

REVIEW

Worldwide Asset and Liability Modeling. Edited by WILLIAM T. ZIEMBA and JOHN M. MULVEY (Cambridge University Press, 1998)

The asset allocation decision is important for investment managers of insurance companies and pension plans. The optimal decision will depend on the nature of the underlying assets and liabilities as well as the objective of the decision maker. Actuaries have thus a strong interest in the subject matter of this impressively titled volume. The book contains a collection of papers, most of which were presented at a 1995 conference held at the Newton Institute at Cambridge University. The papers are organised into nine sections which are summarised below.

- (1) *Asset and Liability Management Systems for Long Term Investors: Discussion of the Issues*. This section consists of a survey paper by the editors of the volume that discusses different approaches to asset liability management.
- (2) *Static Portfolio Analysis for Asset Allocation*. Topics include an analysis of the asset allocation decision, the sensitivity of the results to the input parameters (e.g. means, variances and covariances) and methods of reducing the sensitivity of the results to the input parameters.
- (3) *Performance of Measurement Models*. The first paper by Grinold & Easton provides a mathematical decomposition of the components of performance in a mean variance model. The second paper uses a factor model to analyse trends towards capital market integration, and the third suggests that six fundamental factors (four for stocks and two for bonds) can explain most of the common volatility we see in international markets.
- (4) *Dynamic Portfolio Models for Asset Allocation*. This section contains some of the most interesting material in the volume. Grauer & Hakansson describe a simple way of incorporating the historical distribution of asset returns and an inflation adapter to improve market timing. Carino & Turner describe how to handle derivatives in the asset allocation problem. Brennan & Schwartz extend the classical Merton analysis to handle changes in the investment opportunity set.
- (5) *Scenario Generation Procedures*. The first two papers in this section deal with technical issues that arise in stochastic programming. The third paper describes the investment model used by a large consulting firm. This last article is conspicuously vague on some critical points: such as how to determine the functional relationship between asset prices and financial variables.
- (6) *Currency Hedging and Modeling Techniques*. There are two papers in this section. The first demonstrates that, by using optimal currency hedges, the range of efficient portfolios is expanded. The second paper is a descriptive account of the model used by a particular firm.
- (7) *Dynamic Portfolio Analysis with Assets and Liabilities*. The six papers in this section cover a range of topics. In the first paper Robert Merton reminds us of the importance of formulating appropriate objectives in investment problems. Sethi surveys the theoretical results on optimal consumption decisions when there is bankruptcy. Two papers (Klaasen & Consigli and Dempster) discuss theoretical techniques that are useful in the solution of stochastic programming problems. Dert's paper discusses a scenario-based optimisation model that can be used to analyse the investment and funding policies of a pension plan. Zenio describes optimisation models that could be used for the analysis of fixed income securities in the asset liability management context.
- (8) *Case Studies of Implemented Asset-Liability Management Models*. The first paper in this section discusses the application of asset/liability management models to Dutch pension plans, and the second describes some of the technical and organisational issues raised by the use of optimisation techniques in the management of financial intermediaries, with special emphasis on mortgage insurers.

- (9) *Total Integrative Risk Management Models*. This section consists of two papers which describe proprietary models in an uncritical fashion.

Several of the papers in this book will be of interest to actuaries. However, some important topics are absent or dealt with inadequately. Actuaries will find the treatment of the liabilities very cursory. There is little critical comparative analyses of the different models or arms-length evaluation of their performance. There is a dearth of detail on how to select the investment models and sparse guidance on how to estimate the parameters of these models. Black boxes abound in these papers.

The book does not discuss the novel approach to the portfolio optimisation problem developed by Cox & Huang (1989). The key idea of Cox & Huang is to find first the investor's optimal end of period wealth. Given the maintained assumptions of no arbitrage and market completeness, one can find the portfolio of assets that perfectly replicates this optimal wealth.

REFERENCE

- COX, J. & HUANG, C. F. (1989). Optimal consumption and portfolio policies when asset prices follow a diffusion process. *Journal of Economic Theory*, **49**, 33-83.

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