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C. Literatur-Rundschau

MARIO V. WÜTHRICH, HANS BÜHLMANN UND HANSJÖRG FURRER (2008):
Market-Consistent Actuarial Valuation. EAA Lecture Notes series, Springer Berlin,
VIII + 120 pages, ISBN 978-3-54073642-4.

This paperback book is the first one in the new EAA Lecture Notes series published by Springer in conjunction with the European Actuarial Academy (EAA). It has been designed for graduate students, researchers and practitioners interested in recent theoretical work and applied developments in insurance and quantitative finance.

The book is devoted to the establishment of an intuitive mathematical framework that leads to market-consistent values for life and non-life insurance liabilities. The six chapters are

1. Introduction
2. Stochastic discounting
3. Valuation portfolio in life insurance
4. Financial risks
5. Valuation portfolio in non-life insurance
6. Selected Topics

Chapter 1 motivates the use of market-consistent values and provides a brief review of the three-pillar approach used in most new solvency requirements (e.g. Basel II, Swiss Solvency Test and Solvency II), the full balance sheet approach and important definitions such as Available Solvency Surplus/Risk Bearing Capital and Required Solvency Margin/Target Capital.

In a sound mathematical framework Chapter 2 introduces the concept of deflators (stochastic discounting) which is used to replace the classical technical interest rate. Furthermore, it provides the notions of “Financial Variables” and “Technical Variables” which only depend on the financial markets and insurance events, respectively.

Chapter 3 introduces and explains the important concept of the “Valuation Portfolio” (VaPo) in the life insurance context by the means of an explicit example (endowment insurance). This concept is central for the entire book and the main idea is to measure/evaluate a life insurance portfolio in basis units which are appropriately chosen financial instruments instead of calculating in monetary values. Thereby, at first, it is assumed that the cash flow is deterministic (i.e. deterministic life table) and only

the value of the financial instruments describes a stochastic process. In a second step the framework is enlarged to allow a stochastic cash flow (i.e. stochastic life table). The additional risk due to technical variables is included in the VaPo protected against technical risk.

Chapter 4 treats the financial risk which originates from the fact that the VaPo protected against technical risk differs from the real existing investment portfolio of the insurance company. It is shown how the VaPo protected against technical risk provides the insurer each year with the price of a Margrabe option which can be used to buy the option, to hedge the option and/or to cover the cost of risk-bearing capital.

Chapter 5 extends the notation of the VaPo and the VaPo protected against technical risk to the area of non-life insurance. Analogously to Chapter 3 (life insurance context), the construction of a VaPo for a non-life insurance portfolio is carried out in two steps. However, the main difference to life insurance is caused by the fact that in non-life insurance, the technical risk is much more important and involved. Therefore, the choice of an appropriate risk measure to calculate the additional risk due to technical variables is a crucial issue. Moreover, the choice of appropriate financial instruments as basis units is more elaborate in non-life insurance, and one of the decisive steps.

The last chapter contains a brief treatment of select topics, ideas and remarks which go beyond the presentations in the previous chapters. By this means it provides the ambitious reader with a few of open problems which can serve as a good starting point for their own research.

The authors have been at the forefront of academic research related to market-consistent actuarial valuation. Therefore, academia as well as practice will undoubtedly be very interested in their book and will rather quickly grasp the views and ideas contained in it. The result is a fine book which is well written and organized and more or less self-contained for researchers and practitioners with a basic knowledge in stochastic processes as well as actuarial and financial mathematics. Behind all mathematical models and methods, there is a clarifying motivation and discussion. The reader will find out how to measure liabilities and assets in the same way and, in particular, how established actuarial methods for measuring liabilities need to be changed to give values as if a trading market for insurance policies exists. Therefore, this book provides an important contribution for graduate students and researchers who want to start and, respectively, pursue their work in the field of actuarial and financial mathematics. However, in the light of modern and more sophisticated solvency requirements by regulators this book is also very useful for practitioners who will find feasible and intuitive ideas as well as powerful methods to

tackle these new challenges. In summary, therefore, this book is an excellent start of the new EAA Lecture Notes series and I am already looking forward to the forthcoming titles in this series.

Michael Merz