

Data Envelopment Analysis A Handbook Of Modeling Internal Structure And Network International Series In Operations Research Management Science

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[The Measurement of Productive Efficiency and Productivity Growth](#) - Harold O. Fried 2008-02-04

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.

Data Envelopment Analysis - William W. Cooper 2007-01-10

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.

Network Data Envelopment Analysis - Chiang Kao 2016-08-23

This book presents the underlying theory, model development, and applications of network Data Envelopment Analysis (DEA) in a systematic way. The field of network DEA extends and complements conventional DEA by considering not only inputs and outputs when measuring system efficiency, but also the internal structure of the system being analyzed. By analyzing the efficiency of individual internal components, and more particularly by studying the effects of relationships among components which are modeled and implemented by means of various network structures, the "network DEA" approach is able to help identify and manage the specific components that contribute inefficiencies into the overall systems. This relatively new approach comprises an important analytical tool based on mathematical programming techniques, with valuable implications to production and operations management. The existing models for measuring the efficiency of systems of specific network structures are also discussed, and the relationships between the system and component efficiencies are explored. This book should be able to inspire new research and new applications based on the current state of the art. Performance evaluation is an important task in management, and is needed to (i) better understand the past accomplishments of an organization and (ii) plan for its future development. However, this task becomes rather challenging when multiple performance metrics are involved. DEA is a powerful tool to cope with such issues. For systems or

operations composed of interrelated processes, managers need to know how the performances of the various processes evaluated and how they are aggregated to form the overall performance of the system. This book provides an advanced exposition on performance evaluation of systems with network structures. It explores the network nature of most production and operation systems, and explains why network analyses are necessary.

Data Envelopment Analysis in the Financial Services Industry - Joseph C. Paradi 2017-11-21

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.

[Data Envelopment Analysis](#) - Joe Zhu 2016-10-05

This handbook represents a milestone in the progression of Data Envelopment Analysis (DEA). Written by experts who are often major contributors to DEA theory, it includes a collection of chapters that represent the current state-of-the-art in DEA research. Topics include distance functions and their value duals, cross-efficiency measures in DEA, integer DEA, weight restrictions and production trade-offs, facet analysis in DEA, scale elasticity, benchmarking and context-dependent DEA, fuzzy DEA, non-homogenous units, partial input-output relations, super efficiency, treatment of undesirable measures, translation invariance, stochastic nonparametric envelopment of data, and global frontier index. Focusing only on new models/approaches of DEA, the book includes contributions from Juan Aparicio, Mette Asmild, Yao Chen, Wade D. Cook, Juan Du, Rolf Färe, Julie Harrison, Raha Imanirad, Andrew Johnson, Chiang Kao, Abolfazl Keshvari, Timo Kuosmanen, Sungmook Lim, Wenbin Liu, Dimitri Margaritis, Reza Kazemi Matin, Ole B. Olesen, Jesus T. Pastor, Niels Chr. Petersen, Victor V. Podinovski, Paul Rouse, Antti Saastamoinen, Bires K. Sahoo, Kaoru Tone, and Zhongbao Zhou.

Data Envelopment Analysis and Effective Performance Assessment - Lotfi, Farhad Hossein Zadeh 2016-09-01

For any organization, analysis of performance and effectiveness through available data allows for informed decision making. Data envelopment analysis, or DEA, is a popular, effective method that can be used to measure productive efficiency in operations management assessment. Data Envelopment Analysis and Effective Performance Assessment addresses the myriad of practical uses and innovative developments of DEA. Emphasizing the importance of analyzing productivity by measuring inputs, goals, economic growth, and performance, this book covers a wide breadth of innovative knowledge. This book is essential reading

for managers, business professionals, students of business and ICT, and computer engineers.

Introduction to Data Envelopment Analysis and Its Uses - William W. Cooper 2006-03-20

Introduction to Data Envelopment Analysis and Its Uses: With DEA-Solver Software and References has been carefully designed by the authors to provide a systematic introduction to DEA and its uses as a multifaceted tool for evaluating problems in a variety of contexts. The authors have been involved in DEA's development from the beginning. William Cooper (with Abraham Charnes and Edwardo Rhodes) is a founder of DEA. Lawrence Seiford and Kaoru Tone have been actively involved as researchers and practitioners from its earliest beginnings. All have been deeply involved in uses of DEA in practical applications as well as in the development of its basic theory and methodologies. The result is a textbook grounded in authority, experience and substance.

Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis - Joe Zhu 2010-02-12

In a relatively short period of time, data envelopment analysis (DEA) has grown into a powerful analytical tool for measuring and evaluating performance. DEA is computational at its core and this book is one of several Springer aim to publish on the subject. This work deals with the micro aspects of handling and modeling data issues in DEA problems. It is a handbook treatment dealing with specific data problems, including imprecise data and undesirable outputs.

Quantitative Models for Performance Evaluation and Benchmarking - Joe Zhu 2008-10-20

Managers are often under great pressure to improve the performance of their organizations. To improve performance, one needs to constantly evaluate operations or processes related to producing products, providing services, and marketing and selling products. Performance evaluation and benchmarking are a widely used method to identify and adopt best practices as a means to improve performance and increase productivity, and are particularly valuable when no objective or engineered standard is available to define efficient and effective performance. For this reason, benchmarking is often used in managing service operations, because service standards (benchmarks) are more difficult to define than manufacturing standards. Benchmarks can be established but they are somewhat limited as they work with single measurements one at a time. It is difficult to evaluate an organization's performance when there are multiple inputs and outputs to the system. The difficulties are further enhanced when the relationships between the inputs and the outputs are complex and involve unknown tradeoffs. It is critical to show benchmarks where multiple measurements exist. The current book introduces the methodology of data envelopment analysis (DEA) and its uses in performance evaluation and benchmarking under the context of multiple performance measures.

Handbook of Operations Analytics Using Data Envelopment Analysis - Shih-Nan Hwang 2016-07-01

This handbook focuses on Data Envelopment Analysis (DEA) applications in operations analytics which are fundamental tools and techniques for improving operation functions and attaining long-term competitiveness. In fact, the handbook demonstrates that DEA can be viewed as Data Envelopment Analytics. Chapters include a review of cross-efficiency evaluation; a case study on measuring the environmental performance of OECS countries; how to select a set of performance metrics in DEA with an application to American banks; a relational network model to take the operations of individual periods into account in measuring efficiencies; how the efficient frontier methods DEA and stochastic frontier analysis (SFA) can be used synergistically; and how to integrate DEA and multidimensional scaling. In other chapters, authors construct a dynamic three-stage network DEA model; a bootstrapping based methodology to evaluate returns to scale and convexity assumptions in DEA; hybridizing DEA and cooperative games; using DEA to represent the production technology and directional distance functions to measure bank performance; an input-specific Luenberger energy and environmental productivity indicator; and the issue of reference set by differentiating between the uniquely found reference set and the unary and maximal types of the reference set. Finally, additional chapters evaluate and compare the technological advancement observed in different hybrid electric vehicles (HEV) market segments over the past 15 years; radial measurement of efficiency for the production process possessing multi-components under different production technologies; issues around the use of accounting information in DEA; how to use DEA environmental assessment to establish corporate sustainability; a summary of research efforts on DEA

environmental assessment applied to energy in the last 30 years; and an overview of DEA and how it can be utilized alone and with other techniques to investigate corporate environmental sustainability questions.

Stochastic Benchmarking - Alireza Amirteimoori 2021-12-12

This book introduces readers to benchmarking techniques in the stochastic environment, primarily stochastic data envelopment analysis (DEA), and provides stochastic models in DEA for the possibility of variations in inputs and outputs. It focuses on the application of theories and interpretations of the mathematical programs, which are combined with economic and organizational thinking. The book's main purpose is to shed light on the advantages of the different methods in deterministic and stochastic environments and thoroughly prepare readers to properly use these methods in various cases. Simple examples, along with graphical illustrations and real-world applications in industry, are provided for a better understanding. The models introduced here can be easily used in both theoretical and real-world evaluations. This book is intended for graduate and PhD students, advanced consultants, and practitioners with an interest in quantitative performance evaluation.

Data Envelopment Analysis - Joe Zhu 2018-04-14

This handbook compiles state-of-the-art empirical studies and applications using Data Envelopment Analysis (DEA). It includes a collection of 18 chapters written by DEA experts. Chapter 1 examines the performance of CEOs of U.S. banks and thrifts. Chapter 2 describes the network operational structure of transportation organizations and the relative network data envelopment analysis model. Chapter 3 demonstrates how to use different types of DEA models to compute total-factor energy efficiency scores with an application to energy efficiency. In chapter 4, the authors explore the impact of incorporating customers' willingness to pay for service quality in benchmarking models on cost efficiency of distribution networks, and chapter 5 provides a brief review of previous applications of DEA to the professional baseball industry, followed by two detailed applications to Major League Baseball. Chapter 6 examines efficiency and productivity of U.S. property-liability (P-L) insurers using DEA, while chapter 7 presents a two-stage network DEA model that decomposes the overall efficiency of a decision-making unit into two components. Chapter 8 presents a review of the literature of DEA models for the performance assessment of mutual funds, and chapter 9 discusses the management strategies formulation of the international tourist hotel industry in Taiwan. Chapter 10 presents a novel use of the two-stage network DEA to evaluate sustainable product design performances. In chapter 11 authors highlight limitations of some DEA environmental efficiency models, and chapter 12 reviews applications of DEA in secondary and tertiary education. Chapter 13 measures the relative performance of New York State school districts in the 2011-2012 academic year. Chapter 14 provides an introductory prelude to chapters 15 and 16, which both provide detailed applications of DEA in marketing. Chapter 17 then shows how to decompose a new total factor productivity index that satisfies all economically-relevant axioms from index theory with an application to U.S. agriculture. Finally, chapter 18 presents a unique study that conducts a DEA research front analysis, applying a network clustering method to group the DEA literature over the period 2000 to 2014.

Data Envelopment Analysis - Wade D. Cook 2008

The current book introduces the methodology of data envelopment analysis (DEA). DEA uses mathematical programming techniques and models to evaluate the performance of peer units (e.g., bank branches, hospitals and schools) in terms of multiple inputs used and multiple outputs produced. DEA examines the resources available to each unit and monitors the "conversion" of these resources (inputs) into the desired outputs. The book gives an overview of the various models from the literature, and the geometric interpretations provided permit the reader to go beyond the mathematics. Various topics are covered relating to important practical considerations. These include dealing with time series data as well as methods for restricting multipliers. The book will thus provide students, researchers and practitioners with a solid understanding of the methodology, its uses and its potential.

Optimization Modeling with Spreadsheets - Kenneth R. Baker 2012-01-10

Reflects the latest applied research and features state-of-the-art software for building and solving spreadsheet optimization models Thoroughly updated to reflect the latest topical and technical advances in the field, Optimization Modeling with Spreadsheets, Second Edition continues to focus on solving real-world optimization problems through the creation of mathematical models and the use of spreadsheets to

represent and analyze those models. Developed and extensively classroom-tested by the author, the book features a systematic approach that equips readers with the skills to apply optimization tools effectively without the need to rely on specialized algorithms. This new edition uses the powerful software package Risk Solver Platform (RSP) for optimization, including its Evolutionary Solver, which employs many recently developed ideas for heuristic programming. The author provides expanded coverage of integer programming and discusses linear and nonlinear programming using a systematic approach that emphasizes the use of spreadsheet-based optimization tools. The Second Edition also features: Classifications for the various problem types, providing the reader with a broad framework for building and recognizing optimization models Network models that allow for a more general form of mass balance A systematic introduction to Data Envelopment Analysis (DEA) The identification of qualitative patterns in order to meaningfully interpret linear programming solutions An introduction to stochastic programming and the use of RSP to solve problems of this type Additional examples, exercises, and cases have been included throughout, allowing readers to test their comprehension of the material. In addition, a related website features Microsoft Office® Excel files to accompany the figures and data sets in the book. With its accessible and comprehensive presentation, Optimization Modeling with Spreadsheets, Second Edition is an excellent book for courses on deterministic models, optimization, and spreadsheet modeling at the upper-undergraduate and graduate levels. The book can also serve as a reference for researchers, practitioners, and consultants working in business, engineering, operations research, and management science.

Benchmarking with DEA, SFA, and R - Peter Bogetoft 2010-11-19

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.

Data Envelopment Analysis - William Wager Cooper 2000

CD-ROM contains: DEA-Solver and sample problems -- Comprehensive bibliography.

Quantitative Modelling in Marketing and Management (second Edition) - Luiz E. T. Al MOUTINHO 2015-11-06

"The field of marketing and management has undergone immense changes over the past decade. These dynamic changes are driving an increasing need for data analysis using quantitative modelling. Problem solving using the quantitative approach and other models has always been a hot topic in the fields of marketing and management. Quantitative modelling seems admirably suited to help managers in their strategic decision making on operations management issues. In social sciences, quantitative research refers to the systematic empirical investigation of social phenomena via statistical, mathematical or computational techniques. The first edition of "Quantitative Modelling in Marketing and Management" focused on the description and applications of many quantitative modelling approaches applied to marketing and management. The topics ranged from fuzzy logic and logical discriminant models to growth models and k-

clique models. The second edition follows the thread of the first one by covering a myriad of techniques and applications in the areas of statistical, computer, mathematical as well as other novel nomothetic methods. It greatly reinforces the areas of computer, mathematical and other modeling tools that are designed to bring a level of awareness and knowledge among academics and researchers in marketing and management, so that there is an increase in the application of these new approaches that will be embedded in future scholarly output."--

Advances in DEA Theory and Applications - Kaoru Tone 2017-04-12

A key resource and framework for assessing the performance of competing entities, including forecasting models Advances in DEA Theory and Applications provides a much-needed framework for assessing the performance of competing entities with special emphasis on forecasting models. It helps readers to determine the most appropriate methodology in order to make the most accurate decisions for implementation. Written by a noted expert in the field, this text provides a review of the latest advances in DEA theory and applications to the field of forecasting. Designed for use by anyone involved in research in the field of forecasting or in another application area where forecasting drives decision making, this text can be applied to a wide range of contexts, including education, health care, banking, armed forces, auditing, market research, retail outlets, organizational effectiveness, transportation, public housing, and manufacturing. This vital resource: Explores the latest developments in DEA frameworks for the performance evaluation of entities such as public or private organizational branches or departments, economic sectors, technologies, and stocks Presents a novel area of application for DEA; namely, the performance evaluation of forecasting models Promotes the use of DEA to assess the performance of forecasting models in a wide area of applications Provides rich, detailed examples and case studies Advances in DEA Theory and Applications includes information on a balanced benchmarking tool that is designed to help organizations examine their assumptions about their productivity and performance.

Data Envelopment Analysis: Theory, Methodology, and Applications - Abraham Charnes 2013-12-01

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.

Handbook on Data Envelopment Analysis - William W. Cooper 2011-08-23

This handbook covers DEA topics that are extensively used and solidly based. The purpose of the handbook is to (1) describe and elucidate the state of the field and (2), where appropriate, extend the frontier of DEA research. It defines the state-of-the-art of DEA methodology and its uses. This handbook is intended to represent a milestone in the progression of DEA. Written by experts, who are generally major contributors to the topics to be covered, it includes a comprehensive review and discussion of basic DEA models, which, in the present issue extensions to the basic DEA methods, and a collection of DEA applications in the areas of banking, engineering, health care, and services. The handbook's chapters are organized into two categories: (i) basic DEA models, concepts, and their extensions, and (ii) DEA applications. First edition contributors have returned to update their work. The second edition includes updated versions of selected first edition chapters. New chapters have been added on: different approaches with no need for a priori choices of weights (called "multipliers) that reflect meaningful trade-offs, construction of static and dynamic DEA technologies, slacks-based model and its extensions, DEA models for DMUs that have internal structures network DEA that can be used for measuring supply chain operations, Selection of DEA

applications in the service sector with a focus on building a conceptual framework, research design and interpreting results.

Modeling Performance Measurement - Wade D. Cook 2006-06-03

This volume addresses advanced DEA methodology and techniques developed for modeling unique new performance evaluation issues. Many numerical examples, real management cases and verbal descriptions make it very valuable for researchers and practitioners.

Linear Programming and Resource Allocation Modeling - Michael J. Panik 2018-10-15

Guides in the application of linear programming to firm decision making, with the goal of giving decision-makers a better understanding of methods at their disposal Useful as a main resource or as a supplement in an economics or management science course, this comprehensive book addresses the deficiencies of other texts when it comes to covering linear programming theory—especially where data envelopment analysis (DEA) is concerned—and provides the foundation for the development of DEA. Linear Programming and Resource Allocation Modeling begins by introducing primal and dual problems via an optimum product mix problem, and reviews the rudiments of vector and matrix operations. It then goes on to cover: the canonical and standard forms of a linear programming problem; the computational aspects of linear programming; variations of the standard simplex theme; duality theory; single- and multiple- process production functions; sensitivity analysis of the optimal solution; structural changes; and parametric programming. The primal and dual problems are then reformulated and re-examined in the context of Lagrangian saddle points, and a host of duality and complementary slackness theorems are offered. The book also covers primal and dual quadratic programs, the complementary pivot method, primal and dual linear fractional functional programs, and (matrix) game theory solutions via linear programming, and data envelopment analysis (DEA). This book: Appeals to those wishing to solve linear optimization problems in areas such as economics, business administration and management, agriculture and energy, strategic planning, public decision making, and health care Fills the need for a linear programming applications component in a management science or economics course Provides a complete treatment of linear programming as applied to activity selection and usage Contains many detailed example problems as well as textual and graphical explanations Linear Programming and Resource Allocation Modeling is an excellent resource for professionals looking to solve linear optimization problems, and advanced undergraduate to beginning graduate level management science or economics students.

Data Envelopment Analysis - Joe Zhu 2015-03-18

This handbook represents a milestone in the progression of Data Envelopment Analysis (DEA). Written by experts who are often major contributors to DEA theory, it includes a collection of chapters that represent the current state-of-the-art in DEA research. Topics include distance functions and their value duals, cross-efficiency measures in DEA, integer DEA, weight restrictions and production trade-offs, facet analysis in DEA, scale elasticity, benchmarking and context-dependent DEA, fuzzy DEA, non-homogenous units, partial input-output relations, super efficiency, treatment of undesirable measures, translation invariance, stochastic nonparametric envelopment of data, and global frontier index. Focusing only on new models/approaches of DEA, the book includes contributions from Juan Aparicio, Mette Asmild, Yao Chen, Wade D. Cook, Juan Du, Rolf Färe, Julie Harrison, Raha Imanirad, Andrew Johnson, Chiang Kao, Abolfazl Keshvari, Timo Kuosmanen, Sungmook Lim, Wenbin Liu, Dimitri Margaritis, Reza Kazemi Matin, Ole B. Olesen, Jesus T. Pastor, Niels Chr. Petersen, Victor V. Podinovski, Paul Rouse, Antti Saastamoinen, Biresh K. Sahoo, Kaoru Tone, and Zhongbao Zhou.

Handbook of Operations Analytics Using Data Envelopment Analysis - Shih-Nan Hwang 2018-05-30

This handbook focuses on Data Envelopment Analysis (DEA) applications in operations analytics which are fundamental tools and techniques for improving operation functions and attaining long-term competitiveness. In fact, the handbook demonstrates that DEA can be viewed as Data Envelopment Analytics. Chapters include a review of cross-efficiency evaluation; a case study on measuring the environmental performance of OECD countries; how to select a set of performance metrics in DEA with an application to American banks; a relational network model to take the operations of individual periods into account in measuring efficiencies; how the efficient frontier methods DEA and stochastic frontier analysis (SFA) can be used synergistically; and how to integrate DEA and multidimensional scaling. In other

chapters, authors construct a dynamic three-stage network DEA model; a bootstrapping based methodology to evaluate returns to scale and convexity assumptions in DEA; hybridizing DEA and cooperative games; using DEA to represent the production technology and directional distance functions to measure bank performance; an input-specific Luenberger energy and environmental productivity indicator; and the issue of reference set by differentiating between the uniquely found reference set and the unary and maximal types of the reference set. Finally, additional chapters evaluate and compare the technological advancement observed in different hybrid electric vehicles (HEV) market segments over the past 15 years; radial measurement of efficiency for the production process possessing multi-components under different production technologies; issues around the use of accounting information in DEA; how to use DEA environmental assessment to establish corporate sustainability; a summary of research efforts on DEA environmental assessment applied to energy in the last 30 years; and an overview of DEA and how it can be utilized alone and with other techniques to investigate corporate environmental sustainability questions.

Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis - Ibrahim Osman 2014

"This book highlights the advantages of using data envelopment analysis as a tool to improve business performances and identifying the source of inefficiency in public and private organizations"--Provided by publisher.

Evaluating Hedge Fund and CTA Performance - Greg N. Gregoriou 2005-05-06

Introducing Data Envelopment Analysis (DEA) -- a quantitative approach to assess the performance of hedge funds, funds of hedge funds, and commodity trading advisors. Steep yourself in this approach with this important new book by Greg Gregoriou and Joe Zhu. "This book steps beyond the traditional trade-off between single variables for risk and return in the determination of investment portfolios. For the first time, a comprehensive procedure is presented to compose portfolios using multiple measures of risk and return simultaneously. This approach represents a watershed in portfolio construction techniques and is especially useful for hedge fund and CTA offerings." -- Richard E. Oberuc, CEO, Burlington Hall Asset Management, Inc. Chairman, Foundation for Managed Derivatives Research Order your copy today!

Data Envelopment Analysis - Wade D. Cook 2014-02-26

This handbook serves as a complement to the Handbook on Data Envelopment Analysis (eds, W.W. Cooper, L.M. Seiford and J. Zhu, 2011, Springer) in an effort to extend the frontier of DEA research. It provides a comprehensive source for the state-of-the-art DEA modeling on internal structures and network DEA. Chapter 1 provides a survey on two-stage network performance decomposition and modeling techniques. Chapter 2 discusses the pitfalls in network DEA modeling. Chapter 3 discusses efficiency decompositions in network DEA under three types of structures, namely series, parallel and dynamic. Chapter 4 studies the determination of the network DEA frontier. In chapter 5 additive efficiency decomposition in network DEA is discussed. An approach in scale efficiency measurement in two-stage networks is presented in chapter 6. Chapter 7 further discusses the scale efficiency decomposition in two stage networks. Chapter 8 offers a bargaining game approach to modeling two-stage networks. Chapter 9 studies shared resources and efficiency decomposition in two-stage networks. Chapter 10 introduces an approach to computing the technical efficiency scores for a dynamic production network and its sub-processes. Chapter 11 presents a slacks-based network DEA. Chapter 12 discusses a DEA modeling technique for a two-stage network process where the inputs of the second stage include both the outputs from the first stage and additional inputs to the second stage. Chapter 13 presents an efficiency measurement methodology for multi-stage production systems. Chapter 14 discusses network DEA models, both static and dynamic. The discussion also explores various useful objective functions that can be applied to the models to find the optimal allocation of resources for processes within the black box, that are normally invisible to DEA. Chapter 15 provides a comprehensive review of various type network DEA modeling techniques. Chapter 16 presents shared resources models for deriving aggregate measures of bank-branch performance, with accompanying component measures that make up that aggregate value. Chapter 17 examines a set of manufacturing plants operating under a single umbrella, with the objective being to use the component or function measures to decide what might be considered as each plant's core business. Chapter 18 considers problem settings where there may be clusters or groups of DMUs that form a hierarchy. The specific case of a set off

electric power plants is examined in this context. Chapter 19 models bad outputs in two-stage network DEA. Chapter 20 presents an application of network DEA to performance measurement of Major League Baseball (MLB) teams. Chapter 21 presents an application of a two-stage network DEA model for examining the performance of 30 U.S. airline companies. Chapter 22 then presents two distinct network efficiency models that are applied to engineering systems.

Data Envelopment Analysis with R - Farhad Hosseinzadeh Lotfi 2019-07-23

This book introduces readers to the use of R codes for optimization problems. First, it provides the necessary background to understand data envelopment analysis (DEA), with a special emphasis on fuzzy DEA. It then describes DEA models, including fuzzy DEA models, and shows how to use them to solve optimization problems with R. Further, it discusses the main advantages of R in optimization problems, and provides R codes based on real-world data sets throughout. Offering a comprehensive review of DEA and fuzzy DEA models and the corresponding R codes, this practice-oriented reference guide is intended for masters and Ph.D. students in various disciplines, as well as practitioners and researchers.

Data-Enabled Analytics - Joe Zhu 2021

This book brings Data Envelopment Analysis (DEA) based techniques and big data together to explore the novel uses and potentials of DEA under big data. These areas are of widespread interest to researchers and practitioners alike. Considering the vast literature on DEA, one could say that DEA has been and continues to be, a widely used technique both in performance and productivity measurement, having covered a plethora of challenges and debates within the modelling framework. Over the past four decades, DEA models have been applied in almost every major field of study. However, DEA has not been used to its fullest extent. As the inter- and intra-disciplinary research grows, DEA could be used in potentially many other ways; for instance, DEA could be viewed as a data mining tool for data-enabled analytics. One opportunity is brought by the existence of big data. Although big data has existed for a while now, gaining popularity among insight seekers, we are still in incipient stages when it comes to taking full advantage of its potential. Generally, researchers have either been interested in examining its origin or in developing and using big data technology. As the amount of (big) data is growing every day in an exponential manner, so does its complexity; in this sense, various types of data are surfacing, whose study and examination could shed new light on phenomena of interest. A quick review of existing literature shows that big data is a new entrant within the DEA framework. Recently, there has been an increasing interest in bringing the two concepts together, with research studies aiming to integrate DEA and big data concepts within a single framework. But, more work is needed to fully explore the value of their intersection -- it is time to view DEA in light of its potential usage in new fields or new usage within the existing fields, under the big data umbrella. It is time to view DEA models beyond their present scope and mine new insights for better data-driven decision-making.

Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis - Joe Zhu 2007-06-08

In a relatively short period of time, data envelopment analysis (DEA) has grown into a powerful analytical tool for measuring and evaluating performance. DEA is computational at its core and this book is one of several Springer aim to publish on the subject. This work deals with the micro aspects of handling and modeling data issues in DEA problems. It is a handbook treatment dealing with specific data problems, including imprecise data and undesirable outputs.

Handbook on Constructing Composite Indicators: Methodology and User Guide - OECD 2008-08-22

A guide for constructing and using composite indicators for policy makers, academics, the media and other interested parties. In particular, this handbook is concerned with indicators which compare and rank country performance.

Data Envelopment Analysis: Theory, Methodology, and Applications - Abraham Charnes 1995-07-31

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.

Business Process Modeling, Simulation and Design - Laguna Manuel 2011

This book covers the design of business processes from a broad quantitative modeling perspective. The text presents a multitude of analytical tools that can be used to model, analyze, understand and ultimately, to design business processes. The range of topics in this text include graphical flowcharting tools, deterministic models for cycle time analysis and capacity decisions, analytical queuing methods, as well as the use of Data Envelopment Analysis (DEA) for benchmarking purposes. And a major portion of the book is devoted to simulation modeling using a state of the art discrete-event simulation package.

Rethinking Valuation and Pricing Models - Carsten Wehn 2012-11-08

It is widely acknowledged that many financial modelling techniques failed during the financial crisis, and in our post-crisis environment many techniques are being reconsidered. This single volume provides a guide to lessons learned for practitioners and a reference for academics. Including reviews of traditional approaches, real examples, and case studies, contributors consider portfolio theory; methods for valuing equities and equity derivatives, interest rate derivatives, and hybrid products; and techniques for calculating risks and implementing investment strategies. Describing new approaches without losing sight of their classical antecedents, this collection of original articles presents a timely perspective on our post-crisis paradigm. Highlights pre-crisis best classical practices, identifies post-crisis key issues, and examines emerging approaches to solving those issues Singles out key factors one must consider when valuing or calculating risks in the post-crisis environment Presents material in a homogenous, practical, clear, and not overly technical manner

Introduction to the Theory and Application of Data Envelopment Analysis - Emmanuel Thanassoulis 2013-06-29

1 DATA ENVELOPMENT ANALYSIS Data Envelopment Analysis (DEA) was initially developed as a method for assessing the comparative efficiencies of organisational units such as the branches of a bank, schools, hospital departments or restaurants. The key in each case is that they perform feature which makes the units comparable the same function in terms of the kinds of resource they use and the types of output they produce. For example all bank branches to be compared would typically use staff and capital assets to effect income generating activities such as advancing loans, selling financial products and carrying out banking transactions on behalf of their clients. The efficiencies assessed in this context by DEA are intended to reflect the scope for resource conservation at the unit being assessed without detriment to its outputs, or alternatively, the scope for output augmentation without additional resources. The efficiencies assessed are comparative or relative because they reflect scope for resource conservation or output augmentation at one unit relative to other comparable benchmark units rather than in some absolute sense. We resort to relative rather than absolute efficiencies because in most practical contexts we lack sufficient information to derive the superior measures of absolute efficiency. DEA was initiated by Charnes Cooper and Rhodes in 1978 in their seminal paper Charnes et al. (1978). The paper operationalised and extended by means of linear programming production economics concepts of empirical efficiency put forth some twenty years earlier by Farrell (1957).

Quantitative Models for Performance Evaluation and Benchmarking - Joe Zhu 2014-09-11

The author is one of the prominent researchers in the field of Data Envelopment Analysis (DEA), a powerful data analysis tool that can be used in performance evaluation and benchmarking. This book is based upon the author's years of research and teaching experiences. It is difficult to evaluate an organization's performance when multiple performance metrics are present. The difficulties are further enhanced when the relationships among the performance metrics are complex and involve unknown tradeoffs. This book

introduces Data Envelopment Analysis (DEA) as a multiple-measure performance evaluation and benchmarking tool. The focus of performance evaluation and benchmarking is shifted from characterizing performance in terms of single measures to evaluating performance as a multidimensional systems perspective. Conventional and new DEA approaches are presented and discussed using Excel spreadsheets — one of the most effective ways to analyze and evaluate decision alternatives. The user can easily develop and customize new DEA models based upon these spreadsheets. DEA models and approaches are presented to deal with performance evaluation problems in a variety of contexts. For example, a context-dependent DEA measures the relative attractiveness of similar operations/processes/products. Sensitivity analysis techniques can be easily applied, and used to identify critical performance measures. Two-stage network efficiency models can be utilized to study performance of supply chain. DEA benchmarking models extend DEA's ability in performance evaluation. Various cross efficiency approaches are presented to provide peer evaluation scores. This book also provides an easy-to-use DEA software — DEAFrontier. This DEAFrontier is an Add-In for Microsoft® Excel and provides a custom menu of DEA approaches. This version of DEAFrontier is for use with Excel 97-2013 under Windows and can solve up to 50 DMUs, subject to the capacity of Excel Solver. It is an extremely powerful tool that can assist decision-makers in benchmarking and analyzing complex operational performance issues in manufacturing organizations as well as evaluating processes in banking, retail, franchising, health care, public services and many other industries.

Introduction and Comparison of Data Envelopment Analysis Software Packages - Alireza Alinezhad 2021

"This book presents and compares 11 software packages of Data Envelopment Analysis (DEA). Performance measurement is done by various methods, one of which is DEA. Due to the ability of DEA models to meet practical requirements, extensive research can be conducted in the fields of mathematics, management, economics, and engineering. Therefore, during recent decades, the use of this method has been considered with significant growth among researchers. DEA evaluates the performance of Decision Making Units (DMUs) by using linear programming. Since linear programming should be solved for each DMU, performance measurement for a large number of DMUs is difficult and time-consuming. For this purpose, various software packages have been designed and developed to address these problems. Each of these software's is designed for different purposes and has different features and applications. The main objectives of this book are to introduce, express the advantages and disadvantages of each of these software packages, as well as their comparisons"--

Data Envelopment Analysis - Subhash C. Ray 2004-06-07

Using the neo-classical theory of production economics as the analytical framework, this book, first published in 2004, provides a unified and easily comprehensible, yet fairly rigorous, exposition of the core literature on data envelopment analysis (DEA) for readers based in different disciplines. The various DEA models are developed as nonparametric alternatives to the econometric models. Apart from the standard fare consisting of the basic input- and output-oriented DEA models formulated by Charnes, Cooper, and Rhodes, and Banker, Charnes, and Cooper, the book covers developments such as the directional distance function, free disposal hull (FDH) analysis, non-radial measures of efficiency, multiplier bounds, mergers and break-up of firms, and measurement of productivity change through the Malmquist total factor productivity index. The chapter on efficiency measurement using market prices provides the critical link between DEA and the neo-classical theory of a competitive firm. The book also covers several forms of stochastic DEA in detail.

Data Envelopment Analysis - Joe Zhu 2014-05-06

The current book introduces the methodology of data envelopment analysis (DEA) as a data-oriented operations analytics. This data analysis tool analyzes multiple performance metrics, integrates multi-dimensional data into a composite index, and recommends directions for improvement. A number of DEA books have been written for conventional and new DEA models. Yet, many of these books still require fundamental and necessary knowledge on linear mathematical optimization. This book is uniquely designed to present the DEA methodology in an applied setting where a reader is not required to have the knowledge on linear programming and linear algebra.

Handbook on Data Envelopment Analysis - William W. Cooper 2004-03-31

This Handbook has been developed as a comprehensive reference for researchers, students and practitioners. It reflects the state-of-the-art in Data Envelopment Analysis. It also represents a milestone in the progression of a continuously advancing methodology. which has extensive utility. Written by experts - who are the major research contributors to the topics covered - the Handbook is organized in three sections. The first section is a comprehensive examination of the basic DEA models and DEA extensions. The second section consists of a collection of coverages by persons experienced in applications to the areas of banking, education, sports, retailing, health care, etc. The final section is a review of current DEA software technology.