

**BOOK REVIEWS AND NOTICES**

Edward I. Altman and Irwin T. Vanderhoof, editors, *The Financial Dynamics of the Insurance Industry*, 512 pp., published by Irwin Professional Publishing, New York, N.Y., 1995.

*The Financial Dynamics of the Insurance Industry* is a collection of papers presented in 1993 at a conference on the dynamics of the insurance industry organized by the Salomon Center of New York University, in cooperation with the Stern School of Business. The 23 papers cover solvency issues for life and property and casualty insurance companies as well as the management of assets and liabilities, analysis of asset performance, and performance measurement. The book is a valuable collection of papers with a good mix of theory and practical applications.

The papers are written to address issues primarily from a U.S. perspective, but the issues raised and the approaches discussed will be of interest to managers in other countries.

The book will be of particular interest to those in the insurance business with asset-liability management and reporting responsibilities. The papers bring together viewpoints from practitioners, regulators and academics. Many insurance managers need to keep themselves aware of emerging theories of financial management in the industry as well as the complex regulatory climate. For example, the theory of risk-based capital, which has become an important part of financial management and regulation, is also a useful tool for assessing the appropriate asset mix to meet corporate objectives.

Several papers consider some of the practical issues surrounding the matching of assets and liabilities for life and P&C insurance organizations. These papers provide a useful perspective to supplement some of the theoretical considerations of asset-liability matching. The papers on performance measurement address issues that have challenged insurance company management for some time.

Although it has been a few years since I was in the insurance industry, I believe the papers offer practical and useful advice for managers. As the editors note, the industry is facing financial challenges—and public perception challenges. Regulators, investors and customers are increasingly questioning the actions of management—in some cases, with justification. Most managers and professionals will want to read selectively and focus on the issues important to their responsibilities. However, *Financial Dynamics of the Insurance Industry* also provides a valuable resource to assess trends,

theories and concerns that were important to the industry in 1993 and in most cases, remain valid in 1996.

ROBERT H. STAPLEFORD

Bruce S. Pyenson, editor, *Calculated Risk: A Provider's Guide to Assessing and Controlling the Financial Risk of Managed Care*, 67 pp., published by American Hospital Publishing, Inc., Chicago, Illinois, 1995.

*Calculated Risk* is intended to provide hospitals and provider organizations with guidance in managing financial risk under the many managed care arrangements that integrate provider services with financial risk for the cost of care. Developing integrated networks and successfully managing capitated arrangements will require that providers learn many risk management functions similar to those used by insurers and managed care organizations (for example, HMOs). The publication outlines steps to help hospitals develop risk management strategies wherever the hospital lies on the managed care continuum.

Chapter 1 identifies the new elements of provider risk, including underpricing risk, fluctuation risk, and business and administrative risk. Chapter 2 deals with how risk is measured and evaluated. It defines the basic elements of the actuarial cost model and defines a methodology for assessing the degree of health care management for a hospital. The various approaches used by HMOs, PPOs, insurance carriers, and employers for shifting risk to providers are reviewed in Chapter 3. Valuable guidance for evaluating a capitated proposal and a managed care partner is included in Chapter 4. This chapter also discusses the keys to success under capitation contracts. While the first four chapters are written by actuaries, the last two chapters are written by physicians. Chapter 5 discusses how to align clinical practice with aggregate managed care goals for a hospital or integrated system. Chapter 6 discusses the role and risk assumed by partners in a provider network, integrators of a full-service provider network, and owner/operators of a provider/insurer organization.

*Calculated Risk* does not offer to hospitals any easy solution for surviving under managed care, but it does provide valuable advice and insight for hospitals from an actuarial perspective. The publication should not replace the need to seek competent design, legal, medical, and actuarial assistance once a hospital or provider organization decides to assume financial risk. *Calculated Risk* would be more valuable if it included contributions by a

wider range of consultants and dealt with a broader array of critical issues. For example, how much risk-taking by providers is allowed under state insurance law before the organization needs an HMO license?

This book is recommended as a primer for students who want a quick introduction to the strategies of health care capitation. The importance of the book arises from its strategic perspective of the issues facing providers that assume financial risk.

THOMAS J. LIVORSI

Phelim P. Boyle, *Options and the Management of Financial Risk*, 223 pp., published by the Society of Actuaries, Schaumburg, Illinois, 1994, \$25.00.

The introduction states: "The aim of this text is to communicate concepts and models from modern financial economics and investment theory that are useful in actuarial science." Investors and insurance policy-owners have become increasingly knowledgeable over the past two decades. In that span, the conceptual framework of financial economics has replaced the traditional actuarial models of classic compound interest as the preferred tool for managing interest rate spreads. With this book, Dr. Boyle creates the bridge from the deterministic to the stochastic approach to dealing with interest rate uncertainty.

The book is targeted to a wide audience of both actuaries and nonactuaries who seek an introduction to the concepts of finance without immediately committing to a 400-page or more text. I would recommend the text for students of the Fellowship Syllabus as they commence the Finance Track. Senior actuaries whose duties are no longer primarily technical will find the text helpful in facilitating discussions with investment and actuarial technicians.

Given the great breadth of subjects encompassed in the economics of finance, a 220-page text simply cannot address any one subject with great rigor. For example, the subject of interest rate swaps merited a two and one-half page treatment. The math background assumed is suggested by the statistical material presented in Chapter 6, "Models of Uncertainty": the central limit theorem, the normal and lognormal distributions, the random walk, arithmetic and geometric Brownian motion, Wiener processes, and Ito's lemma. Given the compactness of the book, many conclusions are merely stated and not demonstrated.

Consistent with the goal of brevity, the book contains no index, no appendices, and no exercises. Nonetheless, the examples work effectively, in that all instruments are discussed from the common initial premise of a defined term structure of interest rates. Conclusions are clearly set out in bold, with ample white space to ease the reader's way.

The author's approach is to concentrate on the underlying theory and concepts, with only limited institutional detail. Assumptions are idealized; financial markets are assumed to be frictionless; transaction costs are ignored.

The most effective approach to grasping the material is to follow the chapters in order, given the abundant references to preceding material. The format is an integrated progression from the building blocks of term structure of interest rates to pricing by stochastic methods.

To provide a flavor of the material, herewith is a nibbler's taste of what piqued this reviewer's interest:

Chapter 1, "Introduction," presents a fundamental contrast between financial risks and insurance risks. Financial risks are statistically correlated, so that the risk reduction accruing from pooling of assets is limited: more assets means more risk. Hence, the use of derivative assets to hedge financial risk has grown rapidly in the past two decades. In contrast, insurance risks are assumed to be independent, that is, not correlated. Hence, pooling risks provides the primary tool for reducing risk from insurance liabilities.

In sum, increasing the volume of assets merely increases risk, while increasing the volume of insurance liabilities greatly reduces risk. The stochastic model of risk management, with its capacity to measure correlation of risks, is the preferable tool for managing the balance sheet. The deterministic model fails utterly, in the era of tight profit margins and the advanced level of financial knowledge of investors and policyholders. It cannot measure the costs of exercising options.

Chapter 2, "The Term Structure of Interest Rates," creates the basic vocabulary of financial economics at its elemental level: spot rates and forward rates build the transition from the limiting notion of force of interest to stochastic term structure models.

With the discussion of duration in Chapter 3, the book is off to a strong start. The foundation is laid for the discussion of derivative assets to follow.

Chapter 4, "Options, Forwards and Futures," introduces the purposes, the pricing and the terminology for the most common types of derivative financial instruments: American options, European options, forward contracts, futures contracts, futures options, and interest rate swaps. Though this list

hardly defines the universe of derivative instruments, the discussion of their features successfully illustrates the concepts of the economics of finance.

Chapter 5 presents "General No-Arbitrage Relationships" that hold among the prices of various derivative securities. A fundamental defect of the deterministic classical compound interest rate model is that arbitrage profits are indeed possible. The stochastic model solves that defect and thus realistically portrays the efficiency of the market in trading out any apparent gains at no risk.

Chapter 6, "Models of Uncertainty," outlines the fundamental statistical concepts supporting pricing models based on stochastic processes. The author faces a tremendous challenge in the attempt to set these out in a mere 23 pages. In unfortunate consequence, so does the reader, in the attempt to comprehend it. Of course, the material is readily available from other sources.

Chapter 7, "The Pricing of Stock Options," discusses the properties of the Black-Scholes solution and illustrates conclusions with numerical examples. The starting point is a discrete time binomial model, followed by the continuous-time option-pricing model. Once the Black-Scholes formula has been developed, it becomes possible to analyze the sensitivity of stock option prices to five underlying parameters. This is quite an elegant tool for risk analysis.

Chapter 8, "Scholastic Interest Rate Models," addresses the fundamental problem of how to develop future interest rate scenarios for calculating bond prices. Bond prices depend on an entire term structure of interest rates, both currently and at future dates. Accordingly, constructing a valid model for pricing bonds is much more complex than that for pricing stock options. Dimensions of the problem include reasonability of scenarios, plausibility (that is, probability) of scenarios occurring, and prevention of arbitrage profits. Numerous solutions exist, of varying complexity. The author outlines one successful approach.

My final observations are twofold: first, financial modeling software is viewed by many as a black box of indeterminate calculations, particularly for market values. For some, the problem is lack of familiarity with the software. For others, the problem is also lack of familiarity with the *theory*. Dr. Boyle's text goes far in removing the latter concern. Second, the emergence of modeling software and the cash-flow-testing requirements have created deep problems of resources for smaller companies, which lack the critical mass to effectively exploit these capital investments. The same might also be said for the *intellectual* capital required to manage financial risk in

today's world. Not surprisingly, asset management consulting services are enjoying tremendous growth these days.

Dr. Boyle has done a great service to the actuarial community in introducing many to the economics of finance. Whether you "just want to know something about the subject" or you ultimately plan to attack the subject in depth, my judgment is that the time invested in reading this book is well spent.

RICHARD J. JUNKER