BOOK REVIEW

JEAN LEMAIRE (1995): *Bonus-Malus Systems in Automobile Insurance.* Kluwer Academic Publishers, Boston-Dotrecht-London. ISBN 0-7923-9545-X.

The new book by Jean Lemaire will be welcomed and appreciated by actuaries working in Automobile Insurance. The presentation of different perspectives of the subject makes it also a valuable reading for actuaries outside Automobile Insurance, who are interested in experience rating and or optimal deductibles. Although it gives a broad and deep introduction to the subject, it is not a boring academic textbook guiding the reader through the matter with lemmas and theorems. The mathematical developments are sufficient to be followed without having to reinvent the wheel, but not so extended to make the reading boring. The student will learn that the development of a bonus-malus system is not only an academic exercise, but embedded in a social and political context, in which several opinions and interests are to be considered. Actuaries will find a complete introduction to the subject, including basics of risk theory and statistics. The book contains many examples and ideas, but no recipe giving simple answers: The reader is not told which is best bonus-malus system, but the reader finds many ideas to approach his specific problem, and many different sources to analyse a given bonus-malus system, to identify its main characteristics, weaknesses and strengths, and to modify some keys according to given targets.

For obvious reasons, I read it from A to Z. I think that it is the best approach to the book, as the different concepts are introduced where they are needed. The book can also serve as reference. The preface contains as detailed overview over the content of the 16 chapters and two appendices forming the book, and therefore allows for a quick orientation. In that preface, the author mentions that he is definitely biased towards simplicity, and therefore wrote a book that can be reads by the entire ASTIN membership, not only its academic subset. "An unavoidable consequence of this approach is that the level of mathematics will tend to be somewhat uneven." This is the main strength of the book and makes it a pleasant and interesting reading.

Part I (Chapters 1-3) defines a bonus-malus system, illustrates the development of the Belgian bonus-malus system over the last 30 years, and introduces to different models for the claim number distribution. The later chapter also discusses several goodness of fit tests. In Appendix A these tests are compared by applying them to some examples in other disciplines.

Part II (Chapter 4-9) develops four tools for analyzing bonus-malus systems: The relative stationary average level, the coefficient of variation of the insured's premium, the elasticity of a bonus-malus system and the average optimal retention. In each of the chapters, the defined key is computed for thirty different systems from twenty-two countries. All these bonus-malus systems are described in

Appendix B. The last chapter of Part II compares the four measures with factor analysis. The method is introduced, and can be understood also by a reader who is not familiar with this part of statistics.

Parts III and IV of the book are more sophisticated than the preceding ones. Nevertheless, more sophisticated techniques are not developed for their own merit, but for answering natural questions arising when developing new bonus-malus systems and, possibly, negotiating them with involved third parties. Part III (Chapters 10-14) deals with the construction of an optimal system using the expected value principle with different loss functions. The concept is extended to other premium calculation principles. Moreover, a possible way of allowing for the severity of claims as factor of the bonus or malus in introduced. Finally, this part discusses the influence of an additional expense loading to the pure risk premium. Let us cite the author: *Except in life insurance, where there are specific cost models for sales commissions (in many cases of regulated form), there seems to be no further modelling principles used, except multiplying the risk premium by a factor 1+A. This lacuna in the literature is all the more surprising, as it is in sharp contrast to the fields of engineering and business management, where extensive and sophisticated cost allocation and modelling are the order of the day. Are these activities outside the realm of the actuary?*

In Part IV (Chapters 15-16), ways of replacing a bonus-malus system by a high deductible are studied.

The book contains a long list of references, an author and a subject index.

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