

## The Stata Journal Malmquist Productivity Index Using Dea

Panel Data Econometrics with R provides a tutorial for using R in the field of panel data econometrics. Illustrated throughout with examples in econometrics, political science, agriculture and epidemiology, this book presents classic methodology and applications as well as more advanced topics and recent developments in this field including error component models, spatial panels and dynamic models. They have developed the software programming in R and host replicable material on the book's accompanying website.

A Practitioner's Guide to Stochastic Frontier Analysis Using Stata provides practitioners in academia and industry with a step-by-step guide on how to conduct efficiency analysis using the stochastic frontier approach. The authors explain in detail how to estimate production, cost, and profit efficiency and introduce the basic theory of each model in an accessible way, using empirical examples that demonstrate the interpretation and application of models. This book also provides computer code, allowing users to apply the models in their own work, and incorporates the most recent stochastic frontier models developed in academic literature. Such recent developments include models of heteroscedasticity and exogenous determinants of inefficiency, scaling models, panel models with time-varying inefficiency, growth models, and panel models that separate firm effects and persistent and transient inefficiency. Immensely helpful to applied researchers, this book bridges the chasm between theory and practice, expanding the range of applications in which production frontier analysis may be implemented.

Industrial Price, Quantity, and Productivity Indices: The Micro-Economic Theory and an Application gives a comprehensive account of the micro-economic foundations of industrial price, quantity, and productivity indices. The various results available from the literature have been brought together into a consistent framework, based upon modern duality theory. This integration also made it possible to generalize several of these results. Thus, this book will be an important resource for theoretically as well as empirically-oriented researchers who seek to analyse economic problems with the help of index numbers. Although this book's emphasis is on micro-economic theory, it is also intended as a practical guide. A full chapter is therefore devoted to an empirical application. Three different approaches are pursued: a straightforward empirical approach, a non-parametric estimation approach, and a parametric estimation approach. As well as illustrating some of the more important concepts explored in this book, and showing to what extent different computational approaches lead to different outcomes for the same measures, this chapter also makes a powerful case for the use of enterprise micro-data in economic research.

Provides a comprehensive approach to productivity and efficiency analysis using economic and econometric theory.

This book presents a mathematical programming approach to the analysis of production frontiers and efficiency measurement.

The authors construct a variety of production frontiers, and by measuring distances to them are able to develop a model of efficient producer behaviour and a taxonomy of possible types of departure from efficiency in various environments. Linear programming is used as an analytical and computational technique in order to accomplish this. The approach developed is then applied to

modelling producer behaviour. By focusing on the empirical relevance of production frontiers and distances to them, and applying linear programming techniques to artificial data to illustrate the type of information they can generate, this book provides a unique study in applied production analysis. It will be of interest to scholars and students of economics and operations research, and analysts in business and government.

Modern textbook presentations of production economics typically treat producers as successful optimizers. Conventional econometric practice has generally followed this paradigm, and least squares based regression techniques have been used to estimate production, cost, profit and other functions. In such a framework deviations from maximum output, from minimum cost and cost minimizing input demands, and from maximum profit and profit maximizing output supplies and input demands, are attributed exclusively to random statistical noise. However casual empiricism and the business press both make persuasive cases for the argument that, although producers may indeed attempt to optimize, they do not always succeed. 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.

Worldwide, postal and delivery economics is the subject of considerable interest. The postal industry's business model is in drastic need of change. Notably, the European Commission and member states are still wrestling with the problems of implementing liberalization of entry into postal markets, addressing digital competition, and maintaining the universal service obligation. In the United States, the Postal Accountability and Enhancement Act of 2006 has, perhaps, exacerbated some of the problems faced by the United States Postal Service (USPS). Currently, the USPS has serious financial problems because of difficulties it faces in making changes and the failure of the Act to address problems that have been long-standing. Electronic competition is severe and affects post offices (POs) worldwide, which have been slow to address the threat. This book addresses this new reality and includes discussion of how POs may attempt to reinvent themselves. Parcels and packets will play a major role in developing new business models for postal operators. This book is of use not only to students and researchers interested in the field, but also to postal operators, consulting firms, utilities, regulatory commissions, Federal Government Departments and agencies of the European Union and other countries.

This Technical Note focuses on banking sector structure in Germany. Germany's banking system comprises three "pillars"—private commercial banks, public sector banks, and cooperative banks—distinguished by the ownership structure and business orientation. The German banking system includes a large number of institutions in both absolute and relative terms. This note describes the evolution of Germany's three-pillar banking system. It analyzes capitalization, credit and the intermediation of savings, and bank profitability and efficiency. It also examines the benefits of public involvement and governance in the banking system.

This book represents a milestone in the progression of Data Envelopment Analysis (DEA). It is the first reference text which includes a comprehensive review and comparative discussion of the basic DEA models. The development is anchored in a unified mathematical and graphical treatment and includes the most important modeling extensions. In addition, this is the first book that addresses the actual process of conducting DEA analyses including combining DEA and 1 parametric techniques. The book has three other distinctive features. It traces the applications driven evolution and diffusion of DEA models and extensions across disciplinary boundaries. It includes a comprehensive bibliography to serve as a source of references as well as a platform for further developments. And, finally, the power of DEA analysis is demonstrated through fifteen novel applications which should serve as an inspiration for future applications and extensions of the methodology. The origin of this book was a Conference on New Uses of DEA in 2 Management and Public Policy which was held at the IC Institute of the University of Texas at Austin on September 27-29, 1989. The conference was made possible through NSF Grant #SES-8722504 (A. Charnes and 2 W. W. Cooper, co-PIs) and the support of the IC Institute.

This proceedings volume examines the state-of-the art of productivity and efficiency analysis and adds to the existing research by bringing together a selection of the best papers from the 8th North American Productivity Workshop (NAPW). It also aims to analyze world-wide perspectives on challenges that local economies and institutions may face when changes in productivity are observed. The volume comprises of seventeen papers that deal with productivity measurement, productivity growth, dynamics of productivity change, measures of labor productivity, measures of technical efficiency in different sectors, frontier analysis, measures of performance, industry instability and spillover effects. These papers are relevant to academia, but also to public and private sectors in terms of the challenges 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 North American Productivity Workshop brings together academic scholars and practitioners in the field of productivity and efficiency analysis from all over the world. It is a four day conference exploring topics related to productivity, production theory and efficiency measurement in economics, management science, operations research, public administration, and related fields. The papers in this volume also address general topics as health, energy, finance, agriculture, utilities, and economic development, among others. The editors are comprised of the 2014 local organizers, program committee members, and celebrated guest conference speakers.

Multinational Enterprises and Host Country Development is a unique collection of papers looking at different aspects of the link between multinational enterprises and their effects on the host countries' economies. The volume studies effects of multinationals on R&D, innovation, productivity, wages, as well as growth and survival of firms in the host countries, and distinguishes direct and indirect effects through spillovers. All the analyses are conducted using firm level data for countries as diverse as China, Ireland, Sweden, Ghana, the UK or a group of countries in Central and Eastern Europe. This volume is a valuable reading for graduate students and researchers wishing to investigate the impact of multinationals.

Agricultural Development: New Perspectives in a Changing World is the first comprehensive exploration of key emerging issues

facing developing-country agriculture today, from rapid urbanization to rural transformation to climate change. In this four-part volume, top experts offer the latest research in the field of agricultural development. Using new lenses to examine today's biggest challenges, contributors address topics such as nutrition and health, gender and household decision-making, agrifood value chains, natural resource management, and political economy. The book also covers most developing regions, providing a critical global perspective at a time when many pressing challenges extend beyond national borders. Tying all this together, *Agricultural Development* explores policy options and strategies for developing sustainable agriculture and reducing food insecurity and malnutrition. The changing global landscape combined with new and better data, technologies, and understanding means that agriculture can and must contribute to a wider range of development outcomes than ever before, including reducing poverty, ensuring adequate nutrition, creating strong food value chains, improving environmental sustainability, and promoting gender equity and equality. *Agricultural Development: New Perspectives in a Changing World*, with its unprecedented breadth and scope, will be an indispensable resource for the next generation of policymakers, researchers, and students dedicated to improving agriculture for global wellbeing.

Our original reason for writing this book was the desire to write down in one place a complete summary of the major results in duality theory pioneered by Ronald W. Shephard in three of his books, *Cost and Production Functions* (1953), *Theory of Cost and Production Functions* (1970), and *Indirect Production Functions* (1974). In this way, newcomers to the field would have easy access to these important ideas. In addition, we report a few new results of our own. In particular, we show the duality relationship between the profit function and the eight equivalent representations of technology that were elucidated by Shephard. However, in planning the book and discussing it with colleagues it became evident that such a book would be more useful if it also provided a number of applications of Shephard's duality theory to economic problems. Thus, we have also attempted to present examples of the use of duality theory in areas such as efficiency measurement, index number theory, shadow pricing, cost-benefit analysis, and econometric estimation. Much of our thinking about duality theory and its uses has been influenced by our present and former collaborators. They include Charles Blackorby, Shawna Grosskopf, Knox Lovell, Robert Russell, and, not surprisingly, Ronald W. Shephard. We have also benefited over the years from many discussions with W. Erwin Diewert.

This edited collection presents recent developments, practical innovations, and policy reforms in the realm of microfinance in emerging markets. Microfinance has been hotly debated by ever-colliding camps of ardent supporters, who believe that microfinance addresses credit market failures and provides a durable answer to the problem of the poverty, and staunch critics, who argue that lending by microfinance institutions is wasteful, and the interest rates are too high. To bring further insight into this important debate, this book presents comprehensive historical, political, and economic perspectives on the latest issues in microfinance. An impressive array of scholars and practitioners build a framework for thinking about regulation to drive sustainable, inclusive development. With case studies of programs in India, Ghana, and Bangladesh, and examinations of the effects of gender and religion on financial decision-making, this comprehensive collection offers something valuable to scholars,

policymakers, and practitioners—anyone with a vested interest in promoting innovation in microfinance.

Productivity, Technology and Economic Growth presents a selection of recent research advances on long term economic growth. While the contributions stem from both economic history, macro- and microeconomics and the economics of innovation, all papers depart from a common viewpoint: the key factor behind long term growth is productivity, and the latter is primarily driven by technological change. Most contributions show implicitly or explicitly that technological change is at least partly dependent on growth itself. Furthermore, technology appears to interact strongly with investment in physical and human capital as well as with changes in historical, political and institutional settings. Together these papers are an up-to-date account of the remarkable convergence in theoretical and empirical work on productivity and growth over the past decades. The first part deals with the characteristics of growth regimes over longer periods, ranging from 20 years to two centuries. The next four chapters study the determinants of productivity growth and, in some cases, productivity slowdown during the last quarter of the twentieth century. The final five chapters focus on the role of technology and innovation as the key determinants of growth. Productivity, Technology and Economic Growth is, therefore, a welcome collection for academic scholars and graduate students in economics, history and related social sciences as well as for policy makers.

This volume takes the child's environment (culture, education, family, peers and media) as an essential component of child development. The intensity of global competition and ever-increasing economic uncertainties has led organizations to search for more efficient and effective ways to manage their business operations. Data envelopment analysis (DEA) has been widely used as a conceptually simple yet powerful tool for evaluating organizational productivity and performance. Fuzzy DEA (FDEA) is a promising extension of the conventional DEA proposed for dealing with imprecise and ambiguous data in performance measurement problems. This book is the first volume in the literature to present the state-of-the-art developments and applications of FDEA. It is designed for students, educators, researchers, consultants and practicing managers in business, industry, and government with a basic understanding of the DEA and fuzzy logic concepts. Annotation Options and guidelines for measuring the efficiency of recently privatized utilities (electricity, gas, water, sewerage, telecommunications, airports, ports, rail).

The productivity slowdown of the 1970s and 1980s and the resumption of productivity growth in the 1990s have provoked controversy among policymakers and researchers. Economists have been forced to reexamine fundamental questions of measurement technique. Some researchers argue that econometric approaches to productivity measurement usefully address shortcomings of the dominant index number techniques while others maintain that current productivity statistics underreport damage to the environment. In this book, the contributors propose innovative approaches to these issues. The result is a state-of-the-art exposition of contemporary productivity analysis. Charles R. Hulten is professor of economics at the University of Maryland. He has been a senior research associate at the Urban Institute and is chair of the Conference on Research in Income and Wealth of the National Bureau of Economic Research. Michael Harper is chief of the Division of Productivity Research at the Bureau of Labor Statistics. Edwin R. Dean, formerly associate commissioner for Productivity and Technology at the Bureau of Labor Statistics, is adjunct professor of economics at The George Washington University.

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.

This book presents the methodology and applications of Data Envelopment Analysis (DEA) in measuring productivity, efficiency and effectiveness in Financial Services firms such as banks, bank branches, stock markets, pension funds, mutual funds, insurance firms, credit unions, risk tolerance, and corporate failure prediction. Financial service DEA research includes banking; insurance businesses; hedge, pension and mutual funds; and credit unions. Significant business transactions among financial service organizations such as bank mergers and acquisitions and valuation of IPOs have also been the focus of DEA research. The book looks at the range of DEA uses for financial services by presenting prior studies, examining the current capabilities reflected in the most recent research, and projecting future new uses of DEA in finance related applications.

What are the challenges and action points for agricultural sustainability in Sub-Saharan Africa? This open access collection of papers offers technical analyses, policy recommendations and an overview of success stories to date. Each carefully selected paper provides valuable insights for improved policy making and defines relevant strategic priorities on Africa's sustainable transformation process, which is in line with the international development agenda. Although agriculture remains the main source of income for Africa's population, the sector is rain-fed subjecting it to the vagaries of weather and climate change. This volume demonstrates the rationale of developing a competitive, inclusive and sustainable agribusiness sector for Africa's food security and structural transformation. From the impact of Bioenergy crop adoption and Drought Index Insurance to Agro-Industrialization, this volume is important reading for individual researchers, academic associations and professional bodies interested in African agricultural development.

This book covers recent advances in efficiency evaluations, most notably Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) methods. It introduces the underlying theories, shows how to make the relevant calculations and discusses applications. The aim is to make the reader aware of the pros and cons of the different methods and to show how to use these methods in both standard and non-standard cases. Several software packages have been developed to solve some of the most common DEA and SFA models. This book relies on R, a free, open source software environment for statistical computing and graphics. This enables the reader to solve not only standard problems, but also many other problem variants. Using R, one can focus on understanding the context and developing a good model. One is not restricted to predefined model variants and to a one-size-fits-all approach. To facilitate the use of R, the authors have developed an R package called Benchmarking, which implements the main methods within both DEA and SFA. The book uses mathematical formulations of models and assumptions, but it de-emphasizes the formal proofs - in part by placing them in appendices -- or by referring to the original sources. Moreover, the book emphasizes the usage of the theories and the interpretations of the mathematical formulations. It includes a series of small examples, graphical illustrations, simple extensions and questions to think about. Also, it combines the formal models with less formal economic and organizational thinking. Last but not least it discusses some larger applications with significant practical

impacts, including the design of benchmarking-based regulations of energy companies in different European countries, and the development of merger control programs for competition authorities.

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.

An Updated Look at the Recovery of Agricultural Productivity in Sub-Saharan Africa Intl Food Policy Res Inst Measurement of Productivity and Efficiency Cambridge University Press

'... my opinion is that this book not only presents a wide and complete report of an extensive research effort, but also opens new directions for future research advancements in this field, that is very relevant both from theoretical considerations and policy-making implications.' Education Economics 'This book is the first work that brings together comprehensive evidence on research and education activities conducted in European universities. The volume is both timely (current discussion on the European Research Area is based on very poor quality comparative evidence) and important for scholars, practitioners, policymakers and students. It provides a critical assessment of the availability and use of input/output data and indicators to measure and map European higher education systems. At a time when universities are being asked to play an increasing number of roles, this book represents a foundation on which scholars and policymakers can start to develop the harmonised statistical infrastructure needed to evaluate, assess and support European universities in their changing roles.' Aldo Geuna, University of Sussex, UK Although the role of universities in the knowledge society is increasingly significant, there remains a severe lack of systematic quantitative evidence at the micro-level, with virtually all policy discussion based on country level statistics or case studies. This book redresses the balance by examining original data from universities in six European countries Italy, Norway, Portugal, Spain, Switzerland and the UK. The authors provide micro-based evidence on the evolution of the strategic profile of universities in terms of scientific research, contract research, education and the third mission. The result is a highly innovative book that combines detailed national case studies and comparative institutional analyses with state-of-the-art quantitative techniques. Applying for the first time new generations of nonparametric efficiency measures on a large scale, Universities and Strategic Knowledge Creation will be of great interest to researchers and postgraduate students in higher education, economics of science and technology, and innovation studies. It will also appeal to policymakers and administrators in governments, ministries and universities.

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.

. . . is a voluminous and timely collection of 18 essays that addresses a number of core issues on the economics of education. . . An exhaustive survey of the literature on the role of universities as multi-product firms at various levels and disciplines identifies the nature of the economies of scope and scale. This enriches the volume further. *Economic Analysis & Policy* . . . the endeavour of bringing together very knowledgeable contributors, including some of the leading contributors to the literature in the UK and beyond, to write a handbook on the economics of education is highly appreciated. The Handbook contains 18 substantive chapters, encapsulated by a brief introduction and an extensive and a very useful index. . . the Handbook should be praised as a useful overview of the field of economics of education as it stands today. Ludger Wößmann, *Economic Issues* This major Handbook comprehensively surveys the rapidly growing field of the economics of education. It is unique in that it comprises original contributions on an exceptional range of topics from a review of human capital, signalling and screening models, to consideration of issues such as educational externalities and economic growth, funding models, determinants of educational success, the educational production function, educational standards and efficiency measurement. Labour market issues such as the market for teachers and the transition of students from school to work are also explored. The *International Handbook on the Economics of Education* will be warmly welcomed by academic economists, educational researchers and practitioners in educational management as well as policymakers. Comprising specially commissioned articles, the Handbook will become indispensable reference for this ever topical field of study.

This volume systematically details both the basic principles and new developments in Data Envelopment Analysis (DEA), offering a solid understanding of the methodology, its uses, and its potential. New material in this edition includes coverage of recent developments that have greatly extended the power and scope of DEA and have lead to new directions for research and DEA uses. Each chapter accompanies its developments with simple numerical examples and discussions of actual applications. The first nine chapters cover the basic principles of DEA, while the final seven chapters provide a more advanced treatment.

When Harold Fried, et al. published *The Measurement of Productive Efficiency: Techniques and Applications* with OUP in 1993, the book received a great deal of professional interest for its accessible treatment of the rapidly growing field of efficiency and

productivity analysis. The first several chapters, providing the background, motivation, and theoretical foundations for this topic, were the most widely recognized. In this tight, direct update, these same editors have compiled over ten years of the most recent research in this changing field, and expanded on those seminal chapters. The book will guide readers from the basic models to the latest, cutting-edge extensions, and will be reinforced by references to classic and current theoretical and applied research. It is intended for professors and graduate students in a variety of fields, ranging from economics to agricultural economics, business administration, management science, and public administration. It should also appeal to public servants and policy makers engaged in business performance analysis or regulation.

Providing a systematic and comprehensive treatment of recent developments in efficiency analysis, this book makes available an intuitive yet rigorous presentation of advanced nonparametric and robust methods, with applications for the analysis of economies of scale and scope, trade-offs in production and service activities, and explanations of efficiency differentials.

Featuring an original introduction by the editors, this important collection of essays explores the main issues surrounding the regulation of the environment. The expert contributors illustrate that regulating the environment in the UK is conceptually complex, involves a diverse range of institutions, techniques and methodologies and crosses geographical and national boundaries. In the USA it is more formalised, juridical, adversarial and formally dependent upon legal rules. The articles highlight the fact that despite differences in the UK and the USA's regulatory styles, environmental regulation today has much in common with both traditions. This book addresses the rising productivity gap between the global frontier and other firms, and identifies a number of structural impediments constraining business start-ups, knowledge diffusion and resource allocation (such as barriers to up-scaling and relatively high rates of skill mismatch).

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 in economics, management science, operation research, public administration, 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.

This book analyzes how financial liberalization affected the development of the financial crisis in Europe, with particular attention

given to the ways in which power asymmetries within Western Europe facilitated financial liberalization and distributed the costs and gains from it. The author combines institutional narrative analysis with empirical surveys and econometrics, as well as country-level studies of financial liberalization and its consequences before and after the 2008 Global Financial Crisis.

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