

BOOK REVIEW

E. STRAUB (1988): *Non-Life Insurance Mathematics*. Springer-Verlag, Berlin etc. and Association of Swiss Actuaries, Zurich, 136 pages, DM 84.00.

This book is based on lecture notes which the author wrote for his lectures at the University of Berne. The subject matter is kept basic and is aimed, on the one hand, at mathematicians who are interested in applications of risk theory in insurance and, on the other, at practitioners who wish to gain an insight into the methods of a non-life actuary. The contents cover the five most common sub-fields of risk theory, i.e. aggregate claims distribution, ruin theory, premium principles, credibility theory and IBNR methods. In this connection it should be pointed out that the interconnections between these sub-fields are also taken into account. In addition, the author's own suggestion concerning the handling of the retention problem between the direct insurer and reinsurer is described in sufficient detail. The individual chapters, the titles of which are not always self-explanatory, are dealt with below.

The short first chapter, "Problems", serves as an introduction to the at first intuitive links between retention, capital, risk behaviour, profitability and fluctuation of results. It is followed by the longest chapter "Tools" with more than 40 pages. In it the classic risk process is described and the special Erlang model (claims size exponentially distributed, claims frequency is a homogeneous Poisson process) dealt with. The Erlang model provides the reader with a concrete calculable model at a very early stage. This is followed by a selection of special claim number and claim size distributions, moments and the moment generating function. The aggregate claim in the collective model is introduced and the recursive algorithm named after Panjer concerning numerical calculation derived. The individual model is unfortunately not mentioned at all. Within ruin theory Cramèr's inequality for a compound Poisson process is derived.

In Chapter 3 practical premium calculation principles (such as expected value, standard deviation and variance principle) are defined under "Premiums", but also utility-orientated principles (such as zero utility or Swiss principle). Systematic comparison criteria for premium principles are not dealt with. The chapter is brought to a close with a simple credibility model. In Chapter 4, "Reinsurance", the proportional forms of reinsurance are described with the help of quota share and surplus examples and the non-proportional forms are described using excess of loss and stop loss as a basis. In the next chapter on "Retentions" the author is brave enough, despite a few reservations, to suggest concrete solutions for the so-called absolute retention problem for each individual form of reinsurance. In view of techniques developed so far, assumptions and approximations are necessary for such a solution but little is said about their justification and accuracy in a practical situation. In any case,

the techniques and assumptions make it possible for the beginner become familiar with this important problem quickly. The relative retention problem is then dealt with in line with the de Finetti approach, largely in the same way as in Bühlmann's book.

Chapter 6, "Statistics", does not so much cover statistical methods but describes realistically what problems have to be faced in practice. This is briefly indicated in the context of the IBNR problem, large claims, segmentation, excess of loss reinsurance, and experience rating. The problem of estimating IBNR reserves is dealt with as a central issue in Chapter 7 "Reserves": in addition to the chain ladder procedure, the Cape Cod method (presented at the Summer School in Switzerland) and the Complementary Loss Ratio approach, the author presents the procedure developed for Lloyd's in 1986 together with a few modifications. No comparison criteria are specified. The last chapter, "Solutions", covers special characteristics and aspects of negative binomial distribution, so-called exact credibility, and of the retention problem.

This book is well suited for newcomers (in insurance practice or actuarial methods): it is not laden with ballast which is unnecessary for this readership, introduces the relevant problems at a very early stage, offers helpful exercises, foregoes introducing new developments in actuarial science and avoids questions which are not related to practice. Particular emphasis should be given to the fact that this book is short, accompanied by comments and easy for the beginner to read.

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