BOOK REVIEW

C. D. DAYKIN, T. PENTIKÄINEN and M. PESONEN: *Practical Risk Theory for Actuaries*. Monographs on Statistics and Applied Probability 53, Chapman & Hall, London 1993. 546 pp. ISBN 0-412-42850-4.

This book has essentially grown out of the classical textbook *Risk Theory* by Beard, Pentikäinen and E. Pesonen. However, it is much more than a revised edition of the former book. At some risk of simplification one could describe Part One of *Practical Risk Theory for Actuaries* as an abridged version of the old monograph, while Part Two is essentially new.

Part One (Foundations of Practical Risk Theory) introduces the reader to the mixed compound Poisson process and some in its applications. The applications discussed in Part One are those involving mainly short-term claim fluctuation: evaluating capital at risk, and choice of reinsurance. Methods for calculating the aggregate claim distribution are presented, including approximation methods as well as recursive methods. Monte Carlo simulation is described maybe more briefly, than its subsequent use would warrant. Experience rating, hereunder credibility theory, is outlined briefly, as is the theory of optimal risk exchanges.

Part Two (Stochastic Analysis of Insurance Business) introduces the reader to stochastic modelling of all the other dynamic quantities which determine an insurance company's results: inflation, investment income, business cycles, claims run-off, catastrophes, competitive strategies, solvency control — to mention but a few. Part Two is almost free of mathematical formulas. Instead, it provides a refreshingly discursive introduction into the dynamics and the interrelation between the quantities in question. The Wilkie model is presented and discussed at considerable length. Generally, the presentation is descriptive rather than prescriptive, leaving to the reader the details of modelling his or her particular situation. Monto Carlo simulation is offered as the main tool of analysing models which are too complex for analytical treatment. In the last two chapters of the book, modelling of life insurance and pension schemes is briefly addressed.

A number of technical derivations, as well as solutions to the exercices, are given in the appendices.

Practical Risk Theory for Actuaries provides something useful for everyone. For the practising actuary it provides a glimpse into some of the available mathematical techniques and how they can be applied fruitfully. For the theoretical actuary the book provides a wealth of discussion and ideas which can, and should, lead to further modelling and research. For teachers of actuarial science it offers a large number of solved exercises. If anything is to be criticised about this book, it would have to be that it aims long on model specification but somewhat short on model estimation and validation — the latter being those tedious statistical activities which form part of the necessary groundwork, even for a Monte Carlo simulation. The difficulty in estimating complex models with complex correlations should not be

under-estimated. There is, however, an extensive bibliography for the interested reader to consult.

For my own part, I am convinced that I will consult *Practical Risk Theory for Actuaries* as frequently as its predecessor, *Risk Theory*. The book should be in every actuary's professional survival kit.

WALTHER NEUHAUS, Sydney

https://doi.org/10.2143/AST.25.1.563255 Published online by Cambridge University Press