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Microeconometrics: Methods and Applications

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Microeconometrics

This book provides a comprehensive treatment of microeconometrics, the analysis of individual-level data on the economic behavior of individuals or firms using regression methods applied to cross-section and panel data. The book is oriented to the practitioner. A good understanding of the linear regression model with matrix algebra is assumed. The text can be used for Ph.D. courses in microeconometrics, in applied econometrics, or in data-oriented microeconomics sub-disciplines; and as a reference work for graduate students and applied researchers who wish to fill in gaps in their tool kit. Distinguishing features include emphasis on nonlinear models and robust inference, as well as chapter-length treatments of GMM estimation, nonparametric regression, simulation-based estimation, bootstrap methods, Bayesian methods, stratified and clustered samples, treatment evaluation, measurement error, and missing data. The book makes frequent use of empirical illustrations, many based on seven large and rich data sets.

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Microeconometrics
Methods and Applications

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To
my mother and the memory of my father
the memory of my parents

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Preface

This book provides a detailed treatment of microeconomic analysis, the analysis of individual-level data on the economic behavior of individuals or firms. This type of analysis usually entails applying regression methods to cross-section and panel data.

The book aims at providing the practitioner with a comprehensive coverage of statistical methods and their application in modern applied microeconometrics research. These methods include nonlinear modeling, inference under minimal distributional assumptions, identifying and measuring causation rather than mere association, and correcting departures from simple random sampling. Many of these features are of relevance to individual-level data analysis throughout the social sciences.

The ambitious agenda has determined the characteristics of this book. First, although oriented to the practitioner, the book is relatively advanced in places. A cookbook approach is inadequate because when two or more complications occur simultaneously – a common situation – the practitioner must know enough to be able to adapt available methods. Second, the book provides considerable coverage of practical data problems (see especially the last three chapters). Third, the book includes substantial empirical examples in many chapters to illustrate some of the methods covered. Finally, the book is unusually long. Despite this length we have been space-constrained. We had intended to include even more empirical examples, and abbreviated presentations will at times fail to recognize the accomplishments of researchers who have made substantive contributions.

The book assumes a good understanding of the linear regression model with matrix algebra. It is written at the mathematical level of the first-year economics Ph.D. sequence, comparable to Greene (2003). We have two types of readers in mind. First, the book can be used as a course text for a microeconometrics course, typically taught in the second year of the Ph.D., or for data-oriented microeconomics field courses such as labor economics, public economics, and industrial organization. Second, the book can be used as a reference work for graduate students and applied researchers who despite training in microeconometrics will inevitably have gaps that they wish to fill.

For instructors using this book as an econometrics course text it is best to introduce the basic nonlinear cross-section and linear panel data models as early as possible,

PREFACE

initially skipping many of the methods chapters. The key methods chapter (Chapter 5) covers maximum-likelihood and nonlinear least-squares estimation. Knowledge of maximum likelihood and nonlinear least-squares estimators provides adequate background for the most commonly used nonlinear cross-section models (Chapters 14–17 and 20), basic linear panel data models (Chapter 21), and treatment evaluation methods (Chapter 25). Generalized method of moments estimation (Chapter 6) is needed especially for advanced linear panel data methods (Chapter 22).

For readers using this book as a reference work, the chapters have been written to be as self-contained as possible. The notable exception is that some command of general estimation results in Chapter 5, and occasionally Chapter 6, will be necessary. Most chapters on models are structured to begin with a discussion and example that is accessible to a wide audience.

The Web site www.econ.ucdavis.edu/faculty/cameron provides all the data and computer programs used in this book and related materials useful for instructional purposes.

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