

## Book Review

Arne Sandström, *Handbook of solvency for actuaries and risk managers (theory and practice)*, Chapman & Hall/CRC, 2010, 1055pp. (hardback), £89.00 (\$139.95). ISBN: 9781439821305

As an actuary working in a risk team with predominantly non-actuaries, I was interested in reviewing this book from two angles. Firstly, could there really be that much to write about solvency (it is a hefty volume) and secondly, would my non-actuarial colleagues find it useful in practice?

The title indicates that this is not a book to be read from cover to cover (and I do not pretend to have done so), but it is designed as a reference manual for times when a specific need or interest demands. There are two main sections, with general concepts and discussion in parts A to C, followed by the specific issues of the European Solvency II project in parts D to F.

Through necessity of getting this book into print in a timely manner, the Solvency II advice quoted is the CEIOPS final advice, not the final advice adopted by the European Commission and accepted by the European Parliament. As such, it does not contain the Level 3 standards or guidance, but instead the author guides you to his website for any important updates (see [www.SolvencyII.nu](http://www.SolvencyII.nu)).

There is enough detail throughout the book to give a sense of completeness, aided by a comprehensive set of references for anyone seeking more depth in specific areas. The thirteen pages of abbreviations at the front are particularly helpful, as I struggle to distinguish between all of the accounting and actuarial bodies and their standards (try the IAA, IAIS, IAS, IASB and IASC for starters).

Part A covers general solvency and risk management issues, starting with different concepts of solvency and what it means “to be solvent”. It moves on to an historical review of the assessment of capital requirements and management of risks, along with a full timeline summary, and finishes with a discussion of the elements of solvency assessment systems (financial, governance and market conduct). Whilst the history lesson is interesting and sets our current practices in context, it will only really appeal to those of you with time on your hands. The practitioner looking for quick advice will be keener to cut through to the more directly technical sections.

Part B moves on to valuation and investments, starting with the total balance sheet approach and working briefly through asset valuations. There is a comprehensive chapter on liability valuations, with several methods for calculating the risk margin. Other valuation issues are highlighted (risk mitigation, concentration of risk and segmentation), as well as the treatment of “bad” assets and eligibility of funds. I particularly liked the explanation of the different tiers of capital, with the accompanying table and diagram. The development of accounting valuation is outlined, together with the building blocks of insurance contracts (future cashflow, time value of money and margin) and the different valuation objectives – historic cost, exit value or settlement value.

Part C takes us into models and risk measurements, the most technically demanding part of the book. The abundance of formulae may deter non-actuaries from persevering with the text in places. The discussion around models moves from exact relationships to non-linear approximations and

causal relationships, before introducing distribution assumptions for non-Normal risk variables. This leads to the concept of dependence and the use of correlation matrices to reach total diversified capital requirements. And then we arrive at copulas, possibly the most talked about and least understood tools of 2010 (for me at least), with the main idea being to distinguish between dependence strength and dependence structure. My first glance tells me that I need to study this section properly to gain more understanding and confidence on the subject.

The risk measurement chapter then considers risk as either the magnitude of deviation from a target or as a capital requirement, with a discussion around the many properties of risk measures (with the deficiencies of the popular Value at Risk being highlighted). And finally the end result of the capital requirement is now in sight. Calibration issues are dealt with next (consistent measures, confidence levels and time horizons for each set of parameters and scenarios) as well as the difficulties in aggregating a set of risks that are diverse within each risk type and business type (with non-Normality and non-linearity to really test you). Part C finishes with a separate chapter on each of the main risk categories, with full descriptions of the risks and many sub-risks and the different models and approaches available for each.

Having completed the general discussions and technical debates around capital assessments, the remainder of the book is dedicated to real-life practical application by means of the European Solvency II project.

Part D provides relevant extracts from the Solvency II Framework Directive, with detailed interpretation and definitions throughout. It starts with the aims and general structure of the directive, the desire for a holistic approach to be inclusive of supervision, disclosure and governance and an explanation of internal models. It follows with the specific application of the general ideas discussed in Part B for valuation and investments.

Part E is dedicated to the standard formula, from the overall framework through each of the main risk categories to the MCR. Again, the relevant extracts, interpretation and definitions are given, with the added benefit of reference to the numerous appendices in Part F. These appendices give all the calibrations from the series of quantitative impact studies undertaken up to and including QIS4, thus providing a full journey through the political and technical development of the directive (with only the results from QIS5 to come).

It will be interesting to see how the “final” Solvency II position compares with that assumed here prior to the Level 3 guidance.

Before opening this book, I thought I had a pretty good understanding of the concept and measurement of solvency. Having speed-read my way through from cover to cover, I feel that I have learnt a huge amount in a short time and am bracing myself for a return visit to the section on copulas.

As to the answers to my opening two questions, they are most definitely “yes” on both counts. This is an excellent reference manual for anyone working in a risk environment, irrespective of their level of involvement in the Solvency II project.

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