BOOK REVIEW

B. KLING (1993): *Life Insurance, a non-life approach.* Amsterdam: Thesis Publishers (Tinbergen Institute Research Series), 150 pages.

The all embracing nature of the title of this published thesis is perhaps somewhat misleading given the content. In the thesis, aspects of three non-life actuarial techniques *viz* the ordering of risks, credibility theory and portfolio models are applied in a number of actuarial life insurance settings. The material is well organised into three parts with a brief well balanced discussion of the issues at the end of each part. Some of the work is relatively new and sections of the thesis have been published elsewhere in scientific journals. The list of references is informative and potentially useful.

The first part of the thesis is devoted to the ordering of risks in the analysis of life insurances or annuities. It begins with a restatement of basic definitions and results for moment ordering, stochastic ordering and stop-loss ordering in terms of well defined random variables and their distribution functions. There then follow sections dealing with both single life and multi-state applications. The former contains a study of the effects of changes in the remaining lifetime distribution on single premiums, ordering by variance through the optimisation of loss functions together with generalisations to stop-loss ordering. The multi-state application is based on various orderings applied to two dependent lives.

The second part of the thesis is concerned with aspects of credibility theory, in particular, the application of regression methods in credibility theory to parametric graduation at elderly ages. While the author begins by documenting references to credibility applications for portfolios of grouped life insurances, the main emphasis is on a review of the technical detail of both the Hachemeister regression model and the De Vylder non-linear regression model in credibility theory. Adjustments to the detail of these models are discussed and credibility regression methodology applied to the graduation of mortality data, at elderly ages, by estimating the parameters of the Makeham mortality law. While the concept of using credibility theory to smooth mortality data at elderly ages in this way, where the data are sparse, has an appealing ring, it is perhaps questionable whether the method will attract general applicability given both the wide range of well established flexible graduation techniques available and the small reported discontinuity in the graduations induced by the method.

The third and final substantive part of the thesis is concerned with two, largely theoretical, aspects of portfolio models. The first of these deals mainly with computational aspects of the total claims distribution over a fixed limited time period. While a brief review of the potential for using the individual model in a life insurance setting is given, the great bulk of this work focuses on numerical recursive schemes based on the collective model. The detailed implementation of a new numerical procedure for a class of compound generalised distributions and which generalises existing methods is described within this context. This is accompanied by only a partial review of numerical portfolio models since a comprehensive review is already to be found in Panjar & Willmot (1992). Given both the title of the thesis and the non-life insurance background underpinning the more recent developments in numerical portfolio models, the emphasis on the specific application to life insurance is perhaps somewhat light weight here. The second of the two aspects looks at the multi-period approach and deals mainly with computational aspects of the survival probability in finite time ruin theory. A recursive procedure for calculating finite time ruin probabilities for the compound Poisson process is advanced and a comparison made with other methods due to Wikstad, DeVylder & Goovaerts and Dickson & Waters. The procedure is extended to more general claim number distributions using a renewal equation approach. This part of the thesis concludes with some brief comments on the practical implement of the methods described.

REFERENCES

PANJAR, J.J. and WILLMOT, G.E. (1992) Insurance risk models, Society of Actuaries, Schaumburg.

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