

Fellowship Exams

Exam 8

Investments and Financial Analysis

Before commencing study for this four-hour examination, candidates should read the “Introduction” to “Materials for Study” for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** or **SKU** constitute the 2009 CAS Exam 8 Study Kit that may be purchased from the CAS Online Store. Items marked with a bold **W**—the 2009 CAS Exam 8 Web Notes—are available at no charge in the “Study Tools” section of the CAS Web Site or may be purchased from the CAS Online Store. The 2009 Update to the 2008 Study Kit includes only the new item marked with a bold **SKU** and may be purchased from the CAS Online Store.

Please check the “Syllabus Updates” section of the CAS Web Site for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of topics that are presented in the learning objectives. Thus, the candidate should expect that each exam will cover many of the learning objectives and associated knowledge statements and syllabus readings, and that all of these will be tested at least once over the course of a few years—but each one may not be covered on a particular exam.

Exam 8 focuses on a broad array of finance, investment, and financial risk management topics. The exam can be viewed as having two parts, with Sections A-E covering mostly financial theory and tools and Sections F-H covering various financial applications. The material in Exam 8 presupposes and builds upon introductory knowledge of finance. It also presupposes knowledge of probability and statistical modeling, liability and reserve risk and insurance underwriting.

READINGS

There are two main texts: *Investments* (2009) by Bodie, Kane, and Marcus and *Options, Futures and Other Derivatives* (2009) by Hull. In addition, one chapter from *The Handbook of Fixed Income Securities* (2005) edited by Fabozzi is included. For those candidates wishing to gain a broader exposure to fixed income securities, Fabozzi has a wealth of additional material, although this additional material is not part of the learning objectives.

The *Investments* (Bodie, Kane, and Marcus) text contains references to various Web sites. Candidates are not responsible for the identity of the Web sites, or the actual content of the Web sites, except to the extent the content is reproduced in the text. Candidates are also not responsible for any aspect of the Excel applications or the boxes entitled “E-Investments” that are usually placed at or towards the end of a chapter.

While, in general, it is suggested that the candidate cover the learning objectives in the order listed, some references to later chapters in texts may occur before references to earlier chapters. In these cases, the candidate may need to review these earlier chapters first and then return to the learning objectives that reference the later chapters.

For Exam 8, the appendices are part of the material covered by the exam unless specifically excluded.

There are various numeric tables scattered throughout the readings, illustrating actual observations or hypothetical examples. Candidates are not responsible for the actual numeric values.

BACKGROUND – FINANCIAL MARKETS AND INSTRUMENTS

Candidates may find it helpful to review Chapters 1-5 of *Investments* by Bodie, Kane, and Marcus for background in financial markets and instruments.

A. Portfolio Theory and Equilibrium in Capital Markets

Range of weight for Section A: 13-17 percent

The portfolio theory portion of this section discusses the relationship between the risk and return for different combinations of risky and risk-free investments and discusses the impact of diversification on this relationship. Candidates are introduced to the manner in which investors might select, from those available, a particular portfolio that best suits their individual preferences for risk and return. In the portion of this section on equilibrium in capital markets, various equilibrium models are presented, including the Capital Asset Pricing Model, Arbitrage Pricing Theory, and other multi-factor models, along with empirical findings regarding their validity. The concept of market efficiency is presented to help candidates understand the factors that move market prices towards and away from the theoretical prices presented in these models.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Calculate the expected return and standard deviation of return for a portfolio consisting of a risky asset and risk-free asset and identify optimal combinations of the risky asset and the risk-free asset for investors with different levels of risk aversion.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Utility functions, utility scores and utility maximization</p> <p>b. Risk aversion</p> <p>c. Mean-variance criterion</p> <p>d. Capital allocation line</p> <p>e. Complete portfolio</p> <p>f. Reward to variability ratio (Sharpe ratio)</p>
READINGS	
BKM, Chapter 6	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>2. Determine the weights for two risky assets in the optimal risky portfolio and the weights on the components of the optimal complete portfolio.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Expected return for portfolios of risky and risk-free assets</p> <p>b. Standard deviation of return for portfolios of two or more risky assets</p> <p>c. Standard deviation of return for portfolios of risky and risk-free assets</p> <p>d. Reward to variability ratio (Sharpe ratio)</p> <p>e. Optimal risky portfolio</p> <p>f. Optimal complete portfolio</p>
<p>3. Describe two arguments why a passive strategy for selecting a portfolio of risky assets may be a reasonable choice for many investors and the key steps in the Markowitz Portfolio Selection Model.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Passive vs. active strategies: Costs of active strategy and free-rider benefit</p> <p>b. Minimum variance frontier</p> <p>c. Efficient frontier of risky assets</p> <p>d. Optimal capital allocation line</p> <p>e. Separation property</p> <p>f. Asset allocation vs. security selection</p>
<p>4. Calculate the variance of returns for an equally weighted portfolio of risky assets and describe the limits to the benefits of diversification.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Systematic risk</p> <p>b. Risk pooling</p> <p>c. Risk sharing</p> <p>d. Insurance principle</p>
READINGS	
BKM, Chapter 7	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>5. Use a single index model to calculate a security's expected return, variance, covariance (and correlation) with other securities and its beta.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Single factor model</p> <p>b. Single index model</p> <p>c. Systematic risk</p> <p>d. Alpha</p> <p>e. Covariance and correlation estimates for single index model</p> <p>f. Estimating beta using single index model</p> <p>g. Adjusting beta estimates to reflect tendency of betas to move towards 1.0 and account for estimation error.</p> <p>h. Forecasting beta</p>
<p>6. Contrast the process of portfolio construction using the single index model and the full covariance (Markowitz) model.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Markowitz model</p> <p>b. Single index model</p> <p>c. Alpha</p> <p>d. Risk premiums due to market and non-market factors</p> <p>e. Role of parameter estimation risk</p> <p>f. Decentralizing macroeconomic analysis and security analysis</p>
READINGS	
BKM, Chapter 8	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>7. Explain the Capital Asset Pricing Model, including the major assumptions and examples of its applications. Use CAPM to measure expected returns for risky securities with different risk characteristics. Explain the assumptions that are modified under various extensions of CAPM.</p> <p>Range of weight: 3-7 percent</p>	<p>a. CAPM assumptions and why these cause all investors to hold the market portfolio</p> <p>b. Market price of risk</p> <p>c. Capital market line</p> <p>d. Security market line</p> <p>e. Beta</p> <p>f. Extensions of CAPM – Zero Beta CAPM, CAPM with Non-Traded Assets and Labor Income, ICAPM, CAPM with Liquidity Adjustments</p>
<p>8. Describe the differences between CAPM and the Single Index Model, including their respective implications for security alphas.</p> <p>Range of weight: 0-5 percent</p>	<p>a. CAPM</p> <p>b. Single Index Model</p> <p>c. Expected vs. actual returns</p> <p>d. Market portfolio vs. market index</p>
READINGS	
BKM, Chapter 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>9. Use Arbitrage Pricing Theory to determine the expected return for a security given its factor sensitivities, using either known expected returns on the factor portfolios or by calculating the expected returns on the factor portfolios using the expected returns and factor sensitivities of other diversified portfolios.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Arbitrage and the Law of One Price</p> <p>b. Arbitrage Pricing Theory (APT) and its comparison to CAPM</p> <p>c. Factor betas</p> <p>d. Factor portfolios and factor risk premiums</p> <p>e. Alternative Factors in Multifactor Models: Macroeconomic Factors (Chen, Roll and Ross) and Fama-French Factors</p>
READINGS	
BKM, Chapter 10	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>10. Describe the concept of market efficiency, including the three major forms, and its implications for portfolio management.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Efficient Market Hypothesis: Weak Form, Semi-Strong Form, Strong Form</p> <p>b. Random walk</p> <p>c. Technical analysis</p> <p>d. Fundamental analysis</p> <p>e. Passive investment strategy and index funds</p> <p>f. Role of portfolio management in achieving appropriate diversification, reflecting tax differences and reflecting different risk tolerances.</p>
<p>11. Describe various tests of market efficiency and the resulting observations from various studies.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Weak form tests: Patterns in stock prices including momentum, returns over long horizons and predictors of broad market returns</p> <p>b. Semi-strong tests: Market anomalies, including P/E effect, small-firm effect, neglected-firm effect, book-to-market effect and post-earnings announcement price drift</p> <p>c. Strong form tests: Inside information</p> <p>d. Risk premiums vs. inefficiencies</p> <p>e. Anomalies vs. data mining</p> <p>f. The “noisy market hypothesis” and fundamental indexing</p> <p>g. Event studies and abnormal returns</p> <p>h. Performance of market professionals—analysts, mutual funds managers (including effect of survivor bias)</p>
READINGS	
BKM, Chapter 11	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>12. Describe how information processing errors, behavioral irrationalities and limits to arbitrage can affect market efficiency and evaluate the importance of the behavioral critique of market efficiency.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Information processing errors including forecasting errors, overconfidence, conservatism, sample size neglect and representativeness</p> <p>b. Behavioral biases including framing, mental accounting, regret avoidance and prospect theory</p> <p>c. Limits to arbitrage including fundamental risk, implementation costs and model risks</p> <p>d. Examples of violations of Law of One Price, including “Siamese Twin” Companies (Royal Dutch/Shell), Equity carve outs (3Com/Palm) and Close End Fund discounts and premiums</p> <p>e. Behavioral critique, including inconsistencies and statistical significance</p> <p>f. Technical analysis—use of price data, volume data and sentiment indicators, and their links to the behavioral critique</p>
READINGS	
BKM, Chapter 12	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>13. Evaluate the practicality of CAPM.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Testability of CAPM</p> <p>b. Failure of empirical tests of alpha values</p> <p>c. Role of decomposition of systematic and firm-specific risk and the efficiency of the market portfolio in CAPM’s acceptance in practice</p> <p>d. Use of CAPM by security analysts</p> <p>e. Statistical estimation problems associated with CAPM in practice</p>
<p>14. Describe the use of historical data to test the CAPM and APT, the statistical limitations of these tests and the key findings of various studies.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Two-stage test of the expected return - beta relationship</p> <p>b. Statistical limitations, including actual versus expected returns, market index as proxy for market portfolio, measurement error, stochastic volatility</p> <p>c. Roll’s critique</p> <p>d. Important tests of CAPM, such as Miller and Scholes; Black, Jensen and Scholes; Fama and Macbeth, and their results/conclusions</p> <p>e. Accounting for Human Capital, Cyclical Variations, and Nontraded Business</p> <p>f. Chen, Roll and Ross tests of APT</p> <p>g. Fama and French’s 3-Factor Model, including alternative explanations of the empirical results as either priced risk factors or mispricings due to behavioral biases</p>
READINGS	
BKM, Chapters 9 and 13	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
15. Describe the Equity Premium Puzzle and various explanations for the puzzle. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Equity Premium Puzzle b. Fama and French's analysis based on the dividend discount model c. Expected vs. realized returns d. Survivorship bias e. Extensions of CAPM f. Behavioral explanations
READINGS	
BKM, Chapter 13	

B. Fixed Income Securities

Range of weight for Section B: 15-20 percent

This section covers the features of various fixed income securities, including U.S. government bonds, corporate bonds and mortgage-backed securities, and details of how these securities are valued, including the term structure of interest rates.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe key features of various fixed income securities and identify differences in how their cash flows are determined. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Key Features: Issuer, Contractual Cash Flows, Credit Risk, Tax Treatment for Investors b. Types of Fixed Income Securities: Treasury Notes and Bonds, Corporate Bonds, Preferred Stock, Asset-Backed Securities, Catastrophe Bonds, International Bonds, Indexed Bonds (e.g., TIPS)
READINGS	
BKM, Chapter 14 Cummins CAT Bond Gorvett	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Determine the quoted price, cash price, and yield to maturity of U.S. Treasury Bonds and Corporate Bonds. Range of weight: 3-7 percent	<ul style="list-style-type: none"> a. Accrued interest b. Quoted or Clean price c. Sale, Invoice, Cash or Dirty price d. Alternative yield measures—current yield, yield to maturity, yield to call, par yield e. Prices and yields for Zero Coupon Bonds f. Annual, quarterly and continuous compounding g. Day count conventions
READINGS	
BKM, Chapter 14 Hull, Chapter 4 and Section 6.1	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>3. Calculate the pre-tax and after-tax holding period returns, taking into account taxes associated with the amortization of original issue discount.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Holding Period Returns</p> <p>b. Original Issue Discount</p>
READINGS	
BKM, Chapter 14	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>4. Explain the three different Term Structure Theories.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Three theories, including Expectations Hypothesis, Liquidity Preference Theory, and Segmentation Theory</p> <p>b. Forward rate versus expected spot rate</p>
<p>5. Determine U.S. Treasury zero rates at different maturities (i.e., the term structure) based on U.S. Treasury bond yields and calculate forward rates from U.S. Treasury and LIBOR zero rates.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Spot rates</p> <p>b. Short rates</p> <p>c. Bootstrap method for determining zero rates from coupon bonds using both continuous and semi-annual compounding</p> <p>d. LIBOR zero rates</p> <p>e. Determining forward rates from spot rates (zero rates)</p> <p>f. Forward Rate Agreements</p>
READINGS	
BKM, Chapter 15 Hull, Chapter 4	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>6. Describe the process used to rate the default risk on corporate bonds and the various mechanisms used to limit this risk to investors.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Methods to estimate bond default probabilities, including Financial Ratios and Altman's Z-Score</p> <p>b. Bond indentures including, sinking funds, subordination, dividend restrictions, and collateral</p>
READINGS	
BKM, Chapter 14	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>7. Determine the promised (stated) yield and expected yield for corporate bonds, taking into account default probabilities and expected recovery rates.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Promised (stated) yield</p> <p>b. Expected yield</p> <p>c. Unconditional default probability</p> <p>d. Conditional default probability, default intensity or hazard rate</p> <p>e. Default premium or yield spread</p>
READINGS	
BKM, Chapter 14 Hull, Chapter 22	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Determine the approximate default intensity for a corporate bond or the annual unconditional probability of default for a corporate bond given its yield, the risk free yield, and its expected recovery rate. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Default intensity or hazard rate b. Unconditional default probability c. Expected loss from default d. Yield spread e. Recovery rate
READINGS	
Hull, Chapter 22	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
9. Calculate the historical default probabilities for corporate bonds using Altman's bond mortality method. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Bond Mortality b. Marginal and Cumulative Mortality Rates
READINGS	
Altman	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
10. Discuss the reasons Altman gives for excess historical default premiums and the reasons Hull gives for differences between historical default probabilities and default probabilities implied by bond prices. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Historical statistics of bond defaults and yields for various rating cohorts b. Explanations for excess historical default premiums, including overcompensation, other risk factors such as liquidity risk and reinvestment risk, overstated recovery rates, systematic default risk, investor constraints c. Risk Neutral versus Real World estimates of default probabilities
READINGS	
Altman Hull, Chapter 22	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
11. Describe the use of Merton's model to estimate probabilities of default using equity prices and equity volatility. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Equity as a call option on the assets of the firm b. Relationship between asset volatility and equity volatility
READINGS	
Hull, Chapter 22	

C. Futures, Forwards and Swaps

Range of weight for Section C: 8-12 percent

This section covers in detail various derivative instruments, including futures, forwards, and swaps. The emphasis in each case is on understanding cash flow characteristics, using the concept of arbitrage to determine the theoretical value of these securities, and managing financial risk through use of these financial instruments.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Describe the standardized features of futures contracts that are specified by the Exchange and how futures contracts differ from forward contracts.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Standardized features, including asset description, contract size, delivery arrangements, delivery months, method of quoting prices, price, and position limits</p> <p>b. Margins</p> <p>c. Marking to market</p> <p>d. Closing out positions</p>
READINGS	
Hull, Chapter 2 (For background, the candidate may wish to refer to Chapter 1, but no questions will be taken from Chapter 1.)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>2. Use forward and/or futures contracts to either hedge the future purchase or sale of an asset or to hedge a portfolio of stocks.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Long hedge versus short hedge</p> <p>b. Arguments for and against hedging</p> <p>c. Basis risk</p> <p>d. Minimum variance hedge ratio</p> <p>e. Optimal number of futures contracts for hedging asset positions</p> <p>f. Optimal number of index futures contracts to hedge portfolios</p>
READINGS	
Hull, Chapter 3 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>3. Use arbitrage arguments to determine equilibrium forward prices for non-dividend paying stocks, dividend paying stocks, stock indices, currencies and commodities.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Arbitrage</p> <p>b. Short selling</p> <p>c. Forward prices versus futures prices</p> <p>d. Convenience yields</p> <p>e. Relationship between forward prices and expected future spot prices</p> <p>f. Cost of carry</p> <p>g. Stock indices</p>
<p>4. Determine the value of an existing forward contract.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Present value difference of forward price and the delivery price of an existing forward contract</p>
READINGS	
Hull, Chapters 3 and 5 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Describe how Interest Rate Swaps or Currency Swaps can be used to alter the interest rate sensitivity or exchange rate sensitivity of an asset or a liability. Range of weight: 0-5 percent	a. Swap cash flow mechanics b. Role of financial intermediary c. Comparative advantage argument for swaps and the role of the counterparties' credit ratings
6. Determine the value of an existing interest rate swap or currency swap and the equilibrium swap rate. Range of weight: 0-5 percent	a. Swap rate b. LIBOR/swap zero rate c. Value of a swap as an exchange of bonds d. Value of a swap as series of forward agreements
READINGS	
Hull, Chapter 7	

D. Options

Range of weight for Section D: 18-22 percent

This section covers options in detail. The emphasis is in understanding their cash-flow characteristics, how to use the concept of arbitrage to determine the theoretical value of these securities, and how they can be used to manage financial risk. Various valuation models are presented and used to determine the values of a variety of options.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the fundamental aspects of put and call options on stocks, including how they are traded and quoted, key contract provisions, and their payoffs at maturity. Range of weight: 0-5 percent	a. Key determinants of the value of put and call options, including underlying asset price, exercise price, term to maturity, risk-free rate, and volatility of underlying asset price b. Effect of cash dividends, stock dividends, and stock splits on stock option contracts c. Early exercise of American puts and calls, with and without dividends
READINGS	
Hull, Chapters 8 and 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Use Put-Call Parity to determine the relationship between prices of European Put and Call options and to identify arbitrage opportunities. Range of weight: 0-5 percent	a. Arbitrage b. Put-Call Parity for European options c. Use of short selling to lock in arbitrage profits d. Effect of dividends on put-call parity
READINGS	
Hull, Chapter 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Draw payoff and profit diagrams for different trading strategies involving options. Range of weight: 0-5 percent	a. Combinations of options with underlying stock b. Spreads—Bull, Bear, Box, Butterfly, Calendar, Diagonal c. Combinations—Straddle, Strips, Straps, Strangles
READINGS	
Hull, Chapter 10	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Value European and American Put and Call options using the Binomial Model and Risk Neutral Valuation Model. Range of weight: 3-7 percent	a. Single period and multi-period binomial stock price trees b. Selecting parameters (u and d) for the binomial option pricing model based on the stock volatility c. Risk neutral valuation method d. Risk neutral probabilities e. Early exercise of American options f. Binomial model for options on dividend-paying stocks, indices, currencies and futures
READINGS	
Hull, Chapter 11	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Value European Puts and Calls using the Black-Scholes Option Pricing Formula for dividend and non-dividend paying stocks, indices, currencies, and futures contracts. Range of weight: 3-7 percent	a. Geometric Brownian Motion as a model for stock prices b. Estimation of volatility for option pricing purposes and implied volatility c. Put-call parity d. Methods for valuing European and American call options on dividend paying stocks, including Black's Approximation for American options e. Black Model for valuing futures options
READINGS	
Hull, Chapters 12 (excluding Appendix), 13 (excluding Appendix), 15, and 16	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Explain the impact that various real-world deviations from the standard Black-Scholes assumptions would have on the accuracy of the Black-Scholes option pricing formula. Range of weight: 0-5 percent	Impact of: a. Changes in volatility b. Jumps in asset prices c. Changes in interest rates d. Borrowing penalties e. Short-selling restrictions f. Trading costs g. Taxes h. Dividends i. Takeovers
READINGS	
Hull, Chapter 13 (excluding Appendix) Black	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. Determine whether a particular function is a valid formula for the price of a derivative security using the Black-Scholes-Merton Differential Equation. Range of weight: 0-5 percent	a. Ito's Lemma b. Black-Scholes-Merton Differential Equation c. Riskless portfolio
READINGS	
Hull, Section 12.5 and Chapter 13 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Explain the difference between standard options and warrants or executive stock options and use the Black-Scholes model with appropriate adjustments to determine the value of warrants. Range of weight: 0-5 percent	a. Black-Scholes Model b. Adjustments for new shares issued and exercise price paid
READINGS	
Hull, Chapter 13 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
9. Determine the value of bonds with embedded put or call features using a Binomial Interest Rate Tree. Range of weight: 3-7 percent	a. Binomial interest rate tree for short rate b. Calibrating a binomial interest rate tree using U.S. Government bonds c. Option-adjusted spread
READINGS	
Fabozzi, Chapter 37	

E. International Securities

Range of weight for Section E: 0-5 percent

This section introduces the candidate to the effect of global diversification on portfolio risk-return trade-offs and how exchange rate risks and political risks affect the risk of international securities.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe sources of risk in investing internationally, including exchange rate risk and country-specific risk. Range of weight: 0-5 percent	a. Exchange Rate Risk b. Country-specific risk and political risk
2. Describe the potential diversification benefits from investing in international securities for passive and active investors. Range of weight: 0-5 percent	a. Approaches: American Depository Receipts, country specific mutual funds and ETFs (e.g. WEBS), derivatives on foreign markets b. Betas, Average Returns and Correlations c. Expected vs. realized returns and risk measures d. Home bias e. Empirical estimates of benefits for passive investors, including benefits over different historical time periods
READINGS	
BKM, Chapter 25	

F. Asset-Liability Management

Range of weight for Section F: 5-10 percent

This section further exposes the candidate to factors that affect the price sensitivity of fixed income securities and presents various ways in which a portfolio manager might manage the interest rate and cash flow risk in a portfolio of these instruments. The same concepts are also applied to the interest rate risk associated with a firm's liabilities and the interest rate risk associated with a firm's total market value, inclusive of their franchise value.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe how to use various strategies to manage interest rate risk and cash flow risk in a bond portfolio and demonstrate the effectiveness of each strategy under different interest rate scenarios. Range of weight: 3-7 percent	a. Duration (Macaulay, Modified and Effective) b. Convexity c. Estimating the effect of interest changes on bond prices using duration and convexity risk measures d. Immunization – protecting current net worth or protecting future value of portfolio e. Cash flow matching and dedication f. Contingent immunization g. Rebalancing h. Use of interest rate swaps, mortgage-backed securities, and other derivative securities to alter the interest rate risk for a bond portfolio
READINGS	
BKM, Chapter 16 Hull, Sections 4.8 and 4.9, Chapter 7 Gorvett	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Calculate the Macaulay duration of loss reserves and the Macaulay duration of the surplus of a property-casualty insurance company using either annually or continuously compounded interest rates. Range of weight: 0-5 percent	a. Macaulay duration b. Relationship between surplus, asset and liability durations for a property-casualty insurance company
READINGS	
Feldblum Noris (excluding Sections I, II, V, and VI)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Explain why Panning argues that traditional ALM, which emphasizes the interest rate risk management of the assets and liabilities on the balance sheet, is incomplete. Range of weight: 0-5 percent	a. Total Economic Value b. Franchise Value – Magnitude and exposure to interest rate risk (duration)
4. Explain the reason why, with constant expected losses, fixed expenses and premiums that reflect a constant target return on surplus, an insurer's franchise value would have a high duration and how this duration can be altered through changes in the pricing strategy. Range of weight: 0-5 percent	a. Duration of franchise value b. Pricing strategy as defined by <i>a</i> and <i>b</i> parameters c. Advantages of managing the interest rate sensitivity of the firm's total economic value through the pricing strategy as opposed to changing the asset mix or using derivatives
READINGS	
Panning	

G. Financial Risk Management

Range of weight for Section G: 20-25 percent

This section goes beyond the treatment of Asset-Liability Management in Section F to include other sources of financial risk beyond interest rate risk and addresses the theoretical basis for financial risk management. Measures of the price sensitivity of derivative securities and the use of these instruments to manage financial risk are presented. Other measures of financial risk, such as Value at Risk and the Expected Policyholder Deficit, and their uses are presented.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Calculate the sensitivity of an option price to various parameters, including the stock price (delta and gamma), volatility (vega), time (theta), and interest rates (rho). Range of weight: 0-5 percent	a. Delta b. Gamma c. Vega d. Theta e. Rho

<p>2. Demonstrate how to delta, gamma and vega hedge a portfolio of stocks and options. Range of weight: 3-7 percent</p>	<p>a. Strategies for managing risk of written option contracts: do nothing, cover, stop loss, delta hedging b. Delta hedging c. Gamma hedging d. Vega hedging e. Delta, gamma, and vega of stocks, futures, and forwards f. Using futures or forwards to delta hedge efficiently g. Portfolio insurance (synthetic)</p>
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READINGS
Hull, Section 15.1 and Chapter 17 (excluding Appendix)

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>3. Calculate the Value at Risk (VaR) for a portfolio containing a single stock, multiple stocks, fixed income securities, or options. Range of weight: 3-7 percent</p>	<p>a. VaR definition b. VaR for individual stocks using model building (variance-covariance) approach c. VaR for portfolio of stocks using linear model d. VaR for bonds using linear model and duration e. Cash flow mapping procedure for bonds f. VaR for options using linear model and quadratic model</p>

READINGS
Hull, Chapter 20

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>4. Describe alternative ways to estimate the VaR besides analytical calculations. Range of weight: 0-5 percent</p>	<p>a. Historical simulation b. Monte Carlo simulation, including partial simulation approach c. Stress testing and back testing</p>

READINGS
Hull, Chapter 20 Culp, Miller and Neves (excluding Appendix)

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>5. Describe various mechanisms firms can use to reduce their credit risk on derivatives. Range of weight: 0-5 percent</p>	<p>a. Netting b. Collateralization c. Downgrade triggers</p>
<p>6. Describe the <i>CreditMetrics</i> approach to estimating Credit Value at Risk for a single bond or a portfolio of bonds. Range of weight: 0-5 percent</p>	<p>a. Credit ratings transition matrix b. Use of Gaussian copula to simulate correlated ratings transitions for two bonds</p>

READINGS
Hull, Chapter 22

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>7. Describe the limitations of VaR for non-financial firms and the advantages of alternatives such as Cash Flow at Risk, Risk-Based Capital and Shortfall Risk.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Examples of firms experiencing large losses due to poor financial risk management, including Proctor and Gamble, Barings, Orange County, Metallgesellschaft and Daimler Benz</p> <p>b. Limitations of VaR, including limited data to parameterize models over long horizons and deviations of real world distributions from normality assumption</p> <p>c. Cash Flow at Risk</p> <p>d. Risk-Based Capital</p> <p>e. Shortfall Risk</p>

READINGS

Stulz
Culp, Miller and Neves (excluding Appendix)
Butsic
Cummins Capital

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>8. Explain why financial risk management can enhance the value of a firm.</p> <p>Range of weight: 0-5 percent</p>	<p>Effect of risk management on:</p> <p>a. Bankruptcy costs</p> <p>b. Taxes</p> <p>c. Payments to stakeholders</p> <p>d. Access to capital for new investments</p> <p>e. Capital structure</p> <p>f. Management incentives</p>

READINGS

Stulz
Butsic

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>9. Describe how a firm's capital structure or credit rating could affect their preferred degree of financial risk management.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Highly-rated firms</p> <p>b. Low-rated firms</p> <p>c. Firms in distress</p>

READINGS

Stulz

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>10. Describe how firms can use Risk Adjusted Return on Capital (RAROC) and Economic Value Added (EVA) measures to maximize value creation.</p> <p>Range of weight: 0-5 percent</p>	<p>a. RAROC, including alternative measures of income and alternative measures of risk-adjusted capital</p> <p>b. EVA</p> <p>c. Management of risk taking by measuring gains on a risk-adjusted basis and design of compensation systems to reward excess returns only</p>
READINGS	
<p>Goldfarb Risk-Adjusted Performance Measurement Cummins Capital Stulz</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>11. Determine how to allocate risk capital to various risk sources or lines of business, and discuss the strengths and weaknesses of the various methods.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Distinction between risk measures and risk capital</p> <p>b. Proportional allocation using risk measures such as Percentile (VaR), CTE or EPD Ratio</p> <p>c. Merton-Perold method using Insolvency Put/EPD Ratio risk measure</p> <p>d. Myers-Read method</p> <p>e. Co-Measures, such as Co-CTE</p>
READINGS	
<p>Goldfarb Risk-Adjusted Performance Measurement Cummins Capital</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>12. Describe the key risk sources included in Goldfarb's risk-adjusted return on capital (RAROC) framework.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Market Risk</p> <p>b. Credit Risk</p> <p>c. Insurance Risk, including loss reserve risk, underwriting risk, property catastrophe risk</p> <p>d. Other risks, including operational and strategic risk</p>
<p>13. Use the methodology discussed in Goldfarb's Risk-Adjusted Performance Measurement to evaluate actual, <i>ex post</i>, performance of different business units using RAROC.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Measures of income</p> <p>b. Alternative methods used to allocate risk capital</p> <p>c. Return on Risk-Adjusted Capital (RAROC)</p>
<p>14. Use RAROC as a basis for insurance policy pricing by calculating the additional risk margin needed to achieve a target RAROC.</p> <p>Range of weight 0-5 percent</p>	<p>a. Economic profit as income measure</p> <p>b. Allocation of risk capital</p> <p>c. Cost of capital</p> <p>d. Additional risk margin</p> <p>e. Multi-period capital commitment</p>
READINGS	
<p>Goldfarb Risk-Adjusted Performance Measurement Cummins Capital</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
15. Describe the three types of friction costs associated with an insurer's capital. Range of weight: 0-5 percent	a. Friction costs, including agency costs, double taxation and regulation
READINGS	
Cummins Capital	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
16. Calculate the Expected Policyholder Deficit (EPD) for an insurance policy or line of business. Range of weight: 0-5 percent	a. Expected Policyholder Deficit (EPD)
17. Determine the capital required to maintain a constant EPD Ratio when adding a new policy or line of business to an existing portfolio of risks. Range of weight: 0-5 percent	a. EPD ratio b. Alternative assumptions about invested assets (cash versus risky securities)
READINGS	
Butsic Cummins Capital	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
18. Discuss how banks have used mortgage backed securities and other forms of securitization to alter their exposure to interest rate risk, prepayment risk and credit risk. Range of weight: 0-5 percent	a. Impact of securitization on sources of funds for mortgage holders and on interest rate risk retained by the mortgage originators b. Mortgage pass throughs and the effect of mortgage prepayment on cash flows to investors c. Collateralized Mortgage Obligations (CMOs) and the impact of prepayments on cash flows to investors in particular tranches
19. Describe the benefits that various forms of securitization have created for the financial markets. Range of weight: 0-5 percent	a. Increased liquidity b. Observable market prices c. Lower costs of financing d. Improved credit ratings for institutions that are able to transfer their risk to a broader pool of investors
20. Describe the market for securitizing catastrophic risk and explain the reasons for its growth. Range of weight: 0-5 percent	a. Products on the market, including Risk-Linked Securities, CAT Bonds, Sidecars, Cat-E-Puts, Catastrophe Risk Swaps, and Industry Loss Warranties b. Factors influencing interest in insurance securitization in relation to traditional reinsurance c. Factors impeding the growth of the market, including regulatory, accounting, tax, and rating issues

READINGS
BKM, Chapter 1 (p. 16), Chapter 2 (pp. 34-35), and Chapter 16 (Section 16.2) Cummins CAT Bond Gorvett

H. Valuation

Range of weight for Section H: 5-10 percent

This section covers the methods used to determine the theoretical value of equity securities and covers issues associated with the valuation of property and casualty insurance companies.

Learning Objectives	Knowledge Statements
1. Value the equity of a firm based on its expected future dividends. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Dividend Discount Model (DDM), using no growth, constant growth, or two-stage growth assumptions b. Estimating dividend growth rates based on dividend payout ratios and return on equity c. Terminal values
2. Calculate the impact of loss and expense reserve requirements and regulatory or rating agency capital requirements on the free cash flow to equity for a P&C insurer. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Free cash flow to equity for a P&C insurer
3. Value the equity of a P&C insurer based on its expected future dividends, its free cash flow to equity, or its expected abnormal earnings. Range of weight: 3-7 percent	<ul style="list-style-type: none"> a. Dividend Discount Model (DDM) b. Free cash flow to equity for a P&C insurer c. Discounted Cash Flow (DCF) Valuation using free cash flow to equity (FCFE), including impact of alternative methods of estimating terminal values and reasons why this method is preferred over the free cash flow to the firm (FCFF) method for P&C insurers d. Abnormal earnings e. Abnormal Earnings Valuation (AE), including impact of alternative methods of estimating terminal values
4. Value the equity of a firm using comparative or relative valuation methods based on multiples of selected financial variables obtained from either peer companies or from underlying fundamentals. Range of weight: 0-5 percent	<ul style="list-style-type: none"> a. Comparative valuation ratios including price-earnings, price-sales, price-book, price-cash flow b. Relationship between the dividend discount model and the price-earnings (P-E) ratio c. Relationship between the abnormal earnings valuation model and the price-book value (P-BV) ratio

READINGS
BKM, Chapter 18 Goldfarb Valuation

Complete Text References for Exam 8

Text references are alphabetized by the citation column.

Citation	Abbreviation	Learning Objective	Source
Altman, E.I., "Measuring Corporate Bond Mortality and Performance," <i>The Journal of Finance</i> , Volume 44, No. 4, September 1989, pp. 909-922.	Altman	B9-10	SK
Black, F., "How to Use the Holes in Black-Scholes," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 32, pp. 455-461.	Black	D6	SK
Bodie, Z.; Kane, A.; and Marcus, A.J., <i>Investments</i> (Eighth Edition), McGraw-Hill/Irwin, 2009. Chapter or section citations are listed under the appropriate learning objective, and include Chapters 1, 2, 6-16, 18, and 25.	BKM	A1-15, B1-7, E1-2, F1, G18-20, H1-4	L NEW
Butsic, R.P., "Solvency Measurement for Property-Liability Risk-Based Capital Applications," <i>The Journal of Risk and Insurance</i> , Volume 61, No. 4 (December 1994), pp. 656-690.	Butsic	G7-8, G16-17	SK
Culp, C.L.; Miller, M.H.; and Neves, A.M.P., "Value at Risk: Uses and Abuses," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 33, pp. 462-471.	Culp, Miller, and Neves	G4, G7	SK
Cummins, J. D., "Allocation of Capital in the Insurance Industry," <i>Risk Management and Insurance Review</i> , American Risk and Insurance Association, Inc., Spring 2000, Vol. 3, No. 1, pp. 7-27.	Cummins Capital	G7, G10-17	SK
Cummins, J. D., "CAT Bond and Other Risk-Linked Securities: State of the Market and Recent Developments," <i>Risk Management and Insurance Review</i> , American Risk and Insurance Association, Inc., 2008, Vol. 11, No. 1, pp. 23-47.	Cummins CAT Bond	B1, G18-20	SKU NEW
Fabozzi, F.J., <i>The Handbook of Fixed Income Securities</i> (Seventh Edition), McGraw-Hill, 2005, Chapter 37.	Fabozzi	D9	SK
Feldblum, S., "Asset Liability Matching For Property/Casualty Insurers," <i>Valuation Issues, CAS Special Interest Seminar</i> , 1989, pp. 117-154.	Feldblum	F2	W
Goldfarb, R. "CAS Exam 8 Study Note: P&C Insurance Company Valuation," August 2005.	Goldfarb Valuation	H1-4	W
Goldfarb, R. "CAS Exam 8 Study Note: Risk-Adjusted Performance Measurement for P&C Insurers," December 2006.	Goldfarb Risk-Adjusted Performance Measurement	G10-14	W
Gorvett, R.W., "Insurance Securitization: The Development of a New Asset Class," <i>Securitization of Risk, Casualty Actuarial Society Discussion Paper Program</i> , May 1999, pp. 133-140.	Gorvett	B1, F1, G18-20	W NEW

Citation	Abbreviation	Learning Objective	Source
Hull, J.C., <i>Options, Futures, and Other Derivatives</i> (Seventh Edition), Prentice Hall, 2009. Chapter or section citations are listed under the appropriate learning objective, and include Chapters 2-5, 6.1, 7-13, 15-17, 20, and 22.	Hull	B2, B4-5, B7-8, B10-11, C1-6, D1-8, F1, G1-6	L NEW
Noris, P.D., "Asset/Liability Management Strategies for Property and Casualty Companies," Morgan Stanley, May 1985.	Noris	F2	SK
Panning, W.H., "Managing Interest Rate Risk: ALM, Franchise Value, and Strategy," Willis Re Working Paper, July 2006.	Panning	F3-4	W
Stulz, R.M., "Rethinking Risk Management," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 29, pp. 411-427.	Stulz	G7-10	SK

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American Risk and Insurance Association, 716 Providence Road, Malvern, PA 19355; telephone: (610) 640-1997; Web site: aria@cpcuia.org.

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Hull, J.C., *Options, Futures, and Other Derivatives* (Seventh Edition), 2009, Prentice Hall; telephone: (800) 374-1200; Web site: www.prenhall.com.

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