Overview

This guide lists sources that an actuary can use to gain knowledge on investments and asset/liability management. It can be viewed as a preliminary road map for the actuary seeking direction to enhance his or her knowledge in these areas. The emphasis of this guide is on fixed-income securities. We do not assume the reader to have studied the Society of Actuaries Courses 220 and 230.

Many insurance companies do not subscribe to research journals. In compiling this guide, we have given preference to books that are readily available. Some articles have been selected from actuarial or insurance journals and Society of Actuaries Study Notes.

Most of the basic reading list is compiled from two books: W.F. Sharpe and G.J. Alexander, Investments, 4th ed., and F.J. Fabozzi and T.D. Fabozzi (ed.), The Handbook of Fixed Income Securities, 4th ed. Although these two books are not unique in their coverage, we have selected them because they enable the actuary to rapidly gain a good knowledge of investments and fixed-income securities without the need to seek out additional sources. Sharpe and Alexander is a standard textbook on investments at the MBA level; an Instructor’s Manual, which provides answers to the questions at the end of each chapter, is available. (Professor Sharpe was one of three financial economists awarded the 1990 Nobel Memorial Prize in Economics.) Fabozzi and Fabozzi is a textbook for SOA Courses 220 and 230 and for the Chartered Financial Analyst exams.

The main source for the reading list at the intermediate level is again Fabozzi and Fabozzi. We also list some books and articles that complement and supplement Sharpe and Alexander and Fabozzi and Fabozzi. For the more adventurous and mathematically inclined actuaries, we have some suggestions at the advanced level.

This guide is not organized along subtopic lines within the general topic of “Life Insurance Company Investments.” An actuary who wishes to investigate a particular subtopic can do so by noting chapter headings, which are, for the most part, quite definitive; both Sharpe and Alexander and Fabozzi and Fabozzi have extensive indexes. (At the end of Sharpe and Alexander there is a glossary of investment terminology.) However, there are two subtopics of special interest for which we have provided cross-indexed references at the end of this guide. These two subtopics are Asset/Liability Management and Options and Derivative Securities.

Actuary’s Role

An actuary measures, models and manages risk. Risk associated with the investment function is one of the most important risks faced by man insurance companies. An actuary involved with insurance companies should have knowledge of the asset side of the balance sheet and how it relates to the liability side. Specifically, such knowledge should include the operation of Financial markets, the instruments available (particularly those involving fixed income), the options imbedded in such instruments, and the synthetic instruments available to the insurance companies. In addition, the financial reporting actuary and the product development actuary must both understand the relationship of the company’s assets to liabilities, so as to reflect the risks inherent in the insurer’s business and thereby enhance its profitability or possibly even its solvency. Investment products are continually being redesigned, updated expanded, and replaced. The practicing actuary must be aware of these changes (to have a basic knowledge of how they affect the company) and able to communicate regarding them with the company’s portfolio managers (or be part of such portfolio management). The coordination of product development, investment operations and financial reporting is essential for a successful insurance company. An actuary is singular in having the technical education to perform this coordination function.
Basic Reading List

   - Chapter 4 “The Valuation of Riskless Securities,” 82–111.
   - Chapter 5 “The Valuation of Risky Securities,” 112–133.
   - Chapter 7 “Portfolio Analysis,” 154–193.

   - Chapter 6 “The Structure of Interest Rates” (by F.J. Fabozzi), 113–138.
   - Chapter 15 “The High-Yield Corporate Bond Market” (by J.C. Bencivenega), 307–326.
   - Chapter 23 “Mortgages” (by F.J. Fabozzi and L.M. Edens), 483–501.
   - Chapter 42 “Bond Immunization: An Asset/Liability Optimization Strategy” (by P.E. Christensen, F.J. Fabozzi and A. LoFaso), 896–926.
   - Chapter 50 “Introduction to Interest-Rate Futures and Options Contracts” (by M. Pitts and F.J. Fabozzi), 1079–1105.
   - Chapter 54 “An Overview of Fixed Income Option Models” (by L.J. Dyer and D.P. Jacob), 1171–1203.


We suggest that, having read Sharpe and Alexander, one is ready for investment journals such as Financial Analysts Journal, Journal of Fixed Income and Journal of

Intermediate Reading List


This paper discusses applications of modern option-pricing theory, such as the valuation of stochastic cash flows and generalization of Redington’s theory of immunization.


This paper examines the current operational status and planning procedures of seven asset/liability management processes appropriate for life insurers.

   - Chapter 11 “Medium-Term Notes” (by L.E. Crabbe), 233–254.
   - Chapter 12 “Domestic Floating-Rate and Adjustable-Rate Debt Securities” (by R.S. Wilson), 255–264.
   - Chapter 13 “Nonconvertible Preferred Stock” (by R.S. Wilson), 265–289.
   - Chapter 14 “Convertible Securities” (by J.C. Ritchie, Jr.), 290–306.
   - Chapter 25 “Collaterized Mortgage Obligations” (by A.S. Carron), 549–582.
   - Chapter 28 “Valuation of Bonds with Embedded Options” (by F.J. Fabozzi, A.J. Kalotay and G.O. Williams), 611–634.
   - Chapter 29 “Option-Adjusted Spread Analysis” (by L.S. Hayre and K. Lauterbach), 635–664.
   - Chapter 30 “OAS and Effective Duration” (by D. Audley, R. Chin, S. Ramamurthy and S. Volin), 665–681.
   - Chapter 37 “The Term Structure of Interest Rates” (by R.W. M. Evely and J.V. Jordan), 779–829.
   - Chapter 43 “Dedicated Bond Portfolios” (by P.E. Christensen and F.J. Fabozzi), 927–941.
In addition to the above, there are many other sources from which an actuary can learn about investments and asset/liability management. Below are some papers in actuarial journals and readily available books. We also list the titles of chapters of particular interest.

Chapter 51 “Pricing Futures and Portfolio Applications” (by F.J. Fabozzi and M. Pitts), 1106–1118.

Chapter 52 “Treasury Bonds Futures Mechanics and Basis Valuation” (by D.T. Kim), 1119–1144.

Chapter 55 “Hedging with Futures and Options” (by M. Pitts and F.J. Fabozzi), 1204–1235.

Chapter 56 “Interest-Rate Swaps” (by A.K. Bhattacharya and F.J. Fabozzi), 1236–1254.

Chapter 57 “Interest-Rate Caps and Floors and Compound Options” (by A.K. Bhattacharya), 1255–1274.

Chapter 7 “Finding the Immunizing Investment for Insurance Liabilities: The Case of the SPDA” (by P.D. Noris and S. Epstein), 97–141. This paper is also available as Society of Actuaries Study Note 230–22–91.

Chapter 17 “Hedging with Futures and Options” (by L.S. Goodman), 321–344.

Chapter 21 “Capping the Interest Rate Risk in Insurance Products” (by D.F. Babbel, P. Bouyoucos and R. Strickler), 445–474.

Chapter 6 “Duration,” 61–81.

Chapter 7 “Convexity,” 82–107.

Chapter 11 “Bond Options,” 170–208

Chapter 12 “Corporate Bonds (Investment Grade),” 210–250


Chapter 2 “Futures Markets and the Use of Futures for Hedging,” 18–44.

Chapter 3 “Forward and Futures Prices,” 45–79.

Chapter 4 “Interest Rate Futures,” 80–110.

Chapter 5 “Swaps,” 111–135.


Chapter 15 “Interest Rate Derivative Securities,” 370–413.

Chapter 19 “Review of Key Concepts,” 469–472

Chapter 9 “Hedging with Financial Futures” (by A.L. Toevs and D.P. Jacob), 62–116.


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Chapter 15 “Interest Rate Derivative Securities,” 370–413.

Chapter 19 “Review of Key Concepts,” 469–472


This book was written for students in business and economics. Nonessential mathematical material has either been eliminated or included in end-of-chapter appendices.

Chapter 2 “Futures Markets and the Use of Futures for Hedging,” 18–44.

Chapter 3 “Forward and Futures Prices,” 45–79.

Chapter 4 “Interest Rate Futures,” 80–110.

Chapter 5 “Swaps,” 111–135.


Chapter 15 “Interest Rate Derivative Securities,” 370–413.

Chapter 19 “Review of Key Concepts,” 469–472

14. Moody’s Special Report: Corporate Bond Defaults and Default Rates 1970–199X. This report, updated in each January by Moody’s, can be obtained from the Society of Actuaries as a Study Note for Course F-590.


Chapter 2 “The Term Structure of Interest Rates” (by G.D. Latainer), 11–27.

Chapter 3 “Use of Duration Analysis for the Control of Interest Rate Risk (by A.L. Toews), 28–61.

Chapter 4 “Hedging with Financial Futures” (by A.L. Toews and D.P. Jacob), 62–116.

Chapter 7 “Hedging Interest Rate Risk of Fixed-Income Securities with Uncertain Lives” (by A.L. Toews), 176–196.

Chapter 9 “Risk Control Techniques for Life Insurance Companies” (by J.A. Tilley), 225–255.


To conclude the advanced reading list, we note that the top journals in finance and investments are: Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Financial Economics, and Review of Financial Studies. The Journal of Business also contains many important articles on finance and investments.

The following are six textbooks written for doctoral students in finance.

## Asset/Liability Management

**Survey on Tools**

- Immunization (Duration and Convexity Analysis)
  - Fixed and Certain Cash Flows
    - [1, Chapter 14], [2, Chapters 5, 42], [12, Chapters 6, 7], [16, Chapter 3], [18]
  - Interest-Sensitive Cash Flows
    - [2, Chapters 29, 30], [8, Chapter 7], [16, Chapters 7, 9], [4]
  - Hedging with Futures
    - [10], [2, Chapter 55], [8, Chapter 17], [13, Chapters 2, 4], [16, Chapter 4]
  - Multivariate Models
    - [12, Chapter 15], [17], [A1]
- Scenario/Sensitivity Testing
  - [27], [16, Chapter 9]
- Customized Interest Rate Contracts
  - [2, Chapter 57], [8, Chapter 21]

## Options and Derivative Securities

**Option Pricing Theory**

- Stocks (Binomial, Black-Scholes)
  - [1, Chapter 18], [13, Chapters 9, 10, 14]
- Fixed Income Securities
  - [2, Chapters 28, 54], [12, Chapter 11], [13, Chapter 15], [15], [19], [23]

**Fundamental Derivative Instruments**

- Options
  - [1, Chapter 18], [2, Chapters 50, 55], [13, Chapter 15]
- Futures
  - [1, Chapter 19], [13, Chapters 2, 3, 4], [2, Chapters 50, 51, 52, 55]
- Interest Rate Swaps
  - [13, Chapter 5], [2, Chapter 56]

**Complex Derivative Instruments**

- Caps, Floors and Swaptions
  - [2, Chapter 57], [8, Chapter 21], [13, Chapter 15]
- Mortgage-Backed Securities
  - [2, Chapters 24, 25]
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