Actuarial Models for Disability Insurance

Close cooperation between the actuarial professors Steve Haberman (City University, UK) and Ermanno Pitacco (University of Trieste, Italy) has resulted in this excellent book about disability insurance from the actuarial point of view. In this context, the concept “disability insurance” comprises many different types of insurance covers related to illness, which may concern any stage of a human being’s life. Apart from disability annuities, which serve to protect the individual against a loss of income due to the fact that he is not able to work, the authors also study critical insurance covers and long-term care insurance. In many countries, demographic developments tend to an increasing proportion of elderly people in the near future. As older individuals are more vulnerable to future diseases, the authors rightly claim that the insurance treaties they consider will grow in importance, and therefore the book itself. That is why it is a pity that at the last IME congress in Barcelona, only a few papers about the strongly related topic “multi-state (life) insurance” were presented.

The book serves the needs of many, both academics affiliated to actuarial science and professional actuaries working in the insurance industry. It is aimed at final year undergraduate students. The many figures and examples enhance the accessibility.

The book begins with an introduction about the history of multiple state models and their applications to disability insurance. Thereafter, Chapters 1 and 2 consider the underlying probabilistic structure, the possible benefits and premiums and other preliminaries in multi-state life insurance. Chapter 1 deals with the time-continuous approach, where both the Markov model and the semi-Markov model are considered. In Chapter 2, the time-discrete approach is discussed.

Chapter 3, dealing with disability insurance itself, provides the core of the book. It starts by describing the disability products in the UK, the US, the Netherlands, Germany, Austria and Switzerland. For the remainder, the chapter is based on general disability contracts, allowing for the specification of the several policy conditions of waiting period, policy term, deferred period from disability inception, maximum number of years of annuity payment from disability inception, and the stopping time from policy issue of annuity payment. This important theoretical contribution is mainly derived from Pitacco (1995).

It is demonstrated how single and recurrent premi-ums, as well as reserves, corresponding to contracts with certain given policy conditions can be derived. After that, several particular procedures to calculate these quantities, developed in several countries are discussed. In this respect, the book satisfies the aim to consider disability insurance from an international point of view.

Statistical methods to estimate transition intensities are presented in Chapter 4. The chapter mainly involves graduation by means of general linear models.

Chapters 5 and 6 are devoted to the special products of Critical Illness covers and Long-term Care Insurance, respectively, while Chapter 7 deals with the application of multistate life theory to AIDS. Models developed in the UK and the Netherlands are reviewed. The authors conclude their book with Chapter 8, considering the problems of indexing premiums and benefits.

The book is complete in the sense that many topics in the field of multiple state life contingencies are presented. The unified approach to disability treaties invites much future research. To give an example: the authors have concentrated on expected values, such as single premiums. It would be interesting to consider the riskiness of individual and group contracts.
for instance by deriving distributions or higher order moments of present values.

Reference