BOOK REVIEWS

M.A. COPPINI: *Incomes Redistribution Through Social Security*. Centro d'informazione e stampa universitaria (CISU) di Enzi Colamartini, Rome, ISBN 88 7975 201 4.

This is a recently published English translation (by David Giddings) of a book originally published in Italian 20 years ago. In spite of the time lapse, it does not appear to have been revised or updated and the references are all to work in the 1970s and earlier.

However, notwithstanding the fact that the basic principles of this work were presented as long ago as 1975 at the 6th ISSA Conference for Social Security Actuaries and Statisticians in Helsinki, it is likely that the methodologies will be unfamiliar to most actuaries, even to those working in the social security area.

The problems addressed are measuring the redistributive effects of a social security system and quantifying the effectiveness of the system in achieving redistributive objectives. The study of this sort of problem is perhaps more often associated with economists than actuaries, but the author has the advantage of being both an economist and an actuary.

Many readers may find the terminology and definitions somewhat hard to get to grips with. It may well be that some of the nuances are lost in translation, but it is often difficult to conceptualise what the notation is seeking to represent. The mathematics which follows is presented in full detail but requires careful study because of the definitional complexity.

Measuring the effects of redistribution presents many technical problems because of the complexity of the transfer of a social security system, which differ by branch (e.g. pensions, sickness, unemployment, health care, etc.) and have different impacts when looked at by individuals or by households, with effects which depend on earnings level, age, sex, duration of period of study, etc. The mathematics is complicated by the fact that most participants in the system are both contributors and beneficiaries, although not always at the same time. The author develops a generalised framework for examining and quantifying these effects and then elaborates a stochastic methodology, with conceptual roots in the insurance risk process and classical risk theory, as a way of providing practical solutions to a problem of rather daunting complexity.

Even more practical, perhaps, is the alternative approach of simulation which is offered by the author. However, dominant concerns in the book about the practicality of full simulation because of computing constraints more than anything serve to date the presentation. It seems unlikely that the application of these techniques would be much constrained today by

availability of computing power, although I suspect that availability of raw data on earnings distributions, contribution density and other factors will prove more of a constraint in practical applications of the techniques.

The author does present, in a final chapter, some examples of practical applications in the context of the Italian social security system. Since the ground-breaking work on this methodology has been developed by the author and colleagues and students of his in Rome, it is not clear from the book that any equivalent studies have been carried out elsewhere, and I am not aware of a wider literature having developed since the presentation of these ideas at the Helsinki Conference and at a subsequent ISSA meeting in Rome in May 1984. The author himself points out that this is very much "work in progress", rather than a definitive text-book on the techniques. The proof of whether these techniques can be applied to improve understanding of redistributive effects in social security (and, for example, to confirm or rebut charges made by World Bank economists that traditional social security schemes do not redistribute nearly as much as it might be thought, for reasons such as differential mortality between high and low earners) will inevitably depend on further research into practical applications, most likely using simulation techniques.

CHRIS DAYKIN

Y.K. KWOK: *Mathematical Models of Financial Derivatives*. Springer Finance, Singapore, ISBN 981 3083 255 (hardcover), 981 3083 565 (soft-cover), 1998.

This book is described on the cover as being suitable for degree programs in mathematical and computational finance. As one who delivers a masters level course in derivative pricing to *maths* graduates I can see that this is indeed an appropriate audience. At the same time, I suspect that the typical masters student in finance with a first degree in a less numerate subject would struggle with this book.

The book is well written and maintains a consistent approach throughout. Apart from an early mention of the martingale approach to the pricing of derivatives and risk-neutral valuation the author sticks firmly with the partial differential equation (PDE) approach. Whether one should take the PDE approach or the martingale approach is really a matter for personal preference which often is the result of the what background a student or researcher comes from (applied maths or applied probability). However, my own preference is for the martingale approach, not just because of my personal background but also because the martingale approach gives much more insight into the subject. In particular, the martingale approach makes it much easier, at least initially, to tackle any new problem which is thrown at you. The book also tends to avoid rigorous technical development and this can leave students less well prepared for new, perhaps more complex derivative-pricing problems.

My overall impression of the book is, therefore, that it was not one which I would recommend to students as the core textbook in a course on derivative pricing. However, it is one which I would happily recommend as supplementary text. There are a number of reasons why I make this recommendation. First, the book, throughout, has good descriptive introductions to each topic. This carries through many of the essentially more technical sections where the author includes descriptive passages which turn an abstract problem and analysis into something more understandable. Second, each chapter ends with a comprehensive set of exercises which, again, is very useful for students wishing to reinforce what they are learning about the subject.

Chapter 1 gives a general introduction to the subject of derivative pricing, and presents essentially model-free results such as put-call parity and lower and upper bounds for prices. It then proceeds to introduce the models, tools and concepts used in the remainder of the book.

Chapters 2 to 6 deal with equity options. Chapter 2 works on the basic European option with the Black-Scholes model and formula taking centre stage. There is also what is essentially a statement of the Greeks without much intuitive explanation of what they are or how they should be used. Chapter 3 looks at multi-asset options. Chapter 4 considers how to price American options. This includes good non-technical descriptions of the various issues. Chapter 5 deals with various numerical methods for tackling

these problems. It is a well written section and, of course, relates well to the dominant PDE approach in the book. Chapter 6 looks at a number of different exotic options.

Finally, Chapter 7 gives a short introduction (unfortunately common to many books in this field) to bond pricing and interest-rate derivatives.

In summary, therefore, this book is not perfect but there are many good things in it, so it is a worthwhile purchase.

ANDREW CAIRNS

E. KREMER: *Applied Risk Theory.*

This book of Erhard Kremer presents some selected chapters of risk theory. It starts with a nice 20 page summary of the basic results of probability theory.

Chapter two gives an overview about the common premium principles and proves their basic properties. Special emphasis is put on the "Swiss premium principle".

Chapter three deals with classical credibility theory. The reader might actually be mislead by the title "rating theory", since beside credibility theory no other rating methods are discussed.

In the introduction the author mentions that in his view reinsurance is one of the main and nicest topics in Risk Theory. Unfortunately, my high expectations raised by these comments were not fully met. Although the material treated in chapter four covers some important concepts, e.g. Panjer's algorithm or optimality of reinsurance covers, the link to practical applications is fully missing. Beside the classical material I would also have expected some words on today's hot topics like extreme value theory or modelling of correlated risks.

The last chapter gives a short introduction to some methods used in life insurance, including applications of martingale theory.

In my opinion this book can be of value for actuarial students in order to quickly get a first idea about risk theory and some important actuarial principles. I wouldn't recommend it, however, to a practical actuary, who is usually interested in quite different types of questions.

PETER ANTAL

BOB ALTING VON GEÜSAU
1946-1999
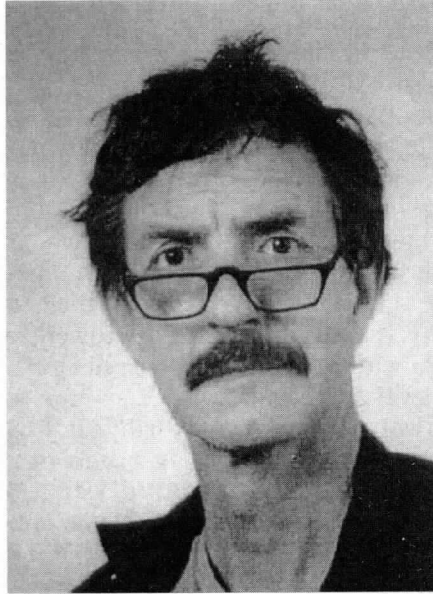
Bob Alting von Geusau died on November 4, 1999, only 53 years old. Though optimistic to the last, he knew he was terribly ill; with a final effort, he had given his goodbye lecture as a professor of actuarial science only a few weeks before. This impressive lecture, aptly called "The survival of the fittest", essentially described the plans he had had for the remainder of his career. It was attended by some 600 of his friends, colleagues and former students. It was a sad occasion, but endurable because of the way Bob handled his predicament, making everybody laugh at his stories and anecdotes.

By students and colleagues alike, he will be sorely missed at the actuarial department of the University of Amsterdam. Apart from being an excellent and inspiring teacher and a really pleasant colleague, he was also outstanding at promoting actuarial science in the Netherlands. He persuaded many students to choose our profession, by presenting them with exotic and inspiring tales at their schools while they were trying to select a career. A recurrent part of these sessions was "Around the world in 80 questions". A prospective student would be asked to name any country in the world, and Bob produced an interesting story about insurance relating to