

## 2011 Exam 9

### Financial Risk and Rate of Return

Before commencing study for this three-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** constitute the 2011 Exam 9 Study Kit that may be purchased from the CAS Online Store. Items marked with a bold **W** (the 2011 Exam 9 Web Notes) are available at no charge and may be downloaded from links in the Complete Text References section below—or a printed version may be purchased from the CAS Online Store. Items marked with a bold **OE** are available online exclusively.

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

The CAS will test the candidates’ knowledge of topics that are presented in the learning objectives. Thus, the candidate should expect that each exam will cover a large proportion 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 9 focuses on a broad array of finance, investment, and financial risk management topics. This examination assumes a working knowledge of basic ratemaking, finance, probability and statistical modeling, liability and reserve risk, and insurance underwriting. The ability to apply this knowledge and experience may be tested through questions dealing with problems for which there are no generally recognized solutions.

#### READINGS

There are two main texts: *Investments* (Eighth or Ninth Edition) by Bodie, Kane, and Marcus and *Options, Futures and Other Derivatives* (Seventh or Eighth Edition) by Hull. *Investments* 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 that 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 the earlier chapters first and then return to the learning objectives that reference the later chapters.

For the Financial Risk and Rate of Return exam, the appendices are part of the material covered 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

Candidates may find it helpful to review Chapters 1-5 of *Investments* for background in financial markets and instruments as well as the Venter paper for background on liquidity risk.

## 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 effect of diversification on this relationship. Candidates are introduced to the manner in which investors might select a particular portfolio, from those available, 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 (CAPM) and Arbitrage Pricing Theory (APT). 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
1. Explain key concepts of risk: <ul style="list-style-type: none"> <li>• Appetite</li> <li>• Tolerance</li> <li>• Aversion</li> <li>• Measurement</li> <li>• Portfolio construction</li> <li>• Strategies for monitoring</li> </ul> Range of weight: 0-5 percent	a. Utility functions, utility scores, and utility maximization b. Risk aversion c. Mean-variance criterion d. Capital allocation line e. Complete portfolio f. Reward to variability ratio (Sharpe ratio)
<b>READINGS</b>	
BKM, Chapter 6 (both Eighth and Ninth Editions)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Calculate the expected value, variance, and covariance of returns of asset portfolios in a multi-dimensional setting. Range of weight: 3-7 percent	a. Expected return and standard deviation for portfolios of risky and risk-free assets b. Optimal risky portfolio c. Optimal complete portfolio
3. Explain and demonstrate the efficient frontier (Markowitz) and diversification principles in asset construction. Range of weight: 3-7 percent	a. Passive versus active strategies: costs of active strategy and free-rider benefit b. Minimum variance frontier c. Efficient frontier of risky assets d. Optimal capital allocation line e. Separation property f. Asset allocation versus security selection
4. Explain and demonstrate effects of various strategies. Range of weight: 0-5 percent	a. Systematic risk b. Risk pooling c. Risk sharing d. Insurance principle
<b>READINGS</b>	
BKM, Chapter 7 (both Eighth and Ninth Editions)	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
5. Explain the single factor models and compare/contrast with the Markowitz model. Range of weight: 3-7 percent	a. Markowitz model b. Single factor model c. Single index model d. Systematic risk e. Alpha, Beta estimating and forecasting f. Covariance and correlation estimates for single index model g. Risk premiums due to market and non-market factors h. Parameter estimation risk i. Macroeconomic factors
<b>READINGS</b>	
BKM, Chapter 8 (both Eighth and Ninth Editions)	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
6. Explain the assumptions and construction of CAPM and use CAPM to calculate expected returns for risky securities. Range of weight: 3-7 percent	a. CAPM assumptions b. Market price of risk c. Capital market line d. Security market line e. Extensions of CAPM <ul style="list-style-type: none"> <li>• Zero Beta CAPM</li> <li>• CAPM with non-traded assets and labor income</li> <li>• ICAPM</li> <li>• CAPM with liquidity adjustments</li> </ul>
7. Compare/contrast CAPM and single index model and explain the assumptions that are modified under various extensions of CAPM. Range of weight: 0-5 percent	a. CAPM b. Single index model c. Expected versus actual returns d. Market portfolio versus market index
<b>READINGS</b>	
BKM, Chapter 9 (both Eighth and Ninth Editions)	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
8. Use APT to determine the expected return for a security and compare/contrast with CAPM and factor models. Range of weight: 0-5 percent	a. Arbitrage and the Law of One Price b. APT and its comparison to CAPM c. Factor betas d. Factor portfolios and factor risk premiums e. Alternative factors in multifactor models
<b>READINGS</b>	
BKM, Chapter 10 (both Eighth and Ninth Editions)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
9. Explain market efficiency and its implications for portfolio management, and describe the various tests and studies of market efficiency. Range of weight: 3-7 percent	a. Efficient market hypothesis b. Random walk c. Technical analysis d. Fundamental analysis e. Passive investment strategy f. Portfolio management
<b>READINGS</b>	
BKM, Chapter 11 (both Eighth and Ninth Editions)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
10. Explain the effect of behavioral finance on market efficiency. Range of weight: 0-5 percent	a. Information processing errors b. Behavioral biases c. Limits to arbitrage d. Violations of Law of One Price e. Behavioral critique f. Technical analysis
<b>READINGS</b>	
BKM, Chapter 12 (both Eighth and Ninth Editions)	

## B. Asset-Liability Management

Range of weight for Section B: 13-17 percent

This section exposes the candidate to factors that influence 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. Explain the different Term Structure Theories. Range of weight: 0-5 percent	a. Expectations hypothesis b. Liquidity preference theory c. Segmentation theory d. Forward rate versus expected spot rate
2. Determine U.S. Treasury zero rates at different maturities. Range of weight: 3-7 percent	a. Bootstrap method for determining zero rates from coupon bonds using both continuous and semi-annual compounding b. Determining forward rates from spot rates (zero rates) c. Spot rates d. Short rates e. LIBOR zero rates f. Forward Rate Agreements
<b>READINGS</b>	
BKM, Chapter 15 (both Eighth and Ninth Editions) Hull, Chapter 4 (both Seventh and Eighth Editions)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Utilize various strategies to manage interest rate risk and cash flow risk in a bond portfolio. Range of weight: 3-7 percent	a. Duration (Macaulay, modified, and effective) b. Convexity c. The effect of interest changes on bond prices d. Immunization 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
<b>READINGS</b>	
BKM, Chapter 16 (both Eighth and Ninth Editions) Hull, Sections 4.8 and 4.9, Chapter 7 (both Seventh and Eighth Editions)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Calculate the Macaulay duration of loss reserves and the Macaulay duration of the surplus of a property and casualty (P&C) insurance company. Range of weight: 0-5 percent	a. Macaulay duration b. Relationship between surplus, asset, and liability durations
<b>READINGS</b>	
Feldblum Asset Noris (excluding Sections I, II, V, and VI)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Quantify franchise value and demonstrate how it can be effectively managed. Range of weight: 0-5 percent	a. Total economic value b. Franchise value—magnitude and exposure to interest rate risk (duration) c. Pricing strategy d. Advantages of managing the interest rate sensitivity of the firm's total economic value through pricing strategy
<b>READINGS</b>	
Panning	

## C. Financial Risk Management

Range of weight for Section C: 25-30 percent

This section addresses financial risks as well as risks related to the insurance industry from the financial economics perspective. The concepts and techniques presented in this section are important components in the field of enterprise risk management.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Estimate the credit risk due to default and default correlation associated with fixed income securities. Range of weight: 3-7 percent	<ul style="list-style-type: none"> <li>a. Default intensity or hazard rate</li> <li>b. Unconditional default probability</li> <li>c. Expected loss from default</li> <li>d. Yield spread</li> <li>e. Recovery rate</li> <li>f. Relationship between asset volatility and equity volatility.</li> <li>g. Merton's model</li> <li>h. Credit ratings transition matrix</li> <li>i. Use of Gaussian copula to simulate correlated ratings transitions for two bonds</li> <li>j. <i>CreditMetrics</i> approach to estimating credit value at risk</li> </ul>
2. Describe the credit risk in derivatives transactions and various mechanisms to manage the risk. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Counterparty default risk</li> <li>b. Netting</li> <li>c. Collateralization</li> <li>d. Downgrade triggers</li> </ul>
<b>READINGS</b>	
Hull, Chapter 22 in the Seventh Edition ( <a href="#">Chapter 23 in the Eighth Edition</a> )	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Describe the reasons for the development of credit derivatives market, the valuation of credit derivative contracts, and the complexity of trading credit risks. Range of weight: 3-7 percent	<ul style="list-style-type: none"> <li>a. Credit default swaps (CDS)</li> <li>b. Mark-to-market</li> <li>c. Asset-backed securities (ABS)</li> <li>d. Collateralized debt obligation (CDO) and synthetic CDO</li> <li>e. The role CDS played in the 2008 financial crisis</li> </ul>
<b>READINGS</b>	
Coval, Jurek, and Stafford Hull, Chapter 23 (23.1-23.9) in the Seventh Edition [ <a href="#">Chapter 24 (24.1-24.9) in the Eighth Edition</a> ]	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Describe liquidity risk and various mechanisms to manage the risk. Range of weight: 3-7 percent	<ul style="list-style-type: none"> <li>a. Liquidity risk</li> <li>b. <a href="#">Sources of liquidity risk</a></li> <li>c. <a href="#">Risk reduction techniques</a></li> <li>d. <a href="#">Lessons from the recent economic crises</a></li> </ul>
<b>READINGS</b>	
Academy Basel: Liquidity Risk Basel: Principles Venter (for background only)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>5. Discuss the development and the complexity of financial engineering products such as mortgage-backed securities and other forms of securitization.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Effect of securitization on sources of funds for mortgage holders and on interest rate risk retained by the mortgage originators</p> <p>b. Mortgage pass-throughs and the effect of mortgage prepayment on cash flows to investors</p> <p>c. Collateralized mortgage obligations (CMOs) and the effect of prepayments on cash flows to investors in particular tranches</p> <p>d. Market liquidity and credit rating</p> <p>e. Lessons from the recent subprime crisis</p>
<p>6. Describe the market for securitizing catastrophe risk in the insurance industry and explain the reasons for its growth.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Products on the market:</p> <ul style="list-style-type: none"> <li>• Risk-linked securities</li> <li>• CAT bonds</li> <li>• Sidecars</li> <li>• Cat-E-puts</li> <li>• Catastrophe risk swaps</li> <li>• Industry loss warranties</li> </ul> <p>b. Factors influencing interest in insurance securitization in relation to traditional reinsurance</p> <p>c. Factors impeding the growth of the market:</p> <ul style="list-style-type: none"> <li>• Regulatory</li> <li>• Accounting</li> <li>• Tax</li> <li>• Rating issues</li> </ul>
<p><b>READINGS</b></p>	
<p>BKM, Chapter 1 (pp. 16-17), Chapter 2 (pp. 34-35), and Chapter 16 (Section 16.2) in the Eighth Edition or Chapter 1 (pp. 17-18), Chapter 2 (pp. 39-41), and Chapter 16 (Section 16.2) in the Ninth Edition  Coval, Jurek, and Stafford  Cummins CAT Bond</p>	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
<p>7. Describe various risk measures and the need for practicing sound financial risk management.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Capital structure and risk taking incentives</p> <p>b. Regulation and rating agency</p> <p>c. Limitations of VaR</p> <p>d. Cash flow at risk</p> <p>e. Shortfall risk</p> <p>f. Risk-based capital</p> <p>g. Expected policyholder deficit (EPD)</p> <p>h. Capital associated with a constant EPD ratio</p> <p>i. Risk-adjusted return on capital (RAROC), including alternative measures of income and alternative measures of risk-adjusted capital</p> <p>j. EVA</p>
<p>8. Benefits of Risk Management</p> <p>Range of weight: 0-5 percent</p>	<p>a. Friction Costs, including agency costs and double taxation</p> <p>b. Lessons from past failures due to poor financial risk management</p>
<b>READINGS</b>	
<p>Butsic  Culp, Miller and Neves (excluding Appendix)  Cummins Capital  Goldfarb  Stulz</p>	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
<p>9. Describe the concept of economic capital (or risk capital) in the insurance industry and various methods of allocating the risk capital to business units or lines of business.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Financial and insurance risks</p> <p>b. Economic capital or risk capital</p> <p>c. Risk aggregation</p> <p>d. Strengths and weaknesses of the various allocation methods using risk measures such as:</p> <ul style="list-style-type: none"> <li>• Percentile (VaR)</li> <li>• CTE</li> <li>• EPD Ratio</li> <li>• Merton-Perold method</li> <li>• Insolvency Put/EPD ratio risk measure</li> <li>• Myers-Read method</li> <li>• Co-Measures</li> <li>• Co-CTE</li> </ul>
<p>10. Apply the RAROC framework to risk management in the insurance industry.</p> <p>Range of weight: 3-7percent</p>	<p>a. Economic profit as income measure</p> <p>b. Cost of capital</p> <p>c. RAROC</p> <p>d. Additional risk margin in price</p> <p>e. Multi-period capital commitment</p>

11. Assess the performance of business units and set prices for insurance policies on a risk-adjusted basis. Range of weight: 3-7percent	a. Economic profit as income measure b. Cost of capital c. RAROC d. Additional risk margin in price e. Multi-period capital commitment
<b>READINGS</b>	
Cummins Capital Goldfarb	

## D. Rate of Return, Risk Loads, and Contingency Provision

Range of weight for Section D: 35-40 percent

This section explores the relationship between insurance concepts (such as underwriting profits, premium-to-surplus ratios, and investment income) and financial concepts (such as interest rates, inflation rates, cost of capital, and risk premiums). The readings build on a background of finance as related to the insurance business, and deal with specific techniques used by actuaries to develop an appropriate profit loading in insurance prices.

Because insurance claims are fortuitous, the expected profit loaded in rates may not be realized. The models discussed in Learning Objectives 1 and 2 assume that insured events are predictable in time and amount. Learning Objective 3 addresses the consideration required when insured events are uncertain, particularly where capacity is limited and/or sufficient diversification of exposure is impossible.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Analyze rate of return. Range of weight: 10-15 percent	a. Composition of surplus b. Measures of return including ROE, underwriting profit, Internal Rate of Return (IRR) <ul style="list-style-type: none"> <li>• Advantages</li> <li>• Disadvantages</li> <li>• Perspectives of users</li> </ul> c. Sources and types of data used for analysis including calendar year versus accident year
2. Estimate a rate in order to achieve a target rate of return. Range of weight: 10-15 percent	a. Composition of surplus b. Measures of return (including ROE, underwriting profit, and IRR) c. Sources and types of data used for analysis including calendar year versus accident year
<b>READINGS</b>	
Feldblum Financial Ferrari McClenahan Robbin Roth	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Determine risk load and contingency provision to be included in insurance rates. Range of weight: 10-15 percent	a. Theory underlying the risk load b. Purpose of a risk load c. Relationship between risk load and variability
READINGS	
Bault Feldblum Financial Ferrari Kreps Mango Roth	

## Complete Text References for Exam 9

*Text references are alphabetized by the citation column.*

Citations	Abbreviation	Learning Objective	Source
American Academy of Actuaries, "Report of the Life Liquidity Work Group of the American Academy of Actuaries to the NAIC's Life Liquidity Working Group," December 2, 2000, pp. 1-9 (up to but excluding "Possible Sources of Liquidity Risk: Embedded Liquidity Options"), 12 (last paragraph) – 16 (first paragraph).	Academy	C4	W
Basel Committee on Banking Supervision, "Liquidity Risk: Management and Supervisory Challenges," Bank for International Settlements, February 2008, Sections 1-4.	Basel: Liquidity Risk	C4	OE
Basel Committee on Banking Supervision, "Principles for Sound Liquidity Risk Management and Supervision," Bank for International Settlements, September 2008, Principles 5-7 (pp. 10-20) and Principles 9-10 (pp. 23-27).	Basel: Principles	C4	OE
Bault, T., "Discussion of Feldblum: 'Risk Load for Insurers,'" <i>PCAS LXXII</i> , 1995, pp. 78-96. Candidates may wish to review the following articles as background to the above, although no questions will be directly drawn from them: Feldblum, S., "Risk Loads for Insurers," <i>PCAS LXXVII</i> , 1990, pp. 160-195, including discussions of paper: Philbrick, S.W., <i>PCAS LXXVIII</i> , 1991, pp. 56-63.	Bault	D3	W
Bodie, Z.; Kane, A.; and Marcus, A.J., <i>Investments</i> (Eighth Edition), McGraw-Hill/Irwin, 2009 or Ninth Edition, 2011. Chapter or section citations are listed under the appropriate learning objective, and include the following in the Eight Edition: Chapters 1 (pp. 16-17), 2 (pp. 34-35), 6-12, 15, and 16; or Chapters 1 (pp. 17-18), 2 (pp. 39-41), 6-12, 15, and 16 in the Ninth Edition.	BKM	A1-A10, B1-B3, C5-C6	L
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	C7-C8	SK

Citations	Abbreviation	Learning Objective	Source
Coval, J.; Jurek, J.; and Stafford, E., "The Economics of Structured Finance," <i>Journal of Economic Perspectives</i> , American Economic Association, Volume 23, Number 1, Winter 2009.	Coval, Jurek, and Stafford	C3, C5	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	C7-C8	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	C7-C11	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	C5-C6	SK
Feldblum, S., "Asset Liability Matching For Property/Casualty Insurers," <i>Valuation Issues, CAS Special Interest Seminar</i> , 1989, pp. 117-154.	Feldblum Asset	B4	W
Feldblum, S., "Pricing Insurance Policies: The Internal Rate of Return Model," CAS Study Note, May 1992. Only Sections 1, 3, and 6 will be directly tested, but the other sections may provide useful background.	Feldblum Financial	D1-D3	W
Ferrari, J.R., "The Relationship of Underwriting, Investment, Leverage, and Exposure to Total Return on Owners' Equity," <i>PCAS LV</i> , 1968, pp. 295-302. Includes discussion: Balcarek, R.J., <i>PCAS LVI</i> , 1969, pp. 58-60.	Ferrari	D1-D3	W
Goldfarb, R. "Risk-Adjusted Performance Measurement for P&C Insurers," October 2010.	Goldfarb	C7-C11	W
Hull, J.C., <i>Options, Futures, and Other Derivatives</i> (Seventh Edition), Prentice Hall, 2009 or <b>Eighth Edition, 2012</b> . Chapter or section citations are listed under the appropriate learning objective.	Hull	B1-B3, C1-C3	L
Kreps, R.E., "Investment-Equivalent Reinsurance Pricing," <i>Actuarial Considerations Regarding Risk and Return In Property-Casualty Insurance Pricing</i> , Casualty Actuarial Society, 1999, Chapter 6, excluding Section IV; including Errata.	Kreps	D3	W
Mango, D.F., "An Application of Game Theory: Property Catastrophe Risk Load," <i>PCAS LXXXV</i> , 1998, pp. 157-186. Exam questions will not be drawn from Section 9.	Mango	D3	W
McClenahan, C.L., "Insurance Profitability," <i>Actuarial Considerations Regarding Risk and Return in Property-Casualty Insurance Pricing</i> , Casualty Actuarial Society, 1999, Chapter 8.	McClenahan	D1-D2	W

Citations	Abbreviation	Learning Objective	Source
Noris, P.D., "Asset/Liability Management Strategies for Property and Casualty Companies," Morgan Stanley, May 1985.	Noris	B4	SK
Panning, W.H., "Managing Interest Rate Risk: ALM, Franchise Value, and Strategy," Willis Re Working Paper, July 2006.	Panning	B5	W
Robbin, Ira, "The Underwriting Profit Provision," CAS Study Note, as updated in 1992.	Robbin	D1-D2	W
Roth, R., "Analysis of Surplus and Rate of Return Without Using Leverage Ratios," <i>Insurer Financial Solvency, Casualty Actuarial Society Discussion Paper Program</i> , 1992, Volume I, pp. 439-464.	Roth	D1-D3	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	C7-C8	SK
Venter, G., "Modeling and Managing Liquidity Risk," Society of Actuaries, for background only.	Venter	C4	W

## Source Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
- OE** Represents material that is available online exclusively.
- SK** Represents material included in the 2011 CAS Study Kit.
- W** Represents material in the 2011 Web Notes that are available at no charge and may be downloaded from links in the Complete Text References section above—or a printed version may be purchased from the CAS Online Store..

Items printed in **red** indicate an update, clarification, or change.

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 9. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 107 Groppo Drive, Suite A, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexmadriver.com; Web site: www.actexmadriver.com.

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: www.actuarialbookstore.com.

American Academy of Actuaries, 1850 M Street, NW, Suite 300, Washington, DC 20036; telephone: (202) 223.8196; fax 202.872.1948; Web site: www.actuary.org.

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

Basel Committee on Banking Supervision, Bank for International Settlements, Centralbahnplatz 2, CH-4002, Basel, Switzerland, telephone: (+41 61) 280 8080; Web site: www.bis.org.

Bodie, Z.; Kane, A.; and Marcus, A.J., *Investments* (Ninth Edition), 2011, McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

Casualty Actuarial Society *E-Forum, Forum, PCAS, and Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: office@casact.org; Web site: www.casact.org.

Chew, D.H., editor, *The New Corporate Finance: Where Theory Meets Practice* (Third Edition), 2001, McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

Hull, J.C., *Options, Futures, and Other Derivatives* (Eighth Edition), 2012, Prentice Hall; telephone: (800) 374-1200; Web site: www.prenhall.com.

*Journal of Economic Perspectives, The*, American Economic Association, 2014 Broadway, Suite 305, Nashville, TN 37203, telephone: (615) 322-2595; fax: (615) 343-7590; Web site: <http://www.aeaweb.org/jep/index.php>.

*Journal of Risk and Insurance, The*, American Risk and Insurance Association, 716 Providence Road, P.O. Box 3028, Malvern, PA 19355; telephone: (610) 640-1997; fax: (610) 725-1007; Web site: www.aria.org.

McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

SlideRule Books, P.O. Box 69, Greenland, NH 03840; telephone: (877) 407-5433 or (603) 373-6140; fax: (877) 417-5433 or (603) 430-1258; Web site: www.sliderulebooks.com.

Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173; telephone: 847.706.3500; Web site: www.soa.org.