

BOOK REVIEWS

Modern Actuarial Risk Theory (Modern ART), by Rob Kaas, Marc Goovaerts, Jan Dhaene, and Michel Denuit, 2001, Kluwer Academic Publishers

Reviewer: Patrick Brockett, University of Texas at Austin

Most texts in risk management repeat that measurement and analysis are fundamental precepts for the risk management process. Before one can measure, however, one needs to create appropriate metrics and models for analysis. In fact, the fundamental basis for the "science" of insurance-related calculations is called "actuarial analysis," a subject that has evolved from simple mathematical analysis concerning the financial consequences of uncertainty in cash flows and life contingencies to considerations of all aspects of financial analysis under uncertainty in a business context and quantitative analysis of the (future and contingent/state-dependent) effect of contingencies upon the financial conditions of a firm. While actuaries might lay claim to such territory, increasingly quantitatively oriented researchers in risk management and insurance and finance have also addressed similar such objectives. Accordingly, it behooves readers of the *Journal of Risk and Insurance (JRI)* to investigate parallel and complementary (actuarial) approaches to the analysis of the financial consequences of uncertainty in an insurance context as presented in insurance-related publications such as the *JRI*.

Actuarial science is currently undergoing great changes (e.g., from a somewhat "sterile" mathematical discipline to a dynamic one interacting continuously with finance, biostatistics, economics, and of course probability and statistics). The authors of this book are among the leaders in certain of the revolutionary advances currently taking place in the subject. Indeed, the topics discussed touch on many areas that have been previously available only in research paper form but not collected in a single, coherent, accessible location. This book does this and more. While certain of the topics of this book are more "classical" actuarial science in a sense, the book is also a breakthrough in conceptualizing and mathematically formulating problems associated with insurance processes (as related to financial consequences) and as such should be considered as recommended reading for researchers acquainted with the *JRI*.

The book takes a mathematical and formal approach to the examination of insurance problems (as would be expected), but it motivates the topic areas very well in each case and then "touches base" with reality sufficiently often to make the book appropriate for a student interested in "understanding" formally and in depth the actual applied subject area. For example, the first chapter, "Utility Theory and Insurance," begins with the usual analysis of utility models from a theoretical perspective but finishes with a discussion of the optimality of stop-loss models. Chapters 2, 3, and 4, respectively, examine the (now) traditional actuarial topics of individual risk models

(i.e., models for losses corresponding to individual policies/policyholders), collective risk models (models for groups of policies or the dynamics through time of a portfolio of homogeneous policyholders), and risk theory (the analysis of when the stochastic process of premium inflows minus the [random] claim outflows for a portfolio of policies would be expected to exceed the surplus of an insurance company [ruin of the company]). However, even here, in the “classical” part of the text, the authors present more modern and advanced approaches and discussions (e.g., they present Panjer’s recursion formula for computing the distribution of certain random sums of random variables, a discussion of “stop-loss” premiums, and certain modern approximations for ruin probabilities and loss probabilities). In the view of this reviewer, this makes this text useful for introducing the student to the modern approach to actuarial methods while at the same time making the (very mathematical) subject have a quite practical side. These chapters could be used to create a course for students studying for actuarial exams while remaining up-to-date mathematically. They are also important for Ph.D.-level researchers attempting to become acquainted with the rigorous analysis of insurance problems while also being cognizant of classical approaches.

The real strength of the book comes in the subsequent chapters, which deviate from the “classical” subjects and hence push the student to the forefront of modern actuarial research. These would be useful for a graduate class in actuarial science. “Modern” topics include an examination of various premium principles relevant to insurance (Chapter 5) and bonus-malus systems using Markov analysis, as used in certain automobile insurance plans (Chapter 6). Credibility theory (Chapter 7) gives a rigorous analysis of how much weight to give to data, including the Balanced Bühlmann Model, the Bühlmann-Straub Model, and the Negative Binomial Model for the Number of Car Insurance Claims. Chapter 8 considers generalized linear models, and Chapter 9 applies them to the estimation of Incurred But Not Reported (IBNR) claims. Chapter 10 discusses the modern topic of ordering of risks, which is of independent economic interest.

Overall, this is a very good, important book that should be read by actuarial researchers and graduate students interested in the mathematical analysis of insurance problems. The exercises make it a useful text for teaching as well. I recommend it as a text and as a part of the researcher’s library.

The Perception of Risk, by Paul Slovic, 2000, in Risk, Society and Policy Series, London and Sterling, Va., EARTHSCAN Publications Ltd

Reviewer: J. Francois Outreville, United Nations Staff Mutual Insurance Society, Geneva

The study of risk perception began in the 1970s as an exercise in individual psychology. Almost every study of risk perception has found age, education, and gender effects. For example, men seem to be less concerned about hazards than do women, and individuals in a group seem to be more risk averse than the group itself. Further research has also demonstrated that important social, political, and cultural factors play an important role.

This book is a collection of 26 articles on the perception of risk published in several journals from 1974 to 2000. The articles are unfortunately in chronological order (except for Chapter 16) and encompass early work in the psychometric paradigm that is distin-

