will be something for everybody—at least that is what I hope. The reader may also want to consult other good books with micro-econometric focus such as Wooldridge (2002), Cameron and Trivedi (2005, 2009), and Green (2007). Compared with these books, the theoretical coverage of this book is relatively at a higher level with a semi-(non) parametric bent.

I am grateful to the Springer Statistics Editor John Kimmel for his patience while this project was dragging on for eight-plus years after the initial talk. I am also grateful to the anonymous reviewers for their comments which led to substantial improvements and re-organizations of the book. Juaõ Santos-Silva provided valuable feedbacks on many occasions, and Jing-young Choi helped me much by proof-reading most parts of the book. Also Sang-hyeok Lee, Jong-hun Choi and Young-min Ju proof-read various chapters and gave me comments. I should admit, however, that I could not incorporate all the comments/feedbacks due to the book-length/time constraints, and also due to the fact that making too many changes near the final stage is a rather risky thing to do. Without implicating any reviewer or anybody for that matter, I will be solely responsible for any errors in the book.

Micro-Econometrics

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