Read Book Implementing Dea Models In The R Program Pdf For Free

Advances in DEA Theory and Applications Efficiency Models in Data Envelopment Analysis Data Envelopment Analysis: Theory, Methodology, and Applications Data Envelopment Analysis Handbook on Data Envelopment Analysis Data Envelopment Analysis Data Envelopment Analysis Decision Making and Performance Evaluation Using Data Envelopment Analysis Data-Enabled Analytics Network Data Envelopment Analysis Data Envelopment Analysis with R Data Envelopment Analysis Data Envelopment Analysis DEA-Based Benchmarking Models in Supply Chain Management Data Envelopment Analysis Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis Quantitative Models for Performance Evaluation and Benchmarking Health Care Benchmarking and Performance Evaluation A Bounded Data Envelopment Analysis Model in a Fuzzy Environment with an Application to Safety in the Semiconductor Industry Data Envelopment Analysis: Theory, Methodology, and Applications Data Envelopment Analysis in the Service Sector Advances in Data Envelopment Analysis Dynamics of Data Envelopment Analysis Regional Performance Measurement and Improvement Data Envelopment Analysis in the Financial Services Industry The Examination of Allocative and Overall Efficiencies in DEA Using Shadow Prices, and the Introduction of an Omni-oriented Radial DEA Model [microform] Data Envelopment Analysis and Its Applications to Management Introduction to Data Envelopment Analysis and Its Uses Introduction to the Theory and Application of Data Envelopment Analysis Handbook of Operations Analytics Using Data Envelopment Analysis Nonparametric Estimation of Educational Production and Costs using Data Envelopment Analysis Service Productivity Management Quantitative Modelling in Marketing and Management (second Edition) Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis Benchmarking with DEA, SFA, and R Handling Proportional Data and Weight Constraints in Data Envelopment Analysis (DEA) Data envelopment analysis based on triangular neutrosophic numbers Data Envelopment Analysis with GAMS Uncertainty in Data Envelopment Analysis Modeling Performance Measurement

Modeling Performance Measurement Dec 30 2019 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.

A Bounded Data Envelopment Analysis Model in a Fuzzy Environment with an Application to Safety in the Semiconductor Industry Oct 20 2021 Data Envelopment Analysis (DEA) is a mathematical programming approach for evaluating the relative efficiency of Decision Making Units (DMUs) in organizations. The conventional DEA methods require accurate measurement of both the inputs and outputs. However, the observed values of the input and output data in real-world problems are often imprecise or vague. Fuzzy set theory is widely used to quantify imprecise and vague data in DEA models. In this paper, we propose a four-step bounded fuzzy DEA model where the inputs and outputs are assumed to be fuzzy numbers. In the first step we create a hypothetical fuzzy anti-ideal DMU and calculate its best fuzzy relative efficiency. In the second step we propose a pair of fuzzy DEA models to obtain the upper- and the lower-bounds of the fuzzy efficiency where the lower-bound is at least equal to the fuzzy efficiency of the anti-ideal DMU and the upper-bound is at most equal to one. In step three we use multi-objective programming to solve the proposed fuzzy programs. In the fourth step we propose a new method for ranking the bounded fuzzy efficiency scores. We also present a case study to demonstrate the applicability of the proposed model and the efficacy of the procedures and algorithms in measuring the safety performance of eight semiconductor facilities.

Advances in DEA Theory and Applications May 07 2023 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 May 27 2022 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 perfoemance 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.

Modeling Data Irregularities and Structural Complexities in Data Envelopment Analysis Jan 23 2022 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.

Efficiency Models in Data Envelopment Analysis Apr 06 2023 This volume discusses the latest techniques and their economic applications for modern industries like computer, pharmaceutical, banking and other manufacturing. Both econometric and mathematical programming techniques are analyzed so as to develop a synthetic approach.

Handbook of Operations Analytics Using Data Envelopment Analysis Nov 08 2020 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 band 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.

Data Envelopment Analysis Apr 25 2022 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 in the Financial Services Industry Apr 13 2021 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: Theory, Methodology, and Applications Sep 18 2021 This book represents a milestone in the progression of Data Envelop ment 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 ex tensions. 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 develop ments. 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.

Quantitative Modelling in Marketing and Management (second Edition) Aug 06 2020 "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."--

Introduction to Data Envelopment Analysis and Its Uses Jan 11 2021 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.

Quantitative Models for Performance Evaluation and Benchmarking Dec 22 2021 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.

Network Data Envelopment Analysis Jul 29 2022 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: Theory, Methodology, and Applications Mar 05 2023 This book represents a milestone in the progression of Data Envelop ment 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 ex tensions. 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 develop ments. 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.

Benchmarking with DEA, SFA, and R Jun 03 2020 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.

Introduction to the Theory and Application of Data Envelopment Analysis Dec 10 2020 The book aims to introduce the reader to DEA in the most accessible manner possible. It is specifically aimed at those who have had no prior exposure to DEA and wish to learn its essentials, how it works, its key uses, and the mechanics of using it. The latter will include using DEA software. Students on degree or training courses will find the book especially helpful. The same is true of practitioners engaging in comparative efficiency assessments and performance management within their organisation. Examples are used throughout the book to help the reader consolidate the concepts covered.

The Examination of Allocative and Overall Efficiencies in DEA Using Shadow Prices, and the Introduction of an Omni-oriented Radial DEA Model [microform] Mar 13 2021 This research presents a couple of important theoretical developments to the field of Data Envelopment Analysis (DEA). The original models developed by Charnes, Cooper and Rhodes [CHAR78], and Banker, Charnes and Cooper [BANK84b] were both radial models. These models, and their varied extensions have remained the most popular DEA models in terms of utilization. Radial models presented in the DEA literature employ either and input- or output-orientation. Furthermore, the benchmark targets they determined for inefficient units were mostly based on the notion of maintaining the same input and output mixes originally employed by the evaluated unit. New DEA models were formulated here to extend the capabilities of DEA in both of these areas. The omni-oriented radial DEA simultaneously considers both input reduction and output expansion, and provides a single efficiency measure based on both of these goals. A methodology was also developed to estimate allocation and overall efficiency in the absence of defined input and output prices. The benchmarks determined from models based on this methodology will consider all possible input mixes, output mixes, or both. Both of these developments were illustrated on a model of the financial intermediary function of a bank branch network.

Data Envelopment Analysis Nov 01 2022 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.

Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis Jul 05 2020 Organizations can use the valuable tool of data envelopment analysis (DEA) to make informed decisions on developing successful strategies, setting specific goals, and identifying underperforming activities to improve the output or outcome of performance measurement. The Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis highlights the advantages of using DEA as a tool to improve business performance and identify sources of inefficiency in public and private organizations. These recently developed theories and applications of DEA will be useful for policymakers, managers, and practitioners in the areas of sustainable development of our society including environment, agriculture, finance, and higher education sectors.

Handbook on Data Envelopment Analysis Jan 03 2023 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.

Decision Making and Performance Evaluation Using Data Envelopment Analysis Sep 30 2022 This book offers new transparent views and step-by-step methods for performance evaluation of a set of units using Data Envelopment Analysis (DEA). The book has twelve practical chapters. Elementary concepts and definitions are gradually built in Chapters 1-6 based upon four examples of one input and one output factors, two input factors, two output factors, and four input

and three output factors. Simultaneously, the mathematical foundations using linear programming are also introduced without any prerequisites. A reader with basic knowledge of mathematics and computers is able to understand the contents of the book. In addition, to prevent pre-judgment about the available concepts and definitions in the DEA literature, some new phrases are introduced and, after elucidating each phrase in detail in Chapters 1-6, they are reintroduced for industry-wide accuracy in Chapter 7. After that, some of the more advanced DEA topics are illustrated in Chapters 8-12, such as: production-planning problems, output-input ratio analysis, efficiency over different time periods, Malmquist efficiency indexes, and a delta neighborhood model. A clear overview of many of the elementary and advanced concepts of DEA is provided, including Technical Efficiency, Relative Efficiency, Cost/Revenue/Profit Efficiency, Price/Overall Efficiency, the DEA axioms, the mathematical background to measure technical efficiency and overall efficiency, the multiplier/envelopment form of basic DEA models in input/output-orientation, the multiplier/envelopment of Additive DEA model, the multiplier/envelopment of slacks-based models, and others. The book also covers a variety of DEA techniques, input-output ratio analysis, the natural relationships between DEA frontier and the ratio of output to input factors, production-planning problems, planning ideas with a centralized decision-making unit, context-dependent DEA, Malmquist efficiency index, efficiency over different time periods, and others. End-of-chapter exercises are provided for each chapter.

Data-Enabled Analytics Aug 30 2022 This book explores the novel uses and potentials of Data Envelopment Analysis (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.

Dynamics of Data Envelopment Analysis Jun 15 2021 Data envelopment analysis develops a set of nonparametric and semiparametric techniques for measuring economic efficiency among firms and nonprofit organizations. Over the past decade this technique has found most widespread applications in public sector organizations. However these applications have been mostly static. This monograph extends this static framework of efficiency analysis in several new directions. These include but are not limited to the following: (1) a dynamic view of the production and cost frontier, where capital inputs are treated differently from the current inputs, (2) a direct role of the technological progress and regress, which is so often stressed in total factor productivity discussion in

modem growth theory in economics, (3) stochastic efficiency in a dynamic setting, where reliability improvement competes with technical efficiency, (4) flexible manufacturing systems, where flexibility of the production process and the economies of scope play an important role in efficiency analysis and (5) the role of economic factors such as externalities and input interdependences. Efficiency is viewed here in the framework of a general systems theory model. Such a view is intended to broaden the scope of applications of this promising new technique of data envelopment analysis. The monograph stresses the various applied aspects of the dynamic theory, so that it can be empirically implemented in different situations. As far as possible abstract mathematical treatments are avoided and emphasis placed on the statistical examples and empirical illustrations.

Handling Proportional Data and Weight Constraints in Data Envelopment Analysis (DEA) May 03 2020 This dissertation addresses two problems when handling proportional data and weight constraints frequently arise in Data Envelopment Analysis (DEA), motivated by several healthcare studies. DEA is a mathematical method for measuring the relative efficiencies of multiple decision making units (DMUs) at transforming multiple inputs (e.g., number of medical staff, number of beds, per patient costs) into multiple outputs (e.g., mortality, clinical outcomes, patient satisfaction), also computing target values and optimal weights for each input and output, where here the DMUs could be hospitals, departments, healthcare systems, physicians, public policies, and so on. The primary contributions of this research are methods for (1) handling proportional and bounded data, (2) rationally constraining the input-output weights, and (3) measuring efficiency robustness over ranges of possible weight constraints. The first problem is motivated by the fact that in some DEA applications the usual assumption is violated that all data must only be nonnegative, namely for proportional data bound between 0 and 1 (e.g., mortality, adverse event, defect, or market penetration rates). Solving conventional constant-returns-to-scale (CRS) DEA models in such cases can produce output targets exceeding their upper bounds (e.g., 130 percent survival). Values bound on a fixed interval (e.g., satisfaction scores between 1 and 5) present a similar problem. Given the common use of CRS models, this research proposes and investigates an odds-ratio transformation that forces all targets between their bounds. The second problem is motivated by periodic "irrational" weights, such as placing less (or no) weight on mortality than on patient satisfaction. Since the two most common approaches in the literature (rank ordering or setting lower bounds for individual weights) have scale, solution feasibility, and arbitrariness limitations, we propose and compare a method that constrains each weight by a percent of the total

(POT) of all weights. To remove the subjectivity of these percentages and as a measure of efficiency robustness, iterative search, numeric, and Monte Carlo algorithms (the last implemented in an Excel-based program) are developed that determine POT regions within which each DMU is on the frontier and compute an overall "hyper efficiency" score. All methods are demonstrated on several analyses of VA medical facilities, the U.S. News and World Report (USNWR) "best" departments, and national healthcare systems using data from the World Health Organization (WHO). Interestingly, results for U.S. hospitals and national healthcare systems both are poorly correlated with the more arbitrary weighted USNWR and WHO rankings.

Data Envelopment Analysis and Its Applications to Management Feb 09 2021 Data envelopment analysis (DEA), a non-parametric technique, has emerged as a popular management tool for measuring the performance of a set of entities, known as decision making units. This book, Data Envelopment Analysis and Its Applications to Management, is a collection of contributions from DEA experts from various countries. It covers a wide range of research papers from the theoretical development of DEA to its applications in various sectors such as economy, banking, education, revenue management, sports, branch networks, cities, and live stock production systems. The book is useful for researchers as well as practitioners who intend to apply DEA to their strategic and managerial decisions.

Data Envelopment Analysis Dec 02 2022 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.

Data Envelopment Analysis in the Service Sector Aug 18 2021 This volume emphasizes the possibilities to adjust and develop the methodology of Data Envelopment Analysis in order to meet the requirements of the service sector.

Advances in Data Envelopment Analysis Jul 17 2021 Data Envelopment Analysis (DEA) is often overlooked in empirical work such as diagnostic tests to determine whether the data conform with technology which, in turn, is important in identifying technical change, or finding which types of DEA models allow data transformations, including dealing with ordinal data. Advances in Data Envelopment Analysis focuses on both theoretical developments and their

applications into the measurement of productive efficiency and productivity growth, such as its application to the modelling of time substitution, i.e. the problem of how to allocate resources over time, and estimating the "value" of a Decision Making Unit (DMU).
Contents:AcknowledgementsPrefaceIntroduction:The DEA Technology and Its Representation(Axiomatic) Properties of the DEA ModelAppendixLooking at the Data in DEA:Data DiagnosticsTechnical ChangeData TranslationAppendix: Distance FunctionsDEA and Intensity Variables:On Shephard's Duality TheoryAdjoint Transformations in DEAThe Diet ProblemPricing Decision Making UnitsDEA and Directional Distance Functions:Directional VectorsAggregation and Directional VectorsEndogenizing the Directional VectorAppendixDEA and Time Substitution:Theoretical UnderpinningReassessing the EU Stability and Growth PactMethodSome Limitations of Two DEA Models:The Non-Archimedean and DEASuper-Efficiency and ZerosReferences Readership: Advanced postgraduate students and researchers in operations research and economics with a particular interest in production theory and operations management.
Keywords:Optimization Techniques;Multifactor Productivity;Intertemporal Firm Choice;Technological Change: Choices and Consequences;Diffusion Processes;Data Envelopment Analysis;Operations Research

Data Envelopment Analysis with GAMS Mar 01 2020 This book provides a comprehensive and practical introduction to Data Envelopment Analysis (DEA). It explains how this non-parametric technique is used to measure performance and extract efficiency from homogeneous entities within a production procedure. It situates DEA within a growing field of productivity analysis and performance measurement, for which numerous models have been proposed. This book encapsulates all of the advances in DEA models proposed in the literature. These models are presented in the context of the GAMS software, which is a powerful tool for mathematical programming models. This book serves two educational purposes: it introduces readers to DEA models and provides examples using GAMS. In addition, the reader is introduced to GAMS programming, as well as innovative and practical applications. GAMS codes are available for free, allowing readers to test and expand the models to meet their specific needs.

Health Care Benchmarking and Performance Evaluation Nov 20 2021 This new edition continues to emphasize the use of data envelopment analysis (DEA) to create optimization-based benchmarks within hospitals, physician group practices, health maintenance organizations, nursing homes and other health care delivery organizations. Suitable for graduate students learning DEA applications in health care as well as for practicing administrators, it is divided

into two sections covering methods and applications. Section I considers efficiency evaluations using DEA; returns to scale; weight restricted (multiplier) models; non-oriented or slack-based models, including in this edition two versions of non-controllable variable models and categorical variable models; longitudinal (panel) evaluations and the effectiveness dimension of performance evaluation. A new chapter then looks at new and advanced models of DEA, including super-efficiency, congestion DEA, network DEA, and dynamic network models. Mathematical formulations of various DEA models are placed in end-of-chapter appendices. Section II then looks at health care applications within particular settings, chapter-by-chapter, including hospitals, physician practices, nursing homes and health maintenance organizations (HMOs). Other chapters then explore home health care and home health agencies; dialysis centers, community mental health centers, community-based your services, organ procurement organizations, aging agencies and dental providers; DEA models to evaluate provider performance for specific treatments, including stroke, mechanical ventilation and perioperative services. A new chapter then examines international-country-based applications of DEA in health care in 16 different countries, along with OECD and multi-country studies. Most of the existing chapters in this section were expanded with recent applications. Included with the book is online access to a learning version of DEA Solver software, written by Professor Kaoru Tone, which can solve up to 50 DMUs for various DEA models listed in the User's Guide at the end of the book.

Data envelopment analysis based on triangular neutrosophic numbers Apr 01 2020 Data envelopment analysis (DEA) is one of the best mathematical techniques to compute the overall performance of units with some inputs and outputs. The original DEA methods are developed to tackle the information based on the crisp number but no ability to handle the indeterminacy, impreciseness, vagueness, inconsistent, and incompleteness information such as triangular neutrosophic numbers (TNNs). This study attempts to establish a new model of DEA, where the information on decision-making units is TNNs. Initially, the concept and features of a conventional DEA model and the comparative TNNs are discussed. Besides, some new ranking functions of TNNs are presented. Furthermore, based on the mentioned ranking functions, an algorithm for solving the new model has been established. A comparison of the new model with an existing method and other kinds of uncertainty tools has been provided. In comparison with the existing methods, the significant characteristic of the new model is that it can handle the triangular neutrosophic information simply and effectively. Finally, the implementation of this strategy for an example has been applied for various models of DEA.

Regional Performance Measurement and Improvement May 15 2021 This is the first book to fully introduce a newly developed distance friction minimization (DFM) model, which is one of the new efficiency improvement projection approaches in data envelopment analysis (DEA). The DFM model can produce a most effective solution in efficiency improvement projections for inefficient spatial entities (decision-making units). The book provides a set of fresh contributions to a quantitative assessment of the performance of such policy entities. First it offers a state-of-the art overview of current DEA models and approaches, followed by the operational design of various new types of DEA models, each of them addressing weaknesses in traditional DEA approaches. Then it illustrates the assessment potential of DEA — and its new variants, in particular, the DFM model and subsequent extensions — on the basis of a broadly composed collection of empirical case studies, centering mainly but not exclusively on Japan and other Asian nations.

DEA-Based Benchmarking Models in Supply Chain Management Mar 25 2022 Data Envelopment Analysis (DEA) is a mathematical methodology for benchmarking a group of entities in a group. The inputs of a DEA model are the resources that the entity consumes, and the outputs of the outputs are the desired outcomes generated by the entity, by using the inputs. DEA returns important benchmarking metrics, including efficiency score, reference set, and projections. While DEA has been extensively applied in supply chain management (SCM) as well as a diverse range of other fields, it is not clear what has been done in the literature in the past, especially given the domain, the model details, and the country of application. Also, it is not clear what would be an acceptable number of DMUs in comparison to existing research. This paper follows a recipe-based approach, listing the main characteristics of the DEA models for supply chain management. This way, practitioners in the field can build their own models without having to perform detailed literature search. Further guidelines are also provided in the paper for practitioners, regarding the application of DEA in SCM benchmarking.

Nonparametric Estimation of Educational Production and Costs using Data Envelopment Analysis Oct 08 2020 This book provides a complete analysis of educational production and costs using the nonparametric technique known as Data Envelopment Analysis (DEA). The book focuses on estimation of technical, allocative and scale efficiency in the public sector characterized by the influence of exogenous socio-economic variables. State of the art DEA models will be presented and fully discussed. Specific education topics important to policy makers including adequacy, technical, allocative and scale efficiency, productivity and environmental costs will be analyzed. To illustrate how these techniques can

be applied to school systems worldwide, the authors use data on Australian elementary and high schools to develop nonparametric measures that will help inform current policy debate in Australia. The purpose of the book is to provide a comprehensive analysis of educational production using numerous public sector DEA models. We provide a review of DEA with SAS programming code to estimate technical, scale and allocative efficiency in chapter 2. In chapter 3, we extend the DEA models to control for exogenous factors of production. SAS code is also provided to estimate all public sector models. We use simulated data to illustrate the results. Chapters 4–6 provide a complete analysis of the primary and secondary schools. We analyze input and output oriented models and derive measures of technical, allocative and scale efficiency. We also provide estimates of environmental costs that arise from schools facing different operating environments based on socioeconomic conditions. In addition, we show how DEA can provide insight on adequacy—the minimum cost of providing a pre-defined adequate education. The models presented are consistent with public sector production in general and educational production in particular. We also provide a complete analysis of educational productivity for both primary and secondary schools using state of the art public sector Malmquist measures. The authors use current data on Australian schools to highlight important policy questions related to efficiency and productivity given concerns that schools are not allocatively scarce resources in an economic efficient way. This research focus comes at an important watershed moment in the Australian Federal Governments' current involvement in designing new nationally consistent funding models for both government and non-government schooling sectors with effect from 2014. A new National School Resourcing Standard is proposed to be implemented signaling a move to resource adequacy, school efficiency and value for money dimensions. These standards are consistent with the measures presented and estimated in this book. As a result, the models implemented in this book can serve as the basis to evaluate the funding changes associated with the transition from a 'centralized' to a new 'decentralized' set of school funding arrangements.

Data Envelopment Analysis Feb 21 2022 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.

Service Productivity Management Sep 06 2020 Here is an in-depth guide to the most powerful available benchmarking technique for improving service organization performance — Data Envelopment Analysis (DEA). The book outlines DEA as a benchmarking technique, identifies high cost service units, isolates specific changes for elevating performance to the best practice services level providing high quality service at low cost and most important, it guides the improvement process.

Uncertainty in Data Envelopment Analysis Jan 29 2020 Classical data envelopment analysis (DEA) models use crisp data to measure the inputs and outputs of a given system. In cases such as manufacturing systems, production processes, service systems, etc., the inputs and outputs may be complex and difficult to measure with classical DEA models. Crisp input and output data are fundamentally indispensable in the conventional DEA models. If these models contain complex uncertain data, then they will become more important and practical for decision makers. Uncertainty in Data Envelopment Analysis introduces methods to investigate uncertain data in DEA models, providing a deeper look into two types of uncertain DEA methods, fuzzy DEA and belief degree-based uncertainty DEA, which are based on uncertain measures. These models aim to solve problems encountered by classical data analysis in cases where the inputs and outputs of systems and processes are volatile and complex, making measurement difficult. Introduces methods to deal with uncertain data in DEA models, as a source of information and a reference book for researchers and engineers Presents DEA models that can be used for evaluating the outputs of many reallife systems in social and engineering subjects Provides fresh DEA models for efficiency evaluation from the perspective of imprecise data Applies the fuzzy set and uncertainty theories to DEA to produce a new method of dealing with the empirical data

Data Envelopment Analysis Feb 04 2023 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. **Data Envelopment Analysis with R** Jun 27 2022 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.

Envelopment Analysis
- Quantitative Models For Performance Evaluation And Benchmarking
- Health Care Benchmarking And Performance Evaluation
- A Bounded Data Envelopment Analysis Model In A Fuzzy Environment With An Application To Safety In The Semiconductor Industry
- Data Envelopment Analysis Theory Methodology And Applications
- Data Envelopment Analysis In The Service Sector
- Advances In Data Envelopment Analysis
- Dynamics Of Data Envelopment Analysis
- Regional Performance Measurement And Improvement
- Data Envelopment Analysis In The Financial Services Industry
- The Examination Of Allocative And Overall Efficiencies In DEA Using Shadow Prices And The Introduction Of An Omni oriented Radial DEA Model Microform
- Data Envelopment Analysis And Its Applications To Management
- Introduction To Data Envelopment Analysis And Its Uses
- Introduction To The Theory And Application Of Data Envelopment Analysis
- Handbook Of Operations Analytics Using Data Envelopment Analysis
- Nonparametric Estimation Of Educational Production And Costs Using Data Envelopment Analysis
- Service Productivity Management
- Quantitative Modelling In Marketing And Management Second Edition
- Handbook Of Research On Strategic Performance Management And Measurement Using Data Envelopment Analysis
- Benchmarking With DEA SFA And R
- Handling Proportional Data And Weight Constraints In Data Envelopment Analysis DEA
- Data Envelopment Analysis Based On Triangular Neutrosophic Numbers
- Data Envelopment Analysis With GAMS
- Uncertainty In Data Envelopment Analysis
- Modeling Performance Measurement