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Dynamic Risk Modeling

by James E. Rech

The year was 1995 and the Casualty Actuarial Society's Dynamic Financial Analysis Committee (DFAC) had published its first DFA Handbook. The handbook provided a cookbook approach outlining numerous considerations in the development of a dynamic financial analysis model. The mere fact that the handbook consisted of nearly 85 pages of considerations and was reflective of the perceived notion that DFA modeling was a "daunting task;" few firms were willing to expend the time and costs in developing and maintaining such extensive DFA models.

The DFA world continued to evolve. The DFAC created new "chapters" for the DFA Handbook in order to expand the scope of the original handbook. More recently, the DFAC changed its name to the Dynamic Risk Modeling Committee (DRMC). The name change was indicative of the more current thought process that advocates the usefulness of dynamic modeling techniques for projects with various scales of scope and purpose. Firms were willing to fund the development of more specific dynamic risk models addressing reinsurance strategies, stochastic reserving, aggregate loss distributions, catastrophe modeling, predictive modeling, etc. The power of dynamic modeling techniques in addressing specific management concerns is now evident.

Ten years have passed since that original DFA Handbook. Last year, the DRMC set up a Working Party (WP) to rewrite and update the renamed DRM handbook. Attesting to a wide interest in the handbook, the membership of the WP was fairly evenly distributed among credentialed actuaries, students and non-actuaries. Geographically, while the majority of members were in the United States, we have several members located outside the U.S. borders.

The concept of this new handbook is to build upon the substantial contributions from previous authors. As such, much of the current undertaking is based on reorganizing, updating and editing the current DFA Handbook in conjunction with other existing DRMC published articles. The revised (and renamed) "Dynamic

Risk Modeling Handbook" is intended to provide a basic understanding of and practical guidelines for the development and implementation of dynamic risk models common to the property and casualty insurance industry. In addition, it is hoped that the DRM Handbook will become a basic reference source for the educational needs of future modelers and the practical day-to-day application needs of experienced practitioners.

The scope of this rewrite is to:

- Restructure and edit the existing core chapters of the current "Dynamic Financial Analysis Handbook" for consistency.
- Add new chapters including "Introduction," "Asset Modeling," "Coherent Risk Measures", and "Presentations of DRM Results."
- Introduce practical examples within these core (and new) chapters to illustrate the concepts using the Public Access DFA Model where that would be helpful to illustrate a concept.
- Add a bibliography relating investment concepts on the syllabus to Dynamic Risk Modeling (the syllabus now has sections on Part 8 that address interest rate models for example).
- Add at least five (5) case studies choosing from the subjects listed below (as Appendices)–
 - Interest Rate Models
 - Investment Policy Statements (IPS) and the economic dependencies between Asset Classes and Liabilities
 - Financial Risk Management (hedging and the use of financial derivatives, options, swaps and forwards)
 - Surplus Allocation
 - Reinsurance
 - Alternative growth strategies by line of business

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- Alternative investment strategies
- Integrate some (or all) of the new case studies with the Work Products of the Working Party on Executive Level Decision Making using DRM and the Working Party on the Public Access DFA Model.
- Set up guidelines for future enhancements, corrections or additions to the new handbook.

It is anticipated that the examples and case studies used in the handbook will be based on the public access model and will be coordinated to the greatest extent possible with the development of the Casualty Actuarial Society's new Risk Modeling Workshop. Documentation, enhancements and "conversion" to "open source" for the public access model is the subject of another WP being sponsored by the DRMC, so coordination of the handbook with this WP is also part of the process.

The general guideline was for the DRM Handbook Working Party to complete its assignment within one year. Unfortunately, the original time frame has turned out to be optimistic. While the majority of the handbook is now in its editing stage, we still require a great effort on one of the primary casualty chapters, Price/Reserving Models. But first, the basics of the handbook: The structure of the DRM Handbook will include nine chapters and three appendices.

Chapters

1. Introduction
2. Overview of the DRM Process
3. Strategies
4. Scenarios
5. Asset Modeling
6. Price/Reserve Modeling
7. Performance and Risk Measures
8. Coherent Measures of Risk
9. Presentations of DRM Results

Appendices

1. Bibliography
2. DRM Checklist of Considerations
3. Glossary of Terms

Because the distribution of the handbook will be digital, it is intended that it will be regularly updated to highlight technical advances and innovations in risk modeling.

While the majority of the DRM Handbook is progressing nicely, there are still a couple of areas in which the handbook requires additional efforts. The first area is in the development of Chapter 6, Price/Reserve Modeling. The second area is in the development of the five case studies for the handbook. We are still looking for writers for these critical additions to the DRM Handbook. If you are interested, please contact Run Yan at run.yan@mercer.com or myself at jresch@gpwa.com. ♦

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