2010 FRM Examination
Part I AIM Statements

The FRM Study Guide sets forth primary topics and subtopics under the five risk-related disciplines covered in the FRM Part I exam. The topics were selected by the FRM Committee as topics that risk managers who work in practice today have to master. The topics are reviewed yearly to ensure the FRM exam is kept timely and relevant.

The Applying Instructional Materials Statements (AIMS) are designed to serve as an additional study resource only and will not in and of themselves fully prepare a candidate for the FRM examination. They should be used as guidance and support for the readings outlined in the Study Guide to help identify key learning objectives for each core reading.

2010 FRM Committee members

Dr. René Stulz (Chairman)	Ohio State University
Richard Apostolik	Global Association of Risk Professionals
Juan Carlos Garcia Cespedes	Banco Bilbao Vizcaya Argentaria
Dr. Christopher Donohue	Global Association of Risk Professionals
Hervé Geny	ICAP
Dr. Satyajit Karnik, *FRM*	Global Association of Risk Professionals
Kai Leifert, *FRM*	Northern Trust Global Investments
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Dr. Victor Ng	Goldman, Sachs & Co
Dr. Elliot Noma	Garrett Asset Management
Robert Scanlon	Standard Chartered Bank
Serge Sverdlov	Microsoft Corporation
Alan Weindorf	Visa

2010 FRM Examination
Part I AIM Statements

Table of Contents

Foundations of Risk Management

Part I Exam Weight: 20%

- **Creating value with risk management**
- **Market efficiency, equilibrium and the Capital Asset Pricing Model (CAPM)**
- **Performance measurement and attribution**
- **Sharpe ratio and information ratio**
- **Tracking error**
- **Factor models and Arbitrage Pricing Theory**
- **Risk management failures**
- **Case studies**
- **Ethics**

Readings for Foundations of Risk Management

1. **Philippe Jorion, *Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York: McGraw-Hill, 2007).**
   - Chapter 1 – The Need for Risk Management

2. **Noel Amenc and Veronique Le Sourd, *Portfolio Theory and Performance Analysis* (West Sussex, England: Wiley, 2003).**
   - Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

3. **Richard Grinold and Ronald Kahn, *Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk, 2nd Edition* (New York: McGraw-Hill, 1999).**
   - Chapter 7 – Expected Returns and the Arbitrage Pricing Theory

4. **René Stulz, *Risk Management & Derivatives* (KY: Thomson South-Western, 2002).**
   - Chapter 2 – Investors and Risk Management
   - Chapter 3 – Creating Value with Risk Management

5. **René Stulz, "Risk Management Failures: What are They and When Do They Happen?" Fisher College of Business Working Paper Series (Oct. 2008).**

6. **Steve Allen, Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk (New York: John Wiley & Sons, 2003)**
   - Chapter 4—Financial Disasters

7. **GARP Code of Conduct.** Available at: www.garp.com/about/GARPCodeofConduct.aspx.

Readings for Foundations of Risk Management - AIMS

Philippe Jorion, *Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York: McGraw-Hill, 2007).

Chapter 1 – The Need for Risk Management

AIMS – *Candidates, after completing this reading, should be able to:*

- Define risk and describe some of the major sources of risk
- Differentiate between business and financial risks and give examples of each
- Relate significant market events of the past several decades to the growth of the risk management industry
- Describe the functions and purposes of financial institutions as they relate to financial risk management
- Define what a derivative contract is and how it differs from a security
- Describe the dual role leverage plays in derivatives and why it is relevant to a risk manager
- Define financial risk management
- Define value-at-risk (VaR) and describe how it is used in risk management
- Describe the advantages and disadvantages of VaR relative to other risk management tools such as stop-loss limits, notional limits, and exposure limits
- Compare and contrast valuation and risk management, using VaR as an example
- Define and describe the four major types of financial risks: market, liquidity, credit, and operational
- Within market risk:
    - Describe and differentiate between absolute and relative market risk
    - Describe and differentiate between directional and non-directional market risk
    - Describe basis risk and its sources
    - Describe volatility risk and its sources
- Within liquidity risk:
    - Describe and differentiate between asset and funding liquidity risk
- Within credit risk:
    - Describe and differentiate between exposure and recovery rate
    - Describe credit event and how it may relate to market risk
    - Describe sovereign risk and its sources
    - Describe settlement risk and its sources
- Within operational risk:
    - Describe the potential relationships between operational, market and credit risk
    - Describe model risk and its sources
    - Describe people risk
    - Describe legal risk and its sources

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Noel Amenc and Veronique Le Sourd, *Portfolio Theory and Performance Analysis* (West Sussex, England: Wiley, 2003).

Chapter 4 – The Capital Asset Pricing Model and Its Application to Performance Measurement

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the capital market line and the construction of the efficient frontier both with and without a risk-free asset.
- Describe how the covariance/correlation of returns between securities affects the returns distribution of a portfolio of securities.
- Describe the Capital Asset Pricing Model (CAPM), list its underlying assumptions, and explain its implications, contributions and limitations.
- Define and calculate the price of risk and the quantity of risk (beta).
- Define market efficiency, identify the three forms of market efficiency, and discuss the link between efficiency and the CAPM.
- Calculate, compare, and evaluate the Treynor measure, the Sharpe measure, and Jensen's alpha.
- Compute and interpret tracking error, the information ratio, and the Sortino ratio.

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Richard Grinold and Ronald Kahn, Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk, 2nd Edition (New York: McGraw-Hill, 1999).

Chapter 7 – Expected Returns and the Arbitrage Pricing Theory

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe limitations and deficiencies in the CAPM.
- Define and describe the components of the Arbitrage Pricing Theory (APT) model.
- Calculate a security's expected excess returns using the APT model and interpret the results.
- Discuss the relationship between APT and the CAPM.
- Describe the properties of a qualified model in the context of the APT.
- Describe the difficulties involved with factor forecasting.
- Describe some of the methods typically used in factor forecasting.
- Describe and compare the attributes of purely statistical and structural APT models.

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René Stulz, *Risk Management & Derivatives* (Florence, KY: Thomson South-Western, 2002).
Chapter 2 – Investors and Risk Management

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain how expected return and returns variance are used to describe the return distribution for a security or portfolio of securities.
- Define and describe the significant characteristics of the efficient frontier.
- Differentiate between diversifiable and systematic risk and describe how diversification can reduce risk in a portfolio.
- Describe the CAPM, and explain the concepts of beta and the security market line.
- Calculate and interpret firm value using the CAPM.
- Use the CAPM to discuss the value of risk management to investors with respect to:
    - A firm's diversifiable risk
    - A firm's systemic risk
- Define and discuss the "hedging irrelevance proposition" as it relates to:
    - Diversifiable risk
    - Systematic risk
    - Risks valued by investors differently from what CAPM would predict.

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René Stulz, *Risk Management & Derivatives* (Florence, KY: Thomson South-Western, 2002).
Chapter 3 – Creating Value with Risk Management

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain how risk management can create value by handling bankruptcy costs.
- Explain how risk management can create value moving income across time and reducing taxes.
- Describe those circumstances when risk reduction benefiting a large shareholder may increase or decrease firm value.
- Explain the relationship between risk management, managerial incentives, and the structure of management compensation.
- Describe debt overhang, and explain how risk management can increase firm value by reducing the probability of debt overhang.
- Explain how risk management can reduce the problem of information asymmetry and increase firm value.

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René Stulz, "Risk Management Failures: What are They and When Do They Happen?" Fisher College of Business Working Paper Series (Oct. 2008).

AIMS – *Candidates, after completing this reading, should be able to:*

- Define the role of risk management and explain why a large financial loss is not necessarily a failure of risk management.
- Describe how risk management can fail.
- Describe how risk can be mismeasured.
- Explain how a firm can fail to take known and unknown risks into account in making strategic decisions.
- Explain the importance of communication in effective risk management.
- Describe how firms can fail to correctly monitor and manage risk on an ongoing basis
- Explain the role of risk metrics and discuss the shortcomings of existing risk metrics.

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Steve Allen, Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk (New York: John Wiley & Sons, 2003)

- Chapter 4—Financial Disasters

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the key factors that led to and the lessons learned from the following risk management case studies:
  - Chase Manhattan and their involvement with Drysdale Securities
  - Kidder Peabody
  - Barings
  - Allied Irish Bank
  - Long Term Capital Management (LTCM)
  - Metallgesellschaft
  - Bankers Trust

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GARP Code of Conduct. Available at: www.garp.com/about/GARPCodeofConduct.aspx.

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the responsibility of each GARP member with respect to professional integrity, ethical conduct, conflicts of interest, confidentiality of information and adherence to generally accepted practices in risk management.
- Describe the potential consequences of violating the GARP Code of Conduct.

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Quantitative Analysis

Part I Exam Weight: 20%

- **Probability distributions**
- **Mean, standard deviation, correlation, skewness, and kurtosis**
- **Estimating parameters of distributions**
- **Linear regression**
- **Statistical inference and hypothesis testing**
- **Estimating correlation and volatility: EWMA and GARCH Models**
- **Maximum likelihood methods**
- **Volatility term structures**
- **Simulation methods**

Readings for Quantitative Analysis

8. **Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).**
   - Chapter 1 – The Nature and Scope of Econometrics
   - Chapter 2 – Review of Statistics: Probability and Probability Distributions
   - Chapter 3 – Characteristics of Probability Distributions
   - Chapter 4 – Some Important Probability Distributions
   - Chapter 5 – Statistical Inference: Estimation and Hypothesis Testing
   - Chapter 6 – Basic Ideas of Linear Regression: The Two-Variable Model
   - Chapter 7 – The Two-Variable Model: Hypothesis Testing
   - Chapter 8 – Multiple Regression: Estimation and Hypothesis Testing

9. **Jorion, *Value-at-Risk, 3rd Edition***
   - Chapter 12- Monte Carlo Methods

10. **John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).**
    - Chapter 21 – Estimating Volatilities and Correlations

11. **Svetlozar Rachev, Christian Menn, and Frank Fabozzi, *Fat-Tailed and Skewed Asset Return Distributions: Implications for Risk Management, Portfolio Selection and Option Pricing* (Hoboken, NJ: Wiley, 2005).**
    - Chapter 2 – Discrete Probability Distributions
    - Chapter 3 – Continuous Probability Distributions

12. **Linda Allen, Jacob Boudoukh and Anthony Saunders, *Understanding Market, Credit and Operational Risk: The Value at Risk Approach* (Oxford: Blackwell Publishing, 2004).**
    - Chapter 2 – Quantifying Volatility in VaR Models

Readings for Quantitative Analysis - AIMS

Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).
Chapter 1 – The Nature and Scope of Econometrics

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the methodology of econometrics.
- Distinguish between the different types of data used for empirical analysis.
- Describe the process of specifying, interpreting, and validity testing an econometric model.

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Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).
Chapter 2 – Review of Statistics: Probability and Probability Distributions

AIMS – *Candidates, after completing this reading, should be able to:*

- Define random variables, and distinguish between continuous and discrete random variables.
- Define the probability of an event.
- Describe the relative frequency or empirical definition of probability.
- Define Bayes' theorem and apply Bayes' formula to determine the probability of an event.
- Describe and interpret the probability mass function, probability density function, and cumulative density function for a random variable.
- Distinguish between univariate and multivariate probability density functions.
- Describe marginal and conditional probability functions.
- Explain the difference between statistical independence and statistical dependence.

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Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).
Chapter 3 – Characteristics of Probability Distributions

AIMS – *Candidates, after completing this reading, should be able to:*

- Define, calculate and interpret the expected value of a random variable.
- Define, calculate and interpret the variance of a random variable.
- Define and apply Chebyshev's inequality to determine the probability that a random variable lies in a certain range.
- Define, calculate and interpret the covariance and correlation of two random variables.

- Define, calculate and interpret the mean and variance of a set of random variables.
- Describe the difference between conditional and unconditional expectation.
- Define, calculate and interpret the skewness and kurtosis of a random variable.
- Describe and identify a platykurtic and leptokurtic distribution.
- Define the skewness and kurtosis of a normally distributed random variable.
- Distinguish between population and sample, and calculate the sample mean, variance, covariance, correlation, skewness, and kurtosis.

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Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).

Chapter 4 – Some Important Probability Distributions

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the key properties of the normal distribution and the standard normal distribution.
- Discuss the concept of random sampling and the sampling distribution of an estimator.
- Construct a frequency distribution and calculate relative frequencies from a frequency distribution.
- Define and calculate the standard error of a sample mean.
- Describe the central limit theorem.
- Describe the key properties of the t-distribution, chi-square distribution, and F distribution, and identify common occurrences of each distribution.

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Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).

Chapter 5 – Statistical Inference: Estimation and Hypothesis Testing

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the concept of statistical inference, including estimation and hypothesis testing.
- Define and distinguish an estimator and a parameter.
- Define and distinguish between point estimate and interval estimation.
- Define and interpret critical t-values.
- Define, calculate and interpret a confidence interval.
- Describe the properties of point estimators.
    - Distinguish between unbiased and biased estimators.
    - Define an efficient estimator and consistent estimator.

- Explain and apply the process of hypothesis testing.
    - Define and interpret the null hypothesis and the alternative hypothesis.
    - Distinguish between one-sided and two-sided hypotheses.
    - Describe the confidence interval approach to hypothesis testing.
    - Describe the test of significance approach to hypothesis testing.
    - Define, calculate and interpret type I and type II errors.
    - Define and interpret the *p* value.
- Describe and interpret the chi-squared test of significance and the F-test of significance.

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Damodar Gujarati, *Essentials of Econometrics*, *3rd Edition* (New York: McGraw-Hill, 2006).

Chapter 6 – Basic Ideas of Linear Regression: The Two-Variable Model

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain how regression analysis in econometrics measures the relationship between dependent and independent variables.
- Define and interpret the results of a scattergram.
- Define and interpret a population regression function, regression coefficients, parameters, slope and the intercept.
- Define and interpret the stochastic error term (or noise component).
- Define and interpret a sample regression function, regression coefficients, parameters, slope and the intercept.
- Describe the key properties of a linear regression.
- Distinguish between two-variable and multivariable regression.
- Describe the method of ordinary least squares for estimation of parameters.
    - Define and interpret the residual sum of squares.
    - Interpret the results of an ordinary least squares regression.

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Damodar Gujarati, *Essentials of Econometrics*, *3rd Edition* (New York: McGraw-Hill, 2006).

Chapter 7 – The Two-Variable Model: Hypothesis Testing

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the assumptions of the classical linear regression model.
- Define and distinguish homoscedasticity and heteroscedasticity.
- Define, calculate and interpret the standard errors in an OLS model.

- Define and interpret the residual sum of squares and the standard error of a regression.
- Describe hypothesis testing in an OLS regression model.
- Define, calculate and interpret the coefficient of determination and the coefficient of correlation.
- Describe and interpret normality testing using histograms and normal probability plots.
- Describe and interpret the Jarque-Bera test of normality.
- Describe forecasting, or prediction, error.

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Damodar Gujarati, *Essentials of Econometrics, 3rd Edition* (New York: McGraw-Hill, 2006).

Chapter 8 – Multiple Regression: Estimation and Hypothesis Testing

AIMS – *Candidates, after completing this reading, should be able to:*

- Distinguish between simple and multivariate regression.
- Define and interpret the partial slope coefficient.
- Explain the assumptions of the multiple linear regression model.
- Explain the concept of multicollinearity and the implications it has on modeling.
- Describe the process of estimating parameters of multiple regression.
- Define and interpret the variance and standard errors in a multilinear regression.

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Philippe Jorion, *Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York: McGraw-Hill, 2007).

Chapter 12- Monte Carlo Methods

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe how to simulate a price path using a geometric Brownian motion model.
- Describe how to simulate various distributions using the inverse transform method.
- Describe the bootstrap method.
- Explain how simulations can be used for computing VaR and pricing options.
- Describe the relationship between the number of Monte Carlo replications and the standard error of the estimated values.
- Describe and identify simulation acceleration techniques.
- Explain how to simulate correlated random variables using Cholesky factorization.

- Describe deterministic simulations.
- Discuss the drawbacks and limitations of simulation procedures.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 21 – Estimating Volatilities and Correlations

AIMS – *Candidates, after completing this reading, should be able to:*

- Discuss how historical data and various weighting schemes can be used in estimating volatility.
- Describe the exponentially weighted moving average (EWMA) model for estimating volatility and its properties.
    - Estimate volatility using the EWMA model.
- Describe the generalized auto regressive conditional heteroscedasticity (GARCH(p,q)) model for estimating volatility and its properties.
    - Estimate volatility using the GARCH(p,q) model.
    - Explain mean reversion and how it is captured in the GARCH(1,1) model.
- Discuss how the parameters of the GARCH(1,1) and the EWMA models are estimated using maximum likelihood methods.
- Explain how GARCH models perform in volatility forecasting.
- Discuss how correlations and covariances are calculated, and explain the consistency condition for covariances.

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Svetlozar Rachev, Christian Menn, and Frank Fabozzi, *Fat-Tailed and Skewed Asset Return Distributions: Implications for Risk Management, Portfolio Selection and Option Pricing* (Hoboken, NJ: Wiley, 2005).

Chapter 2 – Discrete Probability Distributions

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the key properties of the Bernoulli distribution, Binomial distribution, and Poisson distribution, and identify common occurrences of each distribution.
- Identify the distribution functions of Binomial and Poisson distributions for various parameter values.

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Svetlozar Rachev, Christian Menn, and Frank Fabozzi, *Fat-Tailed and Skewed Asset Return Distributions: Implications for Risk Management, Portfolio Selection and Option Pricing* (Hoboken, NJ: Wiley, 2005).

Chapter 3 – Continuous Probability Distributions

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the key properties of Normal, Exponential, Weibull, Gamma, Beta, Chi-squared, Student's t, Lognormal, Logistic and Extreme Value distributions.
- Explain the summation stability of normal distributions.
- Describe the hazard rate of an exponentially distributed random variable.
- Explain the relationship between exponential and Poisson distributions.
- Explain why the generalized Pareto distribution is commonly used to model operational risk events.
- Explain the concept of mixtures of distributions.

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Linda Allen, Jacob Boudoukh and Anthony Saunders, *Understanding Market, Credit and Operational Risk: The Value at Risk Approach* (Oxford: Blackwell Publishing, 2004).

Chapter 2 – Quantifying Volatility in VaR Models

AIMS – *Candidates, after completing this reading, should be able to:*

- Discuss how asset return distributions tend to deviate from the normal distribution.
- Explain potential reasons for the existence of fat tails in a return distribution and discuss the implications fat tails have on analysis of return distributions.
- Distinguish between conditional and unconditional distributions.
- Discuss the implications regime switching has on quantifying volatility.
- Explain the various approaches for estimating VaR.
- Compare, contrast and calculate parametric and non-parametric approaches for estimating conditional volatility, including
    - Historical standard deviation
    - Exponential smoothing
    - GARCH approach
    - Historic simulation
    - Multivariate density estimation
    - Hybrid methods
- Explain the process of return aggregation in the context of volatility forecasting methods.

- Explain how implied volatility can be used to predict future volatility and discuss its advantages and disadvantages.
- Explain the implications of mean reversion in returns and return volatility for forecasting VaR over long time horizons.
- Discuss the effects non-synchronous data has on estimating correlation and describe approaches that mitigate the impact of non-synchronous data on risk estimates.
- Discuss the use of backtesting for comparing VaR results using different volatility estimation approaches and the desirable attributes of VaR estimates.

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Financial Markets and Products

Part I Exam Weight: 30%

- **Clearing house mechanisms, structural hubs, exchanges**
- **Netting, collateral and downgrade triggers**
- **Futures, forwards, swaps, and options**
- **Derivatives on fixed-income securities, interest rates, foreign exchange, equities, and commodities**
- **Measuring portfolio exposures**
- **American options, effects of dividends, early exercise**
- **Trading strategies with derivatives**
- **Minimum variance hedge ratio**
- **Cheapest to deliver bond, conversion factors**
- **Commodity derivatives, cost of carry, lease rate, convenience yield**
- **Basis risk**
- **Foreign exchange risk**
- **Corporate bonds**
- **Debt equity swaps, loan sales**

Readings for Financial Markets and Products

13. **Hull, *Options, Futures, and Other Derivatives, 7th Edition*.**
    - Chapter 1 – Introduction
    - Chapter 2 – Mechanics of Futures Markets
    - Chapter 3 – Hedging Strategies Using Futures
    - Chapter 4 -- Interest Rates
    - Chapter 5 – Determination of Forward and Futures Prices
    - Chapter 6 – Interest Rate Futures
    - Chapter 7 – Swaps
    - Chapter 9 – Properties of Stock Options
    - Chapter 10 – Trading Strategies Involving Options

14. **Robert McDonald, *Derivatives Markets* (Boston: Addison-Wesley, 2003).**
    - Chapter 6 – Commodity Forwards and Futures

15. **Helyette Geman, *Commodities and Commodity Derivatives: Modeling and Pricing for Agriculturals, Metals and Energy* (West Sussex, England: Wiley, 2005)**
    - Chapter 1 – Fundamentals of Commodity Spot and Futures Markets: Instruments, Exchanges and Strategies

16. **Anthony Saunders and Marcia Millon Cornett, *Financial Institutions Management: A Risk Management Approach*, *6th Edition* (New York: McGraw-Hill, 2008).**
    - Chapter 14 – Foreign Exchange Risk
    - Appendix 15A – Mechanisms for Dealing with Sovereign Risk Exposure
17. **Frank Fabozzi, *The Handbook of Fixed Income Securities*, 7th *edition* (New York: McGraw Hill, 2005)**
    - Chapter 13—Corporate Bonds

Readings for Financial Markets and Products - AIMS

John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).
Chapter 1 – Introduction

AIMS – *Candidates, after completing this reading, should be able to:*

- Differentiate between an open outcry system and electronic trading.
- Describe the over-the-counter market and how it differs from trading on an exchange, including advantages and disadvantages.
- Differentiate between options, forwards, and futures contracts.
- Calculate and identify option and forward contract payoffs.
- Describe, contrast, and calculate the payoffs from hedging strategies involving forward contracts and options.
- Describe, contrast, and calculate the payoffs from speculative strategies involving futures and options.
- Calculate an arbitrage payoff and describe how arbitrage opportunities are ephemeral.
- Describe some of the risks that can arise from the (mis)use of derivatives.
- Define:
    - Derivative
    - Market maker
    - Spot contract, Forward contract, and Futures contract
    - Call option and Put option
    - American option and European option
    - Long position and short position
    - Exercise (strike) price
    - Expiration (maturity) date
    - Bid price and offer price
    - Bid-offer spread
    - Hedgers and speculators
    - Arbitrageurs

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).
Chapter 2 – Mechanics of Futures Markets

AIMS – *Candidates, after completing this reading, should be able to:*

- Define and describe the key features of a futures contract.
- Compare and contrast forward and futures contracts.

- Explain the convergence of futures and spot prices.
- Describe the rationale for margin requirements and explain how they work.
- Describe the role of a clearinghouse in futures transactions.
- Describe the role of collateralization in the over-the-counter market and compare it to the margining system.
- Identify and describe the differences between a normal and inverted futures market.
- Describe the mechanics of the delivery process and contrast it with cash settlement.
- Define and demonstrate an understanding of the impact of different order types, including: market, limit, stop-loss, stop-limit, market-if-touched, discretionary, time-of-day, open, and fill-or-kill
- Define:
    - Notice of intention to deliver
    - Limit up and limit down
    - Margin account
    - Initial margin, maintenance margin, variation margin and clearing margin
    - Collateralization
    - Settlement price
    - Open interest

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 3 – Hedging Strategies Using Futures

AIMS – *Candidates, after completing this reading, should be able to:*

- Define and differentiate between short and long hedges and identify appropriate uses.
- Describe the arguments for and against hedging and the potential impact of hedging on firm profitability.
- Define and compute the basis.
- Define the various sources of basis risk and explain how basis risks arise when hedging with futures.
- Define cross hedging.
- Define, compute and interpret the minimum variance hedge ratio and hedge effectiveness.
- Define, compute and interpret the optimal number of futures contracts needed to hedge an exposure, including a "tailing the hedge" adjustment.
- Demonstrate how to use stock index futures contracts to change a stock portfolio's beta.
- Describe what is meant by "rolling the hedge forward" and discuss some of the risks that arise from such a strategy.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 4 – Interest Rates

AIMS – *Candidates, after completing this reading, should be able to:*

- Calculate the value of an investment using daily, weekly, monthly, quarterly, semiannual, annual, and continuous compounding. Convert rates based on different compounding frequencies.
- Calculate the theoretical price of a coupon paying bond using spot rates.
- Calculate forward interest rates from a set of spot rates.
- Value and calculate the cash flows from a forward rate agreement (FRA).
- Describe the limitations of duration and how convexity addresses some of them.
- Calculate the change in a bond's price given duration, convexity, and a change in interest rates.
- Define and discuss the major theories of the term structure of interest rates.
- Define:
    - Spot rate
    - Par yield
    - Bootstrap method
    - Forward rate agreement
    - Basis point
    - Duration
    - Modified duration
    - Dollar duration
    - Convexity

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 5 – Determination of Forward and Futures Prices

AIMS – *Candidates, after completing this reading, should be able to:*

- Differentiate between investment and consumption assets.
- Define short-selling and short squeeze.
- Discuss the differences between forward and futures contracts and explain the relationship between forward and spot prices.
- Calculate the forward price, given the underlying asset's price, with or without short sales and/or consideration to the income or yield of the underlying asset. Describe an arbitrage argument in support of these prices.
- Explain the relationship between forward and futures prices.

- Use the interest rate parity relationship to calculate a forward foreign exchange rate.
- Define income, storage costs, and convenience yield.
- Calculate the futures price on commodities incorporating storage costs and/or convenience yields.
- Define and calculate, using the cost-of-carry model, forward prices where the underlying asset either does or does not have interim cash flows.
- Discuss the various delivery options available in the futures markets and how they can influence futures prices.
- Analyze the relationship between current futures prices and expected future spot prices, including the impact of systematic and nonsystematic risk.
- Define contango and backwardation, interpret the effect contango or backwardation may have on the relationship between commodity futures and spot prices, and relate the cost-of-carry model to contango and backwardation.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).
Chapter 6 – Interest Rate Futures

AIMS – *Candidates, after completing this reading, should be able to:*

- List the most commonly used day count conventions, identify the markets that each one is typically used in, and apply each to an interest calculation.
- Convert from a discount rate to a price for a US Treasury bill.
- Differentiate between the clean and dirty price for a US Treasury bond; calculate the accrued interest and dirty price on a US Treasury bond.
- Explain and calculate a US Treasury bond futures contract conversion factor.
- Calculate the cost of delivering a bond into a Treasury bond futures contract.
- Describe the impact of the level and shape of the yield curve on the cheapest-to-deliver bond decision.
- Calculate the theoretical futures price for a Treasury bond futures contract.
- Calculate the final contract price on a Eurodollar futures contract.
- Describe and compute the Eurodollar futures contract convexity adjustment.
- Demonstrate how Eurodollar futures can be used to extend the LIBOR zero curve.
- Calculate the duration-based hedge ratio and describe a duration-based hedging strategy using interest rate futures.
- Explain the limitations of using a duration-based hedging strategy.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).
Chapter 7 – Swaps

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the mechanics of a plain vanilla interest rate swap and compute its cash flows.
- Explain how a plain vanilla interest rate swap can be used to transform an asset or a liability and calculate the resulting cash flows.
- Explain the role of financial intermediaries in the swaps market.
- Describe the role of the confirmation in a swap transaction.
- Describe the comparative advantage argument for the existence of interest rate swaps and discuss some of the criticisms of this argument.
- Explain how the discount rates in a plain vanilla interest rate swap are computed.
- Value a plain vanilla interest rate swap based on two simultaneous bond positions.
- Value a plain vanilla interest rate swap from a sequence of forward rate agreements (FRAs).
- Explain the mechanics of a currency swap and compute its cash flows.
- Describe the comparative advantage argument for the existence of currency swaps.
- Explain how a currency swap can be used to transform an asset or liability and calculate the resulting cash flows.
- Value a currency swap based on two simultaneous bond positions.
- Value a currency swap based on a sequence of FRAs.
- Discuss the role of credit risk inherent in an existing swap position.
- List and define other types of swaps, including commodity, volatility and exotic swaps.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).
Chapter 9 – Properties of Stock Options

AIMS – *Candidates, after completing this reading, should be able to:*

- Identify the six factors that affect an option's price and discuss how these six factors affect the price for both European and American options.
- Identify, interpret and compute upper and lower bounds for option prices.
- Explain put-call parity and calculate, using the put-call parity on a non-dividend-paying stock, the value of a European and American option, respectively.
- Explain the early exercise features of American call and put options on a non-dividend-paying stock and the price effect early exercise may have.
- Discuss the effects dividends have on the put-call parity, the bounds of put and call option prices, and on the early exercise feature of American options.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 10 – Trading Strategies Involving Options

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the motivation to initiate a covered call or a protective put strategy.
- Describe and explain the use and payoff functions of spread strategies, including bull spread, bear spread, box spread, calendar spread, butterfly spread, and diagonal spread.
- Calculate the pay-offs of various spread strategies.
- Describe and explain the use and payoff functions of combination strategies, including straddles, strangles, strips, and straps.
- Compute the pay-offs of combination strategies.

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Robert McDonald, *Derivatives Markets* (Boston: Addison-Wesley, 2003).

Chapter 6 – Commodity Forwards and Futures

AIMS – *Candidates, after completing this reading, should be able to:*

- Define forward strip and forward curve.
- Describe how to create a synthetic commodity position and use it to explain the relationship between the forward price and the expected future spot price.
- Explain the effect non-storability has on electricity prices.
- Derive the basic equilibrium formula for pricing commodity forwards and futures.
- Explain the implication basic equilibrium has for different types of commodities.
- Describe an arbitrage transaction in commodity forwards and futures, and compute the potential arbitrage profit.
- Define the lease rate and how it determines the no-arbitrage values for commodity forwards and futures, and explain the relationship between lease rates and contango and lease rates and backwardation.
- Define carry markets.
- Explain the impact storage costs and convenience yields have on commodity forward prices and no-arbitrage bounds.
- Compute the forward price of a commodity with storage costs.
- Compare the lease rate with the convenience yield.
- Discuss factors that impact gold, corn, natural gas, and crude oil futures prices.
- Define and compute a commodity spread.
- Explain how basis risk can occur when hedging commodity price exposure.
- Evaluate the differences between a strip hedge and a stack hedge and analyze how these differences impact risk management.

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Helyette Geman, *Commodities and Commodity Derivatives: Modeling and Pricing for Agriculturals, Metals and Energy* (West Sussex, England: Wiley, 2005)

Chapter 1 – Fundamentals of Commodity Spot and Futures Markets: Instruments, Exchanges and Strategies

AIMS – *Candidates, after completing this reading, should be able to:*

- Define "bill of lading".
- Define the major risks involved with commodity spot transactions.
- Differentiate between ordinary and extraordinary transportation risks.
- Explain the major differences between spot, forward, and futures transactions, markets, and contracts.
- Describe basic risk and its key components.
- Describe the basic characteristics and differences between hedgers, speculators, and arbitrageurs.
- Describe an "arbitrage portfolio" and explain the conditions for a market to be arbitrage-free.
- Define basis risk and the variance of the basis.
- Identify a commonly used measure for the effectiveness of hedging a spot position with a futures contract; use this measure to compute and compare the effectiveness of alternative hedges.
- Define and differentiate between an Exchange for Physical and agreement and an Alternative Delivery Procedure.
- Describe one common measure of market depth.

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Anthony Saunders and Marcia Millon Cornett, *Financial Institutions Management: A Risk Management Approach, 6th Edition* (New York: McGraw-Hill, 2008).

Chapter 14 – Foreign Exchange Risk

AIMS – *Candidates, after completing this reading, should be able to:*

- Calculate a financial institution's overall foreign exchange exposure.
- Demonstrate how a financial institution could alter its net position exposure to reduce foreign exchange risk.
- Calculate a financial institution's potential dollar gain or loss exposure to a particular currency.
- List and describe the different types of foreign exchange trading activities.
- Identify the sources of foreign exchange trading gains and losses.
- Calculate the potential gain or loss from a foreign currency denominated investment.

- Explain balance-sheet hedging with forwards.
- Describe how a non-arbitrage assumption in the foreign exchange markets leads to the interest rate parity theorem; use this theorem to calculate forward foreign exchange rates.
- Explain why diversification in multicurrency asset-liability positions could reduce portfolio risk.
- Describe the relationship between nominal and real interest rates.

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Anthony Saunders and Marcia Millon Cornett, *Financial Institutions Management: A Risk Management Approach*, 6th *Edition* (New York: McGraw-Hill, 2008).

Appendix 15A – Mechanisms for Dealing with Sovereign Risk Exposure

AIMS – *Candidates, after completing this reading, should be able to:*

- Define four alternative mechanisms for dealing with problem sovereign credits.
- Describe the major incentives and disincentives for participants in a debt-for-equity swap, including tax considerations and the impact of regulatory constraints.
- Describe the advantages and disadvantages of multiyear restructuring agreements.
- Define the major elements of a multiyear restructuring agreement, including concessionality.
- Describe the major benefits and costs of loan sales.
- Describe the major benefits and costs of bond-for-loan swaps.

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Frank Fabozzi, *The Handbook of Fixed Income Securities*, 7th *edition* (New York: McGraw Hill, 2005)

Chapter 13—Corporate Bonds

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe a bond indenture and explain the role of the corporate trustee.
- Explain a bond's maturity date and how it impacts bond retirements.
- Describe the main types of interest payment classifications.
- Describe zero-coupon bonds, the relationship between original-issue-discount and reinvestment risk, and the treatment of zeroes in bankruptcy.
- Describe the various security types relevant for corporate bonds, including:

  - Mortgage bonds
  - Collateral trust bonds
  - Equipment trust certificates
  - Debenture bonds (including subordinated and convertible debentures)
  - Guaranteed bonds
- Describe the mechanisms by which corporate bonds can be retired before maturity, including:
  - Call provisions
  - Sinking-fund provisions
  - Maintenance and replacement funds
  - Tender offers
- Describe, and differentiate between credit default risk and credit spread risk.
- Describe event risk and what may cause it in corporate bonds.
- Define high-yield bonds, describe types of high-yield bond issuers and some of the payment features peculiar to high yield bonds.
- Define and differentiate between an issuer default rate and a dollar default rate.
- Define recovery rates and describe the relationship between recovery rates and seniority.

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Valuation and Risk Models

Part I Exam Weight: 30%

- **Value-at-Risk (VaR)**
  - **Definition and methods**
  - **Delta-normal valuation, full revaluation, historical simulation, Monte Carlo simulation methods**
- **Applications of VaR for market, credit and operational risk**
- **VaR of linear and non-linear derivatives**
- **VaR for fixed income securities with embedded options**
- **Term structure of interest rates**
- **Discount factors, arbitrage, yield curves**
- **Bond prices, spot rates, forward rates**
- **DV01, duration and convexity, duration based hedging**
- **Credit rating agencies, credit ratings**
- **Credit transition matrices**
- **Sovereign risk and country risk evaluation**
- **Binomial trees**
- **Black-Scholes-Merton model**
- **Greeks**
- **Stress testing and scenario analysis**

Readings for Valuation and Risk Models

18. **Linda Allen, Jacob Boudoukh and Anthony Saunders, *Understanding Market, Credit and Operational Risk: The Value at Risk Approach* (Oxford: Blackwell Publishing, 2004).**
    - Chapter 3 – Putting VaR to Work
    - Chapter 5 – Extending the VaR Approach to Operational Risks

19. **Hull, *Options, Futures, and Other Derivatives, 7th Edition***
    - Chapter 11—Binomial Trees
    - Chapter 13 – The Black-Scholes-Merton Model
    - Chapter 17 – The Greek Letters

20. **Bruce Tuckman, *Fixed Income Securities, 2nd Edition* (Hoboken, NJ: Wiley & Sons, 2002).**
    - Chapter 1 – Bond Prices, Discount Factors, and Arbitrage
    - Chapter 2 – Bond Prices, Spot Rates, and Forward Rates
    - Chapter 3 – Yield to Maturity
    - Chapter 5 – One-Factor Measures of Price Sensitivity

21. **Jorion, *Value-at-Risk, 3rd Edition*.**
    - Chapter 14 – Stress Testing

22. **Caouette, Altman, Narayanan, and Nimmo, *Managing Credit Risk, 2nd Edition***
    - Chapter 6 – The Rating Agencies
    - Chapter 23 – Country Risk Models

23. **Arnaud de Servigny and Olivier Renault, *Measuring and Managing Credit Risk*, (New York: McGraw-Hill, 2004).**
    - Chapter 2 – External and Internal Ratings

24. **Saunders and Cornett, *Financial Institutions Management, 6th Edition*.**
    - Chapter 15 (excluding Appendix 15A) – Sovereign Risk

25. **Michael Ong, *Internal Credit Risk Models: Capital Allocation and Performance Measurement* (London: Risk Books, 2003).**
    - Chapter 4 – Loan Portfolios and Expected Loss
    - Chapter 5 – Unexpected Loss

26. **Kevin Dowd, *Measuring Market Risk, 2nd Edition* (West Sussex, England: Wiley, 2005).**
    - Chapter 2—Measures of Financial Risk

27. **John Hull, Risk Management and Financial Institutions, 2nd Edition (Boston: Pearson, 2010)**
    - Chapter 18—Opearational Risk

28. **"Principles for Sound Stress Testing Practices and Supervision" (Basel Committee on Banking Supervision Publication, May 2009).**

Readings for Valuation and Risk Models - AIMS

Linda Allen, Jacob Boudoukh and Anthony Saunders, *Understanding Market, Credit and Operational Risk: The Value at Risk Approach* (Oxford: Blackwell Publishing, 2004).

Chapter 3 – Putting VaR to Work

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain and give examples of linear and non-linear derivatives.
- Explain how to calculate VaR for linear derivatives.
- Describe the delta-normal approach to calculating VaR for non-linear derivatives.
- Describe the limitations of the delta-normal method.
- Explain the full revaluation method for computing VaR.
- Compare delta-normal and full revaluation approaches.
- Explain structural Monte Carlo, stress testing and scenario analysis methods for computing VaR, identifying strengths and weaknesses of each approach.
- Discuss the implications of correlation breakdown for scenario analysis.
- Describe worst case scenario analysis.

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Linda Allen, Jacob Boudoukh and Anthony Saunders, *Understanding Market, Credit and Operational Risk: The Value at Risk Approach* (Oxford: Blackwell Publishing, 2004).

Chapter 5 – Extending the VaR Approach to Operational Risks

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the following top-down approaches to measuring operational risks:
    - Multifactor models
    - Income based models
    - Expense based models
    - Operating leverage models
    - Scenario analysis models
    - Risk profiling models
- Describe the following bottom-up approaches to measuring operational risk:
    - Process approaches
        - Causal networks and scorecards
        - Connectivity models
        - Reliability models

    - Actuarial approaches
        - Empirical loss distributions
        - Parametric loss distributions
        - Extreme value theory
- Compare and contrast top-down and bottom-up approaches to measuring operational risk.
- Describe ways to hedge against catastrophic operational losses.
- Describe the characteristics of catastrophe options and catastrophe bonds.
- Describe various methods of hedging operational risks and discuss the limitations of hedging operational risk.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 11—Binomial Trees

AIMS – *Candidates, after completing this reading, should be able to:*

- Calculate the value of a European call or put option using the one-step and two-step binomial model.
- Calculate the value of an American call or put option using a two-step binomial model.
- Discuss how the binomial model value converges as time periods are added.
- Describe the impact dividends have on the binomial model.
- Discuss how volatility is captured in the binomial model.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 13 – The Black-Scholes-Merton Model

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the lognormal property of stock prices, the distribution of rates of return, and the calculation of expected return.
- Compute the realized return and historical volatility of a stock.
- List and describe the assumptions underlying the Black-Scholes-Merton option pricing model.
- Compute the value of a European option using the Black-Scholes-Merton model on a non-dividend-paying stock.

- Define implied volatilities and describe how to compute implied volatilities from market prices of options using the Black-Scholes-Merton model.
- Explain how dividends affect the early decision for American call and put options.
- Compute the value of a European option using the Black-Scholes-Merton model on a dividend-paying stock.
- Identify the complications involving the valuation of warrants.

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John Hull, *Options, Futures, and Other Derivatives, 7th Edition* (New York: Pearson, 2009).

Chapter 17 – The Greek Letters

AIMS – *Candidates, after completing this reading, should be able to:*

- Discuss and assess the risks associated with naked and covered option positions.
- Explain how naked and covered option positions generate a stop-loss trading strategy.
- Define delta hedging for an option, forward, and futures contracts.
- Define and compute delta for an option.
- Discuss the dynamic aspects of delta hedging.
- Define the delta of a portfolio.
- Describe how portfolio insurance can be created through option instruments and stock index futures.
- Define, compute and describe theta, gamma, vega, and rho for option positions.
- Explain how to implement and maintain a gamma-neutral position.
- Discuss the relationship between delta, theta, and gamma.
- Describe how hedging activities take place in practice, and discuss how scenario analysis can be used to formulate expected gains and losses with option positions.

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Bruce Tuckman, *Fixed Income Securities, 2nd Edition* (Hoboken, NJ: Wiley & Sons, 2002).

Chapter 1 – Bond Prices, Discount Factors, and Arbitrage

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe and contrast individual and market expressions of the time value of money.
- Define discount factor and use a discount function to compute present and future values.
- Define the "law of one price", support it using an arbitrage argument, and describe how it can be applied to bond pricing.

- Discuss the components of a U.S. Treasury coupon bond, and compare and contrast the structure to Treasury STRIPS, including the difference between P-STRIPS and C-STRIPS.
- Compute the price of a fixed income security with certain cash-flows and compare its value to fixed-income securities with different, but certain, cash flow characteristics.
- Identify arbitrage opportunities for fixed income securities with certain cash flows.

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Bruce Tuckman, *Fixed Income Securities*, 2nd *Edition* (Hoboken, NJ: Wiley & Sons, 2002).
Chapter 2 – Bond Prices, Spot Rates, and Forward Rates

AIMS – *Candidates, after completing this reading, should be able to:*

- Calculate and describe the impact of different compounding frequencies on a bond's value.
- Calculate holding period returns under different compounding assumptions.
- Derive spot rates from discount factors.
- Calculate the value of a bond using spot rates.
- Define and interpret the forward rate, and compute forward rates given spot rates.
- Discuss the impact of maturity on the price of a bond and the returns generated by bonds.
- Recognize the differences yield curve calculations yield when using P-Strips and C-strips.
- Define rich and cheap rates in the context of yield curves.

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Bruce Tuckman, *Fixed Income Securities*, 2nd *Edition* (Hoboken, NJ: Wiley & Sons, 2002).
Chapter 3 – Yield to Maturity

AIMS – *Candidates, after completing this reading, should be able to:*

- Define, interpret, and apply a bond's yield-to-maturity (YTM) to bond pricing.
- Compute a bond's YTM given a bond structure and price.
- Establish the relationship between spot rates and YTM.
- Understand the relationship between coupon rate, YTM, and bond prices.
- Define and describe:
    - Discount bond
    - Premium bond
    - Coupon effect
    - Pull-to-par

- Calculate the price of an annuity.
- Calculate the realized return on a bond.
- Define reinvestment risk.

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Bruce Tuckman, *Fixed Income Securities, 2nd Edition* (Hoboken, NJ: Wiley & Sons, 2002).

Chapter 5 – One-Factor Measures of Price Sensitivity

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe four ways in which measures of fixed income price sensitivity are used.
- Describe an interest rate factor and name common examples of interest rate factors.
- Define and compute the DV01 of a fixed income security given a change in yield and the resulting change in price.
- Explain the limitations of DV01 as a measure of price sensitivity.
- Calculate the face amount of bonds required to hedge an option position given the DV01 of each.
- Define, compute, and interpret the effective duration of a fixed income security given a change in yield and the resulting change in price.
- Contrast DV01 and effective duration as measures of price sensitivity.
- Define, compute, and interpret the convexity of a fixed income security given a change in yield and the resulting change in price.
- Calculate the effective duration and convexity of a portfolio of fixed income security.
- Explain the effect negative convexity has on the hedging of fixed income securities.

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Philippe Jorion, *Value-at-Risk: The New Benchmark for Managing Financial Risk, 3rd Edition* (New York: McGraw-Hill, 2007).

Chapter 14 – Stress Testing

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the purposes of stress testing and the process of implementing a stress testing scenario.
- Explain the difference in event-driven scenarios and portfolio-driven scenarios.
- Identify common one-variable sensitivity tests.

- Describe the Standard Portfolio Analysis of Risk (SPAN®) system for measuring portfolio risk.
- Discuss the drawbacks to scenario analysis.
- Explain the difference between unidimensional and multidimensional scenarios.
- Compare and contrast various approaches to scenario analysis.
- Define and distinguish between sensitivity analysis and stress testing model parameters.
- Explain how the results of a stress test can be used to improve our risk analysis and risk management systems.

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John Caouette, Edward Altman, Paul Narayanan and Robert Nimmo, *Managing Credit Risk: The Great Challenge for the Global Financial Markets, 2nd Edition* (Hoboken, NJ: Wiley 2008).

Chapter 6 – The Rating Agencies

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the role of rating agencies in the financial markets.
- Describe some of the market and regulatory forces that have played a role in the growth of the rating agencies.
- Describe what a rating scale is, what credit outlooks are, and the difference between solicited and unsolicited ratings.
    - Identify Standard and Poor's and Moody's rating scales and distinguish between investment and noninvestment grade ratings.
- Describe the difference between an issuer-pay and a subscriber-pay model and what concerns the issuer-pay model engenders.
- Describe and contrast the process for rating industrial and sovereign debt and describe how the distributions of these ratings may differ.
- Discuss the ratings performance for corporate bonds.
- Describe the relationship between the rating agencies and regulators and identify key regulations that impact the rating agencies and the use of ratings in the market
- Discuss some of the trends and issues emerging from the current credit crisis relevant to the rating agencies and the use of ratings in the market.

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John Caouette, Edward Altman, Paul Narayanan and Robert Nimmo, *Managing Credit Risk: The Great Challenge for the Global Financial Markets, 2nd Edition* (Hoboken, NJ: Wiley 2008).

Chapter 23 – Country Risk Models

AIMS – *Candidates, after completing this reading, should be able to:*

- Define and differentiate between country risk and transfer risk and discuss some of the factors that might lead to each.
- Define and describe contagion.
- Identify and describe some of the major risk factors that are relevant for sovereign risk analysis.
- Compare and contrast corporate and sovereign historical default rate patterns·
- Describe how country risk ratings are used in lending and investment decisions.
- Describe some of the challenges in country risk analysis.

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Arnaud de Servigny and Olivier Renault, *Measuring and Managing Credit Risk*, (New York: McGraw-Hill, 2004).

Chapter 2 – External and Internal Ratings

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe external rating scales, the rating process, and the link between ratings and default.
- Discuss the impact of time horizon, economic cycle, industry, and geography on external ratings.
- Review the results and explanation of the impact of ratings changes on bond and stock prices.
- Explain and compare the through-the-cycle and at-the-point approaches to score a company.
- Describe the process for and issues with building, calibrating and backtesting an internal rating system.
- Define and explain a ratings transition matrix and its elements.
- Identify and describe the biases that may affect a rating system.

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Anthony Saunders and Marcia Millon Cornett, *Financial Institutions Management: A Risk Management Approach, 6th Edition* (New York: McGraw-Hill, 2008).

Chapter 15 (excluding Appendix 15A) – Sovereign Risk

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the differences between credit risk and sovereign risk
- Compare debt repudiation versus debt rescheduling
- Explain the role of the following variables in country risk evaluation
    - Debt service ratio
    - Import ratio
    - Investment ratio
    - Variance of export ratio
    - Domestic money supply growth
- Explain the common problems with statistical country risk evaluation models

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Michael Ong, *Internal Credit Risk Models: Capital Allocation and Performance Measurement* (London: Risk Books, 2003).

Chapter 4 – Loan Portfolios and Expected Loss

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the objectives of measuring credit risk for a bank's loan portfolio.
- Define, calculate and interpret the expected loss for an individual credit instrument.
- Distinguish between loan and bond portfolios.
- Explain how a credit downgrade or loan default affects the return of a loan.
- Distinguish between expected and unexpected loss.
- Define exposures, adjusted exposures, commitments, covenants, and outstandings.
    - Explain how drawn and undrawn portions of a commitment affect exposure.
    - Explain how covenants impact exposures.
- Define usage given default and how it impacts expected and unexpected loss.
    - Explain credit optionality.
- Describe the process of parameterizing credit risk models and its challenges.

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Michael Ong, *Internal Credit Risk Models: Capital Allocation and Performance Measurement* (London: Risk Books, 2003).

Chapter 5 – Unexpected Loss

AIMS – *Candidates, after completing this reading, should be able to:*

- Explain the objective for quantifying both expected and unexpected loss.
- Describe factors contributing to expected and unexpected loss.
- Define, calculate and interpret the unexpected loss of an asset.
- Explain the relationship between economic capital, expected loss and unexpected loss.

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Kevin Dowd, *Measuring Market Risk, 2nd Edition* (West Sussex, England: Wiley, 2005).

Chapter 2—Measures of Financial Risk

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the mean-variance framework and the efficient frontier.
- Explain the limitations of the mean- variance framework with respect to assumptions about the return distributions.
- Define the Value-at-risk (VaR) measure of risk, discuss assumptions about return distributions and holding period, and explain the limitations of VaR.
- Define the properties of a coherent risk measure and explain the meaning of each property.
    - Explain why VaR is not a coherent risk measure.
- Explain and calculate expected shortfall (ES), and compare and contrast VaR and ES.
- Explain how VaR and ES are special cases of spectral risk measures.
- Describe how the results of scenario analysis can be interpreted as coherent risk measures.
- Describe and calculate the features of a distribution including mean, median, variance, standard deviation, skewness and kurtosis, and interpret their importance in risk measurement.

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John Hull, Risk Management and Financial Institutions, 2nd Edition (Boston: Pearson, 2010)

Chapter 18 – Operational Risk

AIMS – *Candidates, after completing this reading, should be able to:*

- Calculate the regulatory capital using the basic indicator approach and the standardized approach.

- Explain how to get a loss distribution from the loss frequency distribution and the loss severity distribution using Monte Carlo simulations.
- Describe the common data issues that can introduce inaccuracies and biases in the estimation of loss frequency and severity distributions.
- Describe how to use scenario analysis in instances when there is scarce data.
- Describe how to use risk and control self assessment (RCSA) and key risk indicators (KRIs) to measure and manage operational risks.
- Discuss the allocation of operational risk capital and the use of scorecards.
- Explain how to use the power law to measure operational risk.
- Explain the risks of moral hazard and adverse selection when using insurance to mitigate operational risks.

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"Principles for Sound Stress Testing Practices and Supervision" (Basel Committee on Banking Supervision Publication, Jan 2009).

AIMS – *Candidates, after completing this reading, should be able to:*

- Describe the rationale for the use of stress testing as a risk management tool.
- Describe weaknesses identified and recommendations for improvement in:
    - The use of stress testing and integration in risk governance
    - Stress testing methodologies
    - Stress testing scenarios
    - Stress testing handling of the following specific risks:
        - Risks arising from the use of complex structured products
        - Basis risk
        - Counterparty credit risk
        - Pipeline risk
        - Contingent risk
        - Funding liquidity risk

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