

following categories: purposes, politics, approaches to building, focus on functions, and components. In Part 2, they describe the Air Force's EFMS to illustrate the points made in later chapters. In Part 3, they describe a step-by-step approach, a combination of the traditional systems-development life-cycle approach and an iterative approach, to building an ODSS. In Part 4, they suggest principles of model-base design, such as finding the optimal number of models, cost-effective model building, model integration, and the like, and illustrate with concrete examples from the EFMS system. Part 5 is concerned with technical and managerial issues related to the successful implementation of an ODSS. The technical issues include programming, designing user interfaces, creating the system's databases, preparing documentation, and updating the system. Managerial issues discussed include project management and transferring models from analysts to implementors.

A weakness of the book is its heavy dependence on examples of the EFMS developed for the US Air Force. To general readers with a limited interest in air force personnel matters, parts of this book may be somewhat arcane. One more weakness I see is inappropriate treatment of all DSS subsystems, such as group DSS, executive information systems, and the like; the authors compare ODSS only with a single-user DSS.

In spite of its weaknesses, this book is the first book on how to build ODSSs. In the study of DSSs, DSS concepts must be supported by evidence drawn from actual practice. The authors provide step-by-step guidance to those who are interested in

building an ODSS, blending material from the growing body of DSS knowledge accumulated over the past two decades and their knowledge gained in developing a large-scale DSS that absorbed 125 person-years. This book is suitable for practitioners, managers, and information systems development personnel (programmers, systems analysts, users, and information systems project managers), who are or may become involved in developing an ODSS. Although the authors do not claim that this book is for DSS researchers, I believe it will provide researchers and graduate students with several important lessons and useful insights.

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GULLEDGE, THOMAS R. AND LOVELL, C. A. KNOX, eds. 1992, *International Applications of Productivity and Efficiency Analysis*, Kluwer Academic Publishers, Dordrecht, The Netherlands, 199 pp., \$80.00/Dfl170.00.

The book contains 10 refereed articles, most which were presented at the joint national meeting of ORSA and TIMS in Philadelphia in October 1990, where the editors of the book organized a cluster of sessions on the theme of the conference: "Productivity and Global Competition." The articles in the book concern a remarkably broad range of techniques and empirical applications of modern productivity and efficiency measurement techniques.

Efficiency and productivity are important characteristics of performance, although most traditional analyses have assumed

that all producers are efficient. All the same, literature focusing on variations in efficiency has emerged in the past 10 to 15 years. The present book belongs to this branch of literature, and several of the authors have contributed to developing techniques for measuring efficiency and productivity.

In about half of the papers, the authors describe applications of data envelopment analysis and variations of this technique in such diverse areas as Swedish electricity retail distribution, Norwegian ferries, Chinese bus firms, and Swedish pharmacies. In the other half of the papers, the authors describe the use of econometric frontier models in assessing the productive efficiency of French workers' cooperatives, urban transit firms in Belgium, US natural gas distribution, European railways, and Indian paddy farmers. A couple of papers also compare two or more techniques.

One of these comparisons of alternative estimation techniques is made by Finn Før-sund in his article "A comparison of parametric and non-parametric efficiency measures: The case of Norwegian Ferries." He compares a standard data envelopment approach with a deterministic parametric frontier function approach. Such comparisons are considered important because they serve to cross-check methodologies, since greater confidence can generally be attached to theories or statements that have survived contradiction.

In the introduction, the editors state that most of the authors use panel data approaches; this enhances the relevance of the book since much current research in the field is focused on developing appropriate techniques for use with panel data.

The article by Färe, Grosskopf, Lindgren, and Ross, "Productivity changes in Swedish pharmacies 1980–1989: A non-parametric Malmquist approach" concerns such a technique. In this article, the authors describe a methodology for calculating input-based Malmquist productivity indices as the ratio of input distance functions. Another interesting article is Thiry and Tulkens's "Allowing for inefficiency in parametric estimation of production functions for urban transit firms." Here, the authors use a two-step method, first identifying efficient observations by the nonparametric free disposal hull method and then estimating parametric production frontiers through OLS applied to the efficient subset. They extend this method to a panel data context.

As a whole, the articles represent state-of-the-art applications of the most important techniques within the field of productivity and efficiency analysis; and several authors describe new techniques or provide new extensions of existing ones. Since most of the papers use panel data in a variety of approaches, the book would be an excellent starting point for students and researchers who want to become familiar with the use of these techniques. As an introduction to productivity and efficiency research, the book could be supplemented with another recent book, Fried, Lovell, and Schmidt's (1993) *The Measurement of Productive Efficiency: Techniques and Applications*.

The articles contained in Gullede and Lovell's book have previously been published as a special issue of the *Journal of Productivity Analysis*. I highly recommend the book to researchers in the area of pro-

ductivity and efficiency analysis who do not already subscribe to this journal. The book should also be a valuable addition to university libraries within such fields as management science, business administration, and economics.

### Reference

Fried, Harold O.; Lovell, C. A. Knox; and Schmidt, Shelton S. eds. 1993, *The Measurement of Productive Efficiency: Techniques and Applications*, Oxford University Press, New York and Oxford.

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ANSELL, J. AND WHARTON, F., eds. 1992, *Risk: Analysis, Assessment and Management*, John Wiley and Sons, New York, 220 pp., \$59.95.

Jake Ansell and Frank Wharton have collected 13 papers, almost all by professors from Great Britain, on the topic of risk analysis. The chapters range from completely nonquantitative expositions to descriptions of models that can be understood only by readers with an intermediate level of statistics and reliability theory.

Wharton proposes basic definitions, concepts, and principles concerning the management of risk in chapter 1. As an example of such a definition, he considers historical definitions of risk that emphasize either positive or negative consequences, then concludes with the neutral definition "A risk is any unintended or unexpected outcome of a decision or course of action." He considers statistical analysis, economics, psychology, and politics in conjunction with this definition. The second chapter, by C. Chapman, contains an engineering approach to risk management with partic-

ular emphasis on examples of underwater pipe-laying projects.

In the third chapter, "The perception of risk," P. Carter and N. Jackson, stress the possibility of failure over the probability of failure. This chapter is completely non-quantitative, and the authors use case studies to illustrate their more general thoughts on the perception of risk. The first case study considers the RMS Titanic, which had 2,201 passengers on her maiden voyage yet carried lifeboats for only 1,176 passengers. The designers met the legal requirements of the time but not the number of lifeboats necessary for the accident, probably because of the perception that the Titanic was unsinkable. The second case study concerns the Challenger Space Shuttle accident, which was launched despite the misgivings of engineers. Finally, the authors describe and analyze the Hixon Railway Crossing accident in Great Britain.

The area of application shifts abruptly in L. Thomas's particularly well-written chapter on financial risk management models. He surveys simple mathematical models for insurance, portfolio analysis, and options, describing existing quantitative financial analysis models and referencing more sophisticated techniques. He spends the bulk of the chapter on credit scoring, which is used to determine which applicants receive credit.

S. Ho and R. Pike give a detailed analysis of a survey of United Kingdom firms concerning their use of quantitative risk analysis techniques in their decision making. In this chapter, titled "The use of risk analysis techniques in capital investment appraisal," Ho and Pike give the propor-