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Panel Data Econometrics - Mike Tsionas 2019-06-20

Panel Data Econometrics (DEA), and that which allows for both unobserved variation in output due to shocks and measurement error as well as inefficiency, known as Stochastic Frontier Analysis (SFA). This volume focuses exclusively on SFA. The econometric study of efficiency analysis typically begins by constructing a convoluted error term that is composed on noise, shocks, measurement error, and a one-sided shock called inefficiency. Early in the development of these methods, attention focused on the proposal of distributional assumptions which yielded a likelihood function whereby the parameters of the distributional components of the convoluted error could be recovered. The field evolved to the study of individual specific efficiency scores and the extension of these methods to panel data. Recently, attention has focused on relaxing the stringent distributional assumptions that are commonly imposed, relaxing the functional form assumptions commonly placed on the underlying technology, or some combination of both. All told exciting and seminal breakthroughs have occurred in this literature, and reviews of these methods are needed to effectively detail the state of the art. The generality of SFA is such that the study of efficiency has gone beyond simple application of frontier methods to study firms and appears across a diverse set of applied milieus. This review should appeal to those outside of the efficiency literature seeking to learn about new methods which might assist them in uncovering phenomena in their applied area of interest.

An Introduction to Efficiency and Productivity Analysis - Timothy J. Coelli 2005-07-22

Softcover version of the second edition Hardcover. Incorporates a new author, Dr. Chris O'Donnell, who brings considerable expertise to the project in the area of performance measurement. Numerous topics are being added and more applications using real data, as well as exercises at the end of the chapters. Data sets, computer codes and software will be available for download from the web to accompany the volume.

Price and Quantity Index Numbers - Bert M. Balk 2012-07-19

This book is the first comprehensive text on index number theory since Irving Fisher's 1922 The Making of Index Numbers. The book covers intertemporal and interspatial comparisons; ratio- and difference-type measures; discrete and continuous time environments; and upper- and lower-level indices. Guided by economic insights, this book develops the instrumental or axiomatic approach.

Handbook of Production Economics - Subhash C. Ray 2022-01-16

This two-volume handbook includes surveys of the state of the art in different areas of neoclassical production economics. Volume 1 will cover theoretical and conceptual contributions to the field of nonparametric efficiency analysis. Two of the more popular methods of efficiency evaluation are Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA), both of which are based on the concept of a production possibility set and its frontier. Depending on the assumed objectives of the decision-making unit, a production, Cost, or Profit Frontier. DEA relies on mathematical programming to create a nonparametric frontier. Yet another alternative is the Convex Nonparametric Frontier, which is based on the assumed convexity of the production possibility set and creates a piecewise linear frontier consisting of a number of tangent hyper planes. Three of the papers in this volume provide a detailed and relatively easy to follow exposition of the underlying theory from neoclassical production economics and offer step-by-step instructions on the appropriate model to apply in different contexts and how to implement. Of particular appeal are the instructions on (i) how to write the codes for different SFA models on STATA, (ii) how to write a VBA Macro for repetitive solution of the DEA problem for each production unit on Excel Solver, and (iii) how to write the codes for the Nonparametric Convex Frontier estimation. The three other papers in the volume are primarily theoretical and will be of interest to PhD students and researchers hoping to make methodological and conceptual contributions to the field of nonparametric efficiency analysis.

Benchmarking for Performance Evaluation - Subhash C. Ray 2015-03-25

This book provides a detailed introduction to the theoretical and methodological foundations of production efficiency analysis using benchmarking. Two of the more popular methods of efficiency evaluation are Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA), both of which are based on the concept of a production possibility set and its frontier. Depending on the assumed objectives of the decision-making unit, a production, Cost, or Profit Frontier. DEA relies on mathematical programming to create a nonparametric frontier. Yet another alternative is the Convex Nonparametric Frontier, which is based on the assumed convexity of the production possibility set and creates a piecewise linear frontier consisting of a number of tangent hyper planes. Three of the papers in this volume provide a detailed and relatively easy to follow exposition of the underlying theory from neoclassical production economics and offer step-by-step instructions on the appropriate model to apply in different contexts and how to implement. Of particular appeal are the instructions on (i) how to write the codes for different SFA models on STATA, (ii) how to write a VBA Macro for repetitive solution of the DEA problem for each production unit on Excel Solver, and (iii) how to write the codes for the Nonparametric Convex Frontier estimation. The three other papers in the volume are primarily theoretical and will be of interest to PhD students and researchers hoping to make methodological and conceptual contributions to the field of nonparametric efficiency analysis.

Stochastic Modelling of Reaction-Diffusion Processes - Radek Erban 2019-12-31

This practical introduction to stochastic reaction-diffusion modelling is based on courses taught at the University of Oxford. The authors discuss the essence of mathematical methods which appear (under different names) in a number of interdisciplinary scientific fields, including biology and chemistry. The book can be used both for self-study and as a supporting text for advanced undergraduate or beginning graduate-level courses in applied mathematics. New mathematical approaches are explained using simple examples of biological models, which range in size from simulations of small biomolecules to groups of animals. The book starts with stochastic modelling of chemical reactions, introducing stochastic simulation algorithms and mathematical methods for analysis of stochastic models. Different stochastic spatio-temporal models are then studied, including models of diffusion and stochastic reaction-diffusion modelling. The methods covered include molecular dynamics, Brownian dynamics, velocity jump processes and compartment-based (lattice-based) models.
Productivity and Efficiency Analysis - Christopher J. O’Donnell 2018-12-12 This book provides a coherent description of the main concepts and statistical methods used to analyse economic performance. The focus is on measures of performance that are of practical relevance to policy makers. Most, if not all, of these measures can be viewed as measures of productivity and/or efficiency. Linking fields as diverse as index number theory, data envelopment analysis and stochastic frontier analysis, the book explains how to compute measures of input and output quantity change that are consistent with measurement theory. It then discusses ways in which meaningful measures of productivity change can be decomposed into measures of technical progress, environmental change, and different types of efficiency change. The book is aimed at graduate students, researchers, statisticians, accountants and economists working in universities, regulatory authorities, government departments and private firms. The book contains many numerical examples. Computer codes and datasets are available on a companion website.

Data Science and Productivity Analytics - Vincent Charles 2020-05-23 This book includes a spectrum of concepts, such as performance, productivity, operations research, econometrics, and data science, for the practically and theoretically important areas of ‘productivity analysis/data envelopment analysis’ and ‘data science/big data’. Data science is defined as the collection of scientific methods, processes, and systems dedicated to extracting knowledge or insights from data and it develops on concepts from various domains, containing mathematics and statistical methods, operations research, machine learning, computer programming, pattern recognition, and data visualisation, among others. Examples of data science techniques include linear and logistic regressions, decision trees, Naïve Bayesian classifier, principal component analysis, neural networks, predictive modelling, deep learning, text analysis, survival analysis, and so on, all of which allow using the data to make more intelligent decisions. On the other hand, it is without a doubt that nowadays the amount of data is exponentially increasing, and analysing large data sets has become a key basis of competition and innovation, underpinning new waves of productivity growth. This book aims to bring a fresh look onto the various ways that data science techniques could unleash value and drive productivity from these mountains of data. Researchers working in productivity analysis/data envelopment analysis will benefit from learning about the tools available in data science/big data that can be used in their current research analyses and endeavours. The data scientists, on the other hand, will also get benefit from learning about the plethora of applications available in productivity analysis/data envelopment analysis.

Forecasting Air Travel Demand - Yafei Zheng 2018-01-03 This book provides an updated, concise summary of forecasting air travel demand methodology. It looks at air travel demand forecasting research and attempts to outline the whole intellectual landscape of demand forecasting. It helps readers to understand the basic idea of TEI@I methodology used in forecasting air travel demand and how it is used in developing air travel demand forecasting methods. The book also discusses what to do when facing different forecasting problems making it a useful reference for business practitioners in the industry.

Martingale Methods in Financial Modelling - Marek Musiela 2013-06-29 A comprehensive and self-contained treatment of the theory and practice of option pricing. The role of martingale methods in financial modelling is exposed. The emphasis is on using arbitrage-free models already accepted by the market as well as on building the new ones. Standard calls and puts together with numerous examples of exotic options such as barriers and quantos, for example on stocks, indices, currencies and interest rates are analysed. The importance of choosing a convenient numeraire in price calculations is explained. Mathematical and financial language is used so as to bring mathematicians closer to practical problems of finance and presenting to the industry useful math tools.

Statistical Benchmarking as a Development Tool - Klaus S. Friesenbichler 2017 This note provides an introduction to two prominent econometric benchmarking methods: Data Envelopment Analysis and Stochastic Frontier Analysis. It discusses the econometric techniques, provides a practical example using the World Bank’s Enterprise Survey data, and offers conclusions for development practitioners.

Encyclopedia of Health Economics - 2014-02-21 The Encyclopedia of Health Economics offers students, researchers and policymakers objective and detailed empirical analysis and clear reviews of current theories and policies. It helps practitioners such as health care managers and planners by providing accessible overviews into the broad field of health economics, including the economics of designing health service finance and delivery and the economics of public and population health. This encyclopedia provides an organized overview of this diverse field, providing one trusted source for up-to-date research and analysis of this highly charged and fast-moving subject area. Features research-driven articles that are objective, better-crafted, and more detailed than is currently available in journals and handbooks Combines insights and scholarship across the breadth of health economics, where theory and empirical work increasingly come from non-economists Provides overviews of key policies, theories and programs in easy-to-understand language.

Air Transport and Regional Development Case Studies - Anne Graham 2020-12-28 This book is one of three inter-connected books related to a four-year European Cooperation in Science and Technology (COST) Action established in 2015. The Action, called Air Transport and Regional Development (ATARD), aimed to promote a better understanding of how the air transport related problems of core regions and remote regions should be addressed in order to enhance both economic competitiveness and social cohesion in Europe. This book focuses on cases studies in Europe related to air transport and regional development. It is divided into four geographical regions after a general chapter that compares regional air transport connectivity between remote and central areas in Europe. The first region is Northern and Western Northern Europe (case studies related specifically to Norway, Finland, the United Kingdom, and Ireland); the second is Central and Eastern Europe, (Bulgaria, Bosnia and Herzegovina, and Poland); the third is Central Western Europe (Belgium and Switzerland); and finally, the fourth is Southern Europe (Portugal, Spain, and Italy). There is no other single source publication that currently covers this topic area in such a comprehensive manner. This book aims at becoming a major reference on the topic, drawing from experienced researchers in the field, covering the diverse experience and knowledge of the members of the COST Action. The book will appeal to academics, practitioners, and policymakers who have a particular interest in acquiring detailed comparative knowledge and understanding of air transport and regional development in many different European countries. Together with the other two books (Air Transport and Regional Development Methodologies and Air Transport and Regional Policies), it fills a much-needed gap in the literature.

Health System Efficiency - Jonathan Cylus 2016-12-15 In this book the authors explore the state of the art on efficiency measurement in health systems and international experts offer insights into the pitfalls and potential associated with various measurement techniques. The authors show that: - The core idea of efficiency is easy to understand in principle - maximizing valued outputs relative to inputs, but is often difficult to make operational in real-life situations - There have been numerous advances in data collection and availability, as well as innovative methodological approaches that give valuable insights into how efficiently health care is delivered - Our simple analytical framework can facilitate the development and interpretation of efficiency indicators.

Multifractal Volatility - Laurent E. Calvet and Jean-Pierre Fisher present a powerful, new technique for volatility forecasting that draws on insights from the use of multifractals in the natural sciences and mathematics and provides a unified treatment of the use of multifractal techniques in finance. A large existing literature (e.g., Engle, 1982; Rossi, 1991) models volatility as an average of past shocks, possibly with a noise component. This approach often has difficulty capturing sharp discontinuities and large changes in financial volatility. Their research has shown the advantages of modelling volatility as subject to regime change of heterogeneous duration and severity that some economic phenomena are long-lasting while others are more transitory, they permit regimes to have varying degrees of persistence. By drawing on insights from the use of multifractals in the natural sciences and mathematics, they show how to construct high-dimensional regime-switching models that are easy to estimate, and substantially outperform some of the best traditional forecasting models such as GARCH. The goal of Multifractal Volatility is to popularize the approach by presenting these exciting new developments to a wider audience. They emphasize both theoretical and empirical applications, beginning with a style that is easily accessible and intuitive in early chapters, and extending to the most rigorous continuous-time and equilibrium pricing formulations in final chapters. Presents a powerful new technique for forecasting volatility that leads the reader intuitively from existing volatility techniques to the frontier of research in this field by top scholars at major universities. The first comprehensive book on multifractal techniques in finance, a cutting-edge
The Palgrave Handbook of Economic Performance Analysis—Thijs ten Raa 2020-02-09 This Handbook takes an econometric approach to the foundations of economic performance analysis. The focus is on the measurement of efficiency, productivity, growth and performance. These concepts are commonly measured residually and difficult to quantify in practice. In real-life applications, efficiency and productivity estimates are often quite sensitive to the models used in the performance assessment and the methodological approaches adopted by the analysis. The Palgrave Handbook of Performance Analysis discusses the two basic techniques of performance measurement—deterministic benchmarking and stochastic benchmarking—in detail, and addresses the statistical techniques that connect them. All chapters include applications and explore topics ranging from the output/input ratio to productivity indexes and national statistics.

Efficiency and Competitiveness of International Airlines—Almas Heshmati 2016-05-18 This book focuses on the factors that support the strengths of international airlines in general and the Asian airline carriers in particular. Defining the quality of human capital as the level of education and the competence of airline employees, it analyzes the efficiency of 39 airlines in various regions, both in terms of production and cost structures. It argues that, despite Asia’s well-developed and globally competitive manufacturing sector, aided by open market practices, its overall service sector still lags far behind more advanced economies. At this does not stop Asia-based carriers from generally being more efficient than their counterparts in Europe and North America, the book investigates how competitiveness analysis of the airline industry can help Asian policymakers better prepare for the liberalization of the service sector, given how crucial this aspect is for the future growth of the Asia-Pacific region. Efficiency and Competitiveness of International Airlines offers a valuable resource for policymakers, airline employees, and researchers and students of microeconomics.

Statistical Data Fusion—Kedem Benjamin 2017-01-24 This book comes up with estimates or decisions based on multiple data sources as opposed to more narrowly defined estimates or decisions based on single data sources. And as the world is awash with data obtained from numerous and varied processes, there is a need for appropriate statistical methods which in general produce improved inference by multiple data sources. The book contains numerous examples useful to practitioners from genomics. Topics range from sensors (radars), to small area estimation of body mass, to the estimation of small tail probabilities, to predictive distributions in time series analysis.

Energy Use Efficiency—Almas Heshmati 2021-04-14 Energy is one of the most important factors of production. Its efficient use is crucial for ensuring production and environmental quality. Unlike normal goods with supply management, energy is demand managed. Efficient energy use—or energy efficiency—aims to reduce the amount of energy required to provide products and services. Energy use efficiency can be achieved in situations such as housing, offices, industrial production, transport and agriculture as well as in public lighting and services. The use of energy can be reduced by using technology that is energy saving. This Special Issue is a collection of research on energy use efficiency.

Econometric Modelling with Time Series—Vance Martin 2012-12-28 “Maximum likelihood estimation is a general method for estimating the parameters of econometric models from observed data. The principle of maximum likelihood plays a central role in the exposition of this book, since a number of estimators used in econometrics can be derived within this framework. Examples include ordinary least squares, generalized least squares and full-information maximum likelihood. In deriving the maximum likelihood estimator, a key concept is the joint probability density function (pdf) of the observed random variables, yt. Maximum likelihood estimation requires that the following conditions are satisfied. (1) The form of the joint pdf of yt is known. (2) The specification of the moments of the joint pdf are known. (3) The joint pdf can be evaluated for all values of the parameters. 9. Parts ONE and TWO of this book deal with models in which all these conditions are satisfied. Part THREE investigates models in which these conditions are not satisfied and considers four important cases. First, if the distribution of yt is misspecified, resulting in both conditions 1 and 2 being violated, estimation is by quasi-maximum likelihood (Chapter 9). Second, if condition 1 is not satisfied, a generalized method of moments estimator (Chapter 10) is required. Third, if condition 2 is not satisfied, estimation relies on nonparametric methods (Chapter 11). Fourth, if condition 3 is violated, estimation relies on simulation-based estimation methods are used (Chapter 12). 1.2 Motivating Examples To highlight the role of probability distributions in maximum likelihood estimation, this section emphasizes the link between observed sample data and 4 The Maximum Likelihood Principle the probability distribution from which they are drawn”—publisher.

Frontiers in Quantitative Finance—Rama Cont 2009-03-09 The Petit D’euner de la Finance—which author Rama Cont has been co-organizing in Paris since 1998—is a well-known quantitative finance seminar that has progressively become a platform for the exchange of ideas between the academic and practitioner communities in quantitative finance. Frontiers in Quantitative Finance is a selection of recent presentations in the Petit D’euner de la Finance. In this book, leading quants and academic researchers cover the most important emerging issues in quantitative finance and focus on portfolio credit risk and volatility modeling.

Productivity and Inequality—William H. Greene 2018-02-02 The volume highlights the state-of-the-art knowledge (including data analysis) of productivity, inequality and efficiency analysis. It showcases a selection of the best papers from the 9th North American Productivity Workshop. These papers are relevant to academia, but also to public and private sectors in terms of the challenges that firms, financial institutions, governments, and individuals may face when dealing with economic and education related activities that lead to increase or decrease of productivity. The volume also aims to bring together ideas from different parts of the world about the challenges those local economies and institutions may face when changes in productivity are observed. These contributions focus on theoretical and empirical research in areas including productivity, production theory and efficiency measurement, economic growth, macroeconomics, management science, operations research, and education. The North American Productivity Workshop (NAPW) brings together academic scholars and practitioners in the field of productivity and efficiency analysis from all over the world, and this proceedings volume is a reflection of this mission. The papers in this volume also address general topics as education, health, energy, finance, agriculture, transport, utilities, and economic development, among others. The editors are comprised of the 2016 local organizers, program committee members, and celebrated guest conference speakers.

Bandit Algorithms—Tor Lattimore 2020-07-16 A comprehensive and rigorous introduction for graduate students and researchers, with applications in sequential decision-making problems.

A Companion to Theoretical Econometrics—Badi H. Baltagi 2008-04-15 A Companion to Theoretical Econometrics provides a comprehensive reference to the basics of econometrics. This companion focuses on the foundations of the field and at the same time integrates popular topics often encountered by practitioners. The chapters are written by international experts and provide up-to-date research in areas not usually covered by standard econometrics texts. Focusses on the foundations of econometrics, managerial econometrics, quantitative finance and focus on portfolio credit risk and volatility modeling.

Benchmarking Social Spending Using Efficiency Frontiers—Mr. Javier Kapsoli 2017-09-05 Developing and low-income economies face the challenge of increasing public spending to address sizeable infrastructure and social gaps while simultaneously restoring the fiscal discipline weakened to counteract the effect of the global recession. Increasing the efficiency of social spending could be the key policy to address the dilemma as it allows the optimization of the existing resources by reducing spending inefficiencies. This paper quantifies the efficiency gap in the health and education sectors for a large sample of developing and emerging countries and proposes measures to reduce these gaps for the specific cases of El Salvador, Guatemala, and Honduras.

Do secrets come out? Statistical evaluation of student cheating—Anatoly Peresetsky 2017-09-05 We suggest an original method of student cheating evaluation based on the comparison of students’ grades in exams in class,
home assignments and experimental homework. The data for the study is collected from the survey of 2012–2013 sophomores of the International College of Economics and Finance at the National Research University Higher School of Economics in Moscow, Russia. At the end of the course in Statistics in addition to standard assignments (homework and exams) students were given experimental homework with a ban on cooperation among them. The violation of this rule was qualified as cheating. The scale of cooperation is measured and then tested through the stochastic frontier technique; it reveals connection with the GPA level, students’ expectations of the cheaters’ share and students’ moral norms. We also find different behavioral patterns for high and low performing students as well as country specific context of student cheating behavior.

Quantitative Regional Economic and Environmental Analysis for Sustainability in Korea - Euijune Kim 2016-11-04 This book focuses on the application of newly innovated analytical tools for sustainable development on regional economic and environmental issues in Korea. With a range of case studies, the authors explore a series of theoretical models and empirical methods including spatial CCE Model, multiregional Input-Output and econometric analysis, logit model, contingent valuation method, GIS, sample selection model, machine learning technique, stochastic frontier analysis, and panel analysis. These models and methods are tailored to spatial development issues such as agglomeration, clustering and industrial innovation, human capital and labor market, education and R&D investments and economic resilience for regional economies and unexpected disaster, and natural resources for environmental markets. Quantitative Regional Economic and Environmental Analysis for Sustainability in Korea is of particular interest to policy makers and practitioners, as well as research scholars active in sustainability science.

Machine Learning in Finance - Matthew F. Dixon 2020-07-01 This book introduces machine learning methods in finance. It presents a unified treatment of machine learning and various statistical and computational disciplines in quantitative finance, such as financial econometrics and discrete time stochastic control, with an emphasis on how theory and hypothesis tests inform the choice of algorithm for financial data modeling and decision making. With the trend towards increasing computational resources and larger datasets, machine learning has grown into an important skillset for the finance industry. This book is written for advanced graduate students and academics in financial econometrics, mathematical finance and applied statistics, in addition to quants and data scientists in the field of quantitative finance. Machine Learning in Finance: From Theory to Practice is divided into three parts, each part covering theory and applications. The first presents supervised learning for cross-sectional data from both a Bayesian and frequentist perspective. The more advanced material places a firm emphasis on neural networks, including deep learning, as well as Gaussian processes, with examples in investment management and derivative modeling. The second part presents supervised learning for time series data, arguably the most common data type used in finance with examples in trading, stochastic volatility and fixed income modeling. Finally, the third part presents reinforcement learning and its applications in trading, investment and wealth management. Python code examples are provided to support the readers’ understanding of the methodologies and applications. The book also includes more than 80 mathematical and programming exercises, with worked solutions available to instructors. As a bridge to research in this emergent field, the final chapter presents the frontiers of machine learning in finance from a researcher’s perspective, highlighting how many well-known concepts in statistical physics are likely to emerge as important methodologies for machine learning in finance.

Stochastic Frontier Analysis - Subal C. Kumbhakar 2003-03-10 This book develops econometric techniques for the estimation of production, cost and profit frontiers, and for the estimation of the technical and economic efficiency with which producers approach these frontiers. Since these frontiers envelop rather than intersect the data, and since the authors continue to maintain the traditional econometric belief in the presence of external forces contributing to random statistical noise, the work is titled Stochastic Frontier Analysis. Hb ISBN (2000): 0-521-48184-8

International Benchmarking for Country Economic Diagnostics - Subal Kumbhakar 2020