Investment – Advanced Portfolio Management Exam

Important Information

The examination for this course will be given on Friday, May 9th, 8:30am–11:45am and 1:30pm–4:45pm and will consist of six hours of written-answer questions. A read-through time will be given prior to the start of the exam—15 minutes in the morning session and 15 minutes in the afternoon session. Information regarding registering for exams is available on the Exam Registration page.

For Spring 2008, this exam includes a case study for the examination. The case study will be distributed in the Study Note package. **Candidates will not be allowed to bring their copy of the case study into the examination room.**

Study notes are part of the required Course of Reading and are not available electronically. Candidates must order the study notes from the Society of Actuaries using the Study Note Order Form. Past exams are available on the Exam Archives page of the SOA web site under Multiple Choice/Essay Examinations.

Candidates should be sure to check the Updates page of the web site periodically for additional corrections or notices.

The candidate should be very familiar with the Learning Objectives as described in the Basic Education Catalog. These Learning Objectives are the first ingredient in developing the syllabus and also guide the examination committee when writing questions. The Learning Objectives set out the cognitive level needed to pass this exam. You will notice that the candidates are expected to "analyze," "explain," "calculate," "describe," "apply," etc. While studying the syllabus material, candidates may want to refer back to the Learning Objectives to remain focused on the goals of the exam.

Investment – Advanced Portfolio Management.	
Instructional Objectives	
1. Financial Markets Modeling Techniques	
Learning Outcomes	
The candidate will be able to: a) Criticize the following modeling methods: ▪ deterministic vs. stochastic ▪ single period vs. multiple period ▪ one vs. multiple factors ▪ realistic vs. risk-neutral ▪ equilibrium vs. arbitrage-free ▪ actuarial vs. capital markets ▪ simulation vs. formula-based ▪ mean-reversion b) Recommend a modeling method for a given situation c) Define and apply the concepts of martingale, market price of risk and measures in single and multiple state variable contexts d) Describe and evaluate equity and interest rate models e) Contrast commonly used equity and interest rate models f) Recommend an equity or interest rate model for a given situation g) Describe issues and best practices in the estimation or calibration of financial models	
Syllabus Resources	
• Babbel & Fabozzi, *Investment Management for Insurers*,1999 o Chapter 11: The four faces of an interest rate model • Hardy, *Investment Guarantees*: *Modeling and Risk Management for Equity-Linked Life Insurance*, o Chapter 1 (pp.11-14): Provision for equity-linked liabilities	

- Chapter 2: Modeling long-term stock returns
- Chapter 3: Maximum Likelihood Estimation for Stock Return Models
- Chapter 4: The Left-Tail Calibration Method
- Chapter 5: Markov Chain Monte Carlo (MCMC) Estimation
- Chapter :7 (pp.115-123): A review of option pricing theory

- Hull, *Options, Futures, and Other Derivatives* Ssixth Edition, 2006
  - Chapter 13: The Black-Scholes-Merton model
  - Chapter 16: Volatility Smiles
  - Chapter 19: Estimating Volatilitlies and Correlations
  - Chapter 24.1- 24.3: More on models and numerical procedures
  - Chapter 25: Martingales and Measures
- V-C125-07 (Formerly 8E-713-05): Chapters 5 & 6 of the Oxford Guide to Financial Modeling – Chapter 5 and 6 (6.1, 6.3-6.9 only)
- V-C101-07 (Formerly 8V-202-00): Quantitative Strategies Research Notes, "Model Risk"
- "Validation of Long-Term Equity Return Models for Equity-Linked Guarantees" by Hardy, Freeland and Till, NAAJ Vol. 10 No. 4, October 2006 (Sections 1-4 only) http://www.soa.org/library/journals/north-american-actuarial-journal/2006/october/naaj0604_3.pdf

Instructional Objectives
2. Pricing Theory and Practice
Learning Outcomes The candidate will be able to: a) Demonstrate mastery of option pricing techniques and theory for equity, interest rate and credit derivatives b) Derive the Black Scholes pricing formula c) Identify limitations of each option pricing technique d) Describe how option pricing models can be modified or alternatives techniques that can be used to deal with option pricing techniques limitations e) Explain how numerical methods can be used to effectively model complex assets or liabilities
Syllabus Resources

- Babbel & Fabozzi, *Investment Management for Insurers*, 1999
  - Chapter 13 Problems Encountered in Valuing Interest Rate Derivatives
- Fabozzi, *Handbook of Fixed Income Securities* Seventh Edition, 2005
  - Chapter 11: Municipal Bonds (271-272)
  - Chapter 15: Inflation-Linked Bonds (364)
  - Chapter 16: Floating-Rate Securities (379-382)
- Hardy, *Investment Guarantees*: *Modeling and Risk Management for Equity-Linked Life Insurance*, 2003
  - Chapter 12: Guaranteed annuity options
  - Chapter 13: Equity-indexed annuities
- Hull, *Options, Futures, and Other Derivatives* Sixth Edition, 2006
  - Chapter 13: The Black-Scholes-Merton model
  - Chapter 14: Options on stock indices, currencies and futures
  - Chapter 16: Volatility Smiles
  - Chapter 17: Basic Numerical Procedures (17.4,17.5, 17.8 only)
  - Chapter 21: Credit Derivatives
  - Chapter 22: Exotic Options
  - Chapter 24 : More on Models and Numerical Procedures (24.1- 24.4 only)
  - Chapter 30: Swaps revisited

Investment – Advanced Portfolio Management Exam

- V-C100-07 Chew, *The New Corporate Finance: Where Theory Meets Practice*, Chapter. V.32:
- V-C125-07 (Formerly8E-713-05):Chapters 5 & 6 of the Oxford Guide to Financial Modeling, section 6.2 only.
- V-C101-07 (Formerly 8V-202-00): Quantitative Strategies Research Notes, "Model Risk"
- V-C102-07 (Formerly 8V-203-01): Current Issues: Options, What Does An Option Pricing Model Tell Us About Option Prices?
- V-C103-07, Longley-Cook & Kehrberg, "Efficient Stochastic Modeling Utilizing Representative Scenarios: Application to Equity Risk", Tillinghast 2003
- V-C104-07 Use of Stochastic Techniques to Value Actuarial Liabilities Under Canadian GAAP, Canadian Institute of Actuaries

Investment – Advanced Portfolio Management Exam

Instructional Objectives
3. Credit Risk
Learning Outcomes The candidate will be able to: a) Define and evaluate credit risk as related to fixed income securities, derivatives and reinsurance ceded b) Define and evaluate spread risk as related to fixed income securities and derivatives c) Describe, contrast and assess credit risk measurement techniques and models d) Describe the role of rating agencies in evaluating credit risk e) Describe best practices in credit risk management, including: ▪ credit and underwriting policies ▪ comprehensive due diligence ▪ diversification requirements and aggregate counter-party exposure limits ▪ use of credit derivatives and credit support agreements f) Recommend a credit risk management strategy for a given situation
Syllabus Resources
• Babbel & Fabozzi, *Investment Management for Insurers*, 1999 o Chapter 8: Credit Derivatives • Crouhy, *Risk Management*, 2001 o Chapter 7: Credit Rating Systems o Chapter 8: Credit Migration Approach to Measuring Credit Risk o Chapter 9: The Contingent Claim Approach to Measuring Credit Risk o Chapter 10: Other Approaches: The Actuarial and Reduced-Form Approaches to Measuring Credit Risk o Chapter 11: Comparison of Industry-Sponsored Credit Models and Associated Back-Testing Issues o Chapter 12: Hedging Credit Risk • Hull, *Options Futures & Other Derivatives*, Sixth Edition, 2006, o Chapter 20: Credit Risk o Chapter 21: Credit Derivatives • Tilman, *Asset/Liability Management of Financial Institutions*, 2003 o Chapter 13: Creditworthiness and asset/liability management of insurance companies: a rating agency perspective • V-C126-07 (Formerly 8V-114-00): Derivatives: Practice and Principles (p13-24)

Investment – Advanced Portfolio Management Exam

Instructional Objectives
4. Advanced Portfolio Management
Learning Outcomes The candidate will be able to: a) Explain how an investment policy and an investment strategy can help manage risk and create value b) Describe how client's needs and constraints affect the selection of an investment strategy or the construction of a portfolio. Considerations include: ▪ Funding objective ▪ Investment policy ▪ Risk-return tradeoff ▪ Regulatory requirements ▪ Target rating from rating agency ▪ Risk appetite ▪ Capital, tax and accounting considerations ▪ Other constraints c) Describe how liability requirements affect the selection of an investment strategy or the selection of an optimal portfolio d) Describe and compare specialized financial instruments that can be used in the construction of an asset portfolio supporting financial institutions and pension plans liabilities e) Describe asset allocation strategies that can be used to construct an asset portfolio f) Assess a portfolio position against portfolio management objectives and recommend a strategy to rebalance the portfolio g) Evaluate complex situations associated with the presence of embedded options, hedging strategies, accounting considerations, taxation and capital requirements under a range of economic environments h) Describe how deterministic and stochastic models can be used to assess different investment strategies i) Recommend an investment strategy for a given situation ▪ Portfolio policy and objectives ▪ Asset selection criteria ▪ Capital market expectations ▪ Risk management strategy
Syllabus Resources
• Babbel & Fabozzi, *Investment Management for Insurers*, 1999 o Chapter 19: Hedging Corporate Securities with Treasury and Derivative Instruments o Chapter 20: Valuation and Portfolio Risk Management with Mortgage-Backed Securities (pp. 413-419: background only) o Chapter 21: Hedging Mortgage Passthrough Securities o Chapter 25: Investment Analysis: Profiting from a Complex Equity Market o Chapter 26: The Use of Derivatives in Managing Equity Portfolios • Fabozzi, *Handbook of Fixed Income Securities*, Seventh Edition, 2005 o Chapter 1: Overview o Chapter 10: U.S. Treasury and Agency Securities (pp. 229-231, 241-245) o Chapter 11: Municipal Bonds (pp. 251-256) o Chapter 12: Private Money Market Instruments (pp. 285-297) o Chapter 13: Corporate Bonds (pp. 305-327, 331-335) o Chapter 14: Medium-term notes (pp. 339-340, 344-350) o Chapter 15: Inflation-Linked Bonds (pp. 351-359, 364-369) o Chapter 16: Floating-Rate Securities (pp. 373-379, 382-383) o Chapter 20: Emerging Market Debt pp. (441-453)

- Chapter 22: An Overview of Mortgages and the Mortgage Market pp. (487-501)
- Chapter 23: Agency Mortgage-Backed Securities (pp. 513-527)
- Chapter 24: Collateralized Mortgage Obligations
- Chapter 25: Nonagency CMOs
- Chapter 26: Residential Asset-Backed Securities (pp. 589-595)
- Chapter 27: Commercial Mortgage-Backed Securities (pp. 615-625)
- Chapter 30: Cash-Collateralized Debt Obligations (pp. 669-683, 689-693)
- Chapter 31: Synthetic CDOs (pp. 695-705)
- Chapter 47: Bond Immunization: An Asset/Liability Optimization Strategy
- Chapter 48: Dedicated Bond Portfolios

- Hardy, *Investment Guarantees*: *Modeling and Risk Management for Equity-Linked Life Insurance*, 2003
  - Chapter 8: Dynamic hedging for separate account guarantees
- Hull, *Options, Futures, and Other Derivatives*, Sixth Edition, 2006
  - Chapter 30: Swaps revisited
- Litterman, *Modern Investment Management: An Equilibrium Approach*,2003
  - Chapter10: Strategic Asset Allocation in the Presence of Uncertain Liabilities
  - Chapter 26: Strategic Asset Allocation and Hedge Funds
  - Chapter 27: Managing a Portfolio of Hedge Funds
  - Chapter 28: Investing in Private Equity
- Tilman, *Asset/Liability Management of Financial Institutions*, 2003
  - Chapter 6: The Role of Alternative Investments in Asset/Liability Management of Financial Institutions
  - Chapter 13 Creditworthiness and asset/liability management of insurance companies: a rating agency perspective (p189-195)
  - Chapter 14: Asset/liability management for life insurers: lessons learned and future directions
  - Chapter 16: Understanding options embedded in insurers' balance sheets
- V-C111-07 (Formerly 8V-320-05): Creating Value in Pension Plans (Or, Gentlemen Prefer Bonds)
- V-C112-07 (Formerly 8V-121-03): Financial Reporting Developments - Accounting for Derivative Instruments and Hedging: Comprehensive Analysis of FASB 133 Amended & Interpreted (Overview and Appendix C only)
- V-C113-07 (Formerly 8V-113-00): Asset Allocation in a Downside Risk Framework
- V-C114-07 (Formerly 8V-123-04): The Real Estate Portfolio Management Process
- V-C116-07 (Formerly 8V-119-00): Handbook of Mortgage Backed Securities, (Chapter 18, 19)
- V-C129-07, Maginn & Tuttle, *Managing Investment Portfolios, A Dynamic Process* (3rd edition, 2007), CFA Institute, Chapter 11: Monitoring & Rebalancing
- V-C131-07, Deloitte – IFRS and US GAAP: A pocket comparison p. 21-24 (IAS 39 only
- V-C132-07, Deloitte – IFRS in Your Pocket 2005 p. 74-78 (IAS 39 only)
- V-C133-07, Deloitte – International Financial Reporting Standards; Model Financial Statements and Disclosures Checklists 2005 p. 204-205 (IAS 39 only)
- V-C134-07 (Formerly 8V-122-04): Overview of Recent Prepayment Behavior and Advances in its Modeling
- V-C135-08, "Living With Mortality: Longevity Bonds And Other Mortality-Linked Securities", by Blake, Cairns and Dowd, Institute of Actuaries, 2006 (sections 3-5)
- Canadian Institute of Actuaries, Guidance Note, "An Overview of an Investment Policy Statement in an Asset/Liability Management Context", 1994. http://www.actuaries.ca/members/publications/1994/9430e.pdf

Investment – Advanced Portfolio Management Exam

Instructional Objectives
5. Performance Measurement
Learning Outcomes
The candidate will be able to: a) Describe and assess techniques that can be used to select or build a benchmark for a given portfolio or portfolio management style b) Recommend a benchmark for a given portfolio or portfolio management style c) Describe and assess performance measurement methodologies for investment portfolios d) Recommend a performance measurement methodology
Syllabus Resources
• Babbel & Fabozzi, *Investment Management for Insurers*, 1999 o Chapter 3: A Performance Measurement System for Insurers. • Fabozzi. *Handbook of Fixed Income Securities*, Seventh Edition, 2005 o Chapter 44: Quantitative Management of Benchmarked Portfolios • V-C107-07, Fabozzi, *Handbook of Portfolio Management*, o Chapter 20: Quantitative Analysis of Fixed Income Portfolios Relative to Indices o Chapter 21: A Return Attribution Model for Fixed Income Securities • V-C108-07, Laurence B. Siegel, *Benchmarks and Investment Management*, Chapter 9: Fixed Income Benchmarks • V-C109-07 (Formerly 8V-314-01): Performance Measurement Using Transfer Pricing • V-C129-07 Chapters 11 and 12 of Maginn & Tuttle, *Managing Investment Portfolios: A Dynamic process*, Chapter 12 only • V-C130-07 (Formerly 8V-311-00): Total Return Approach to Performance Measurement

Instructional Objectives
6. Market Expectations and Behavioral Finance
Learning Outcomes
The candidate will be able to: a) Explain how behavioral characteristics of individuals or firms affect the investment or capital management process b) Describe how behavioral finance explains the existence of some market anomalies c) Identify and apply the concepts of behavioral finance with respect to investors, option holders and policyholders, including ▪ Optimal behavior, real behavior, model behavior, and empirical studies d) Contrast expectations of future investment performance with historical performance
Syllabus Resources
• Fabozzi, *Handbook of Fixed Income Securities* Seventh Edition, 2005 o Chapter 26: Residential Asset-Backed Securities (pp. 595-600)

Investment – Advanced Portfolio Management Exam

- V-C116-07 (Formerly 8V-119-00): Handbook of Mortgage Backed Securities, Chapter 9 only
- V-C119-07, Schiller JEP. Winter 2003 From Efficient Markets Theory to Behavioral Finance
- V-C120-07, Malkiel, JEP Winter 2003, The Efficient Market Hypothesis and Its Critics
- V-C121-07, Rabin and Thaler, JEP Winter 2001, Anomalies: Risk Aversion
- V-C122-07, Thaler and Lamont, JEP Fall 2003, Anomalies: The Law of One Price in Financial Markets,
- V-C123-07, Himmelberg, Mayer and Sinai, JEP Fall 2005, Assessing High House Prices: Bubbles, Fundamentals, and Misperceptions
- V-C124-07, Siegel, *Stocks for the Long Run*, Chapter 7: The Great Bull Market, the New Economy, the Age Wave, and Future Stock Returns
- V-C128-07 (Formerly 8V-201-00): Financial Decision Making in Markets and Firm: A Behavioral Perspective
- V-C134-07 (Formerly 8V-122-04): Overview of Recent Prepayment Behavior and Advances in its Modeling

- Scotchie, *Product Matters* September 2006, "Incorporating Dynamic Policyholder Behavior Assumptions into Pricing of Variable Annuities"
  http://www.soa.org/library/newsletters/product-development-news/2006/september/PDN0609.pdf

- "Modeling Surrender and Lapse Rates with Economic Variables", Changki Kim, NAAJ October 2005
  http://www.soa.org/library/journals/north-american-actuarial-journal/2005/october/naaj0504-4.pdf

- "Equity Risk Premium: Expectation Great and Small", Derrig and Orr, NAAJ January 2004
  http://www.soa.org/library/journals/north-american-actuarial-journal/2004/january/naaj0401-4.pdf