Preface

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William W. Cooper (right), with his wife, Ruth Cooper, at Carnegie Mellon University.

This volume of the *Annals of Operations Research on Performance Evaluation and Beyond: Data Envelopment Analysis Research Frontiers* is in honor of Dr. William W. Cooper for his pathbreaking contributions to diverse fields including DEA.

Dr. Cooper is the Foster Parker Centennial Professor Emeritus of Finance and Management at the McCombs School of Business of The University of Texas at Austin, and the Nadya Kozmetsky Scott Centennial Fellow at the IC² Institute, The University of Texas at Austin. Dr. Cooper holds honorary D.Sc. degrees from Ohio State and Carnegie Mellon Universities in the U.S. and the degree of Doctorado Honoris Causa from the University of Alicante in Spain. He taught at the University of Chicago, Carnegie Mellon University, and Harvard
University’s Graduate School of Business prior to coming to The University of Texas at Austin. He was the founding Dean of the School of Urban and Public Affairs at Carnegie Mellon University. A founder and the first president of the Institute of Management Sciences, Dr. Cooper has also served on the editorial boards of Management Science, Operations Research, Naval Research Logistics Quarterly, Accounting Review, European Journal of Operational Research, Journal of Productivity Analysis, and Socio-economic Planning Sciences. He was editor-in-chief of Auditing: A Journal of Practice and Theory. Dr. Cooper was co-recipient of the John von Neumann Theory Medal jointly awarded by the Institute of Management Sciences and the Operations Research Society of America. He was also co-recipient of an American Institute of Accountants award for the most valuable article on an accounting topic, the Distinguished Service in Auditing Award of the American Accounting Association’s Auditing Section, and three McKinsey Foundation awards for the most valuable article of the year on a management science topic. Dr. Cooper is author or coauthor of some 500 journal articles and 25 books and monographs. He has served as a consultant to more than 200 private corporations and governmental agencies. He has initiated and made significant contributions to a number of areas in management science and operations research. Among, but not limited to, these areas are linear programming, goal programming, chance constrained programming, inequality constrained regressions, semi-infinite programming, and the more recently developed area of data envelopment analysis (DEA), which has an extensive record of applications and publications.

Data Envelopment Analysis (DEA) was established in 1978 as a methodology used in relative efficiency evaluation. While DEA has been regarded as a powerful and effective new methodology for organizing and analyzing data, identifying the best practice frontiers and inefficiency sources, and providing improved performance, the methodology of DEA in fact goes beyond that. The 21 papers in this volume present new DEA theory developments, and creative DEA applications and uses.

The first four papers develop models for efficiency evaluation of supply chain or multi-stage production systems. Chen, Liang and Yang investigate the efficiency game between two supply chain members under central control and decentralized control cases. A bargaining model is developed to analyze the supply chain’s decision process and to determine the best efficiency plan strategy. Biehl, Cook and Johnston study the efficiency of joint decision making in buyer-supplier relations. Liang, Yang, Cook and Zhu develop several DEA-based approaches for characterizing and measuring supply chain efficiency. The models are illustrated in a seller-buyer supply chain context, when the relationship between the seller and buyer is treated first as one of leader-follower, and second as one that is cooperative. Golany, Hackman and Pasy present an approach to simultaneously measure the efficiency of aggregate DMUs with two subsystems in series, which goes beyond simply applying standard DEA analysis to each subsystem separately.

The next four papers present some new developments and findings in DEA theory. Tone and Sahoo propose a new scheme for measuring scale elasticity of production, based on a new cost efficiency model. Huang, Cheung and Wang develop some new Cone DEA models which offer improved definitions of efficiency over general cone and polyhedral cone structures. Liu, Sharp and Wu attempt to systematize the building of DEA models and highlight three building blocks in DEA, namely preference sets, production sets, and performance measures. Silva, Portela and Thanassouli re-assess three independently developed approaches that are aimed at solving the problem of zero-weights or non-zero slacks in DEA.

The remaining 13 papers offer new and novel DEA applications—some include new DEA developments. Førsund and Zanola apply DEA to the arts auction market and propose a categorical DEA model variation as an alternative way of testing the effect of the auction houses
Marco-Serrano uses data on the *Circuít Teatral Valencià*, a Spanish regional theatres network, to develop empirically the concept of managerial efficiency in the performing arts, and sets up a framework that allows one to monitor it.

Gregoriou and Chen examine the performance of Commodity Trading Advisors (CTAs) using fixed and variable benchmarking DEA models. The effectiveness of using benchmarking models in a DEA setting will provide investors with an alternative technique in assessing performance and identifying efficient CTAs. Hadley and Ruggiero analyze the performance of Major League Baseball’s arbitration process. They derive the “lower” and “upper” bound of a player’s expected contract zone.

Mateo, Coelli and O’Donnell propose a range of dynamic DEA models which allow information on costs of adjustment to be incorporated into the DEA framework. Womer, Bougnol, Dula and Retzlaff-Roberts develop a novel approach for conducting benefit-cost analysis (BCA) in order to overcome the three prominent current shortcomings of BCA. Chang and Mashruwala employ DEA to re-examine the issue as to whether a natural monopoly existed for the Bell system, using annual time series data for 1947–1977.

Rouse and Swales use DEA to study the issue of pricing public health care services. Prior presents a formulation that allows the preservation of TQM postulates. The decomposition in the Malmquist productivity index shows an improvement in productivity and a positive technical change, especially when quality is introduced. Sherman and Zhu develop a procedure called Q-DEA to incorporate the quality factors with an empirical study in a large US bank. Pastor, Lovell and Tulkens employ a complementary pair of nonparametric techniques to evaluate the financial performance of a large European savings bank.

Bougnol and Dula aim to validate the use of DEA in ranking universities by comparing DEA results with those produced by a group of experts. Sarkis evaluates a number of hypotheses concerning the relationship between environmental performance and adoption of environmental and risk management practices, especially among smaller organizations.

Finally, the editors would like to thank the reviewers for their hard work, time, and valuable comments and suggestions that have made this volume possible.