CAIA® Level II Study Guide

Learning objectives and keywords to facilitate your exam study

SEPTEMBER 2021

CAIA Level II Study Guide
For the September 2021 Exam

Contents

Introduction to the CAIA Charter Program

From CAIA Association's humble origins in 2002, the CAIA Charter Program has aimed to equip investment professionals to "Think like an Allocator." We strongly believe that all investment professionals, regardless if they ever happen to be employed by an asset owner, should have the ability to think and manage seamlessly across the full spectrum of risk premia. Co-founded by the Alternative Investment Management Association (AIMA) and the Isenberg School Center for International Securities and Derivatives Markets (CISDM), the CAIA Charter is the only globally recognized professional designation in alternative investments, the fastest growing segment of the investment industry.

The allocator's view today is decidedly one that invests across asset classes and industries, including equities, fixed income, hedge funds, private capital (equity and debt), real assets and commodities, and structured products and credit derivatives. This is the "Allocator's Cockpit" by which our curriculum takes its cue.

As such, allocators play a disproportionate role in helping guide the positioning of the program and canon of what is taught and tested. This process is manifested in several in-person roundtables and individual meetings each year with many of the largest pensions, endowments, foundations, and sovereign wealth funds around the world. That top of the food chain perspective is balanced with rigorous survey work with our nearly 12,000 global membership who continuously counsel us on how investment practices are evolving and how the CAIA Charter Program should ultimately respond and adapt in kind.

Level II of the CAIA Charter Program

Welcome to Level II of the CAIA® Charter Program. The Level II curriculum places the candidate in the seat of an asset allocator. Throughout it, candidates will learn advanced applications in the asset allocation and portfolio construction process, such as regulation, models and methods, investment and operational due diligence, and risk management. In addition to the core curriculum, Level II also introduces candidates to recent and developing academic and industry research in alternative investments, asset allocation, and risk management.

The business school faculty and industry practitioners who have helped create the CAIA Charter Program bring years of experience in the financial services industry. Consequently, the curriculum is consistent with recent advances in the financial industry and reflects findings of applied academic research in investment management.

Candidates for the CAIA exams are assumed to understand the central concepts of quantitative analysis and finance. This includes awareness of the instruments that trade in traditional markets, models used to value these instruments, and the tools and methods used to analyze data. These concepts are typically covered in dedicated undergraduate courses or MBA-level investment and business statistics courses.

Becoming a CAIA Charterholder

Passing the Level II examination is an important accomplishment and will require a significant amount of preparation. All candidates will need to study and become familiar with the CAIA Level II curriculum material to develop the knowledge and skills necessary to be successful on examination day. Upon a candidate's successful completion of the Level II examination and meeting the membership requirements, CAIA Association will confer the CAIA Charter upon the candidate.

Earning the CAIA Charter is the beginning of your journey, not the end. It is a condition of eligibility, not a finale. It is a career long commitment to a higher calling, not an episodic academic endeavor. Professions are a team sport where all players collectively unite to place the interests of the client above their own, to foster dignified futures and retirements, and to serve the greater good through their local communities.

Preparing for the Level II Examination

Candidates should obtain all the reading materials and follow the outline provided in this study guide. The required reading materials for the Level II curriculum are as follows:

- *Alternative Investments: An Allocator's Approach,* 4th Edition, Wiley, 2020.
- *CAIA Level II: Current and Integrated Topics*, 2020. These readings can be downloaded free of charge from the CAIA website.

A workbook containing exercises and a keyword glossary is available to download free of charge on the CAIA website.

Learning Objectives

The Learning Objectives (LOs) in each chapter are an important way for candidates to organize their studies, as they form the basis for examination questions. LOs provide guidance on the readings and keywords that are most important to understanding the CAIA curriculum. Every learning objective is accompanied by one or multiple supporting concepts designed to provide candidates with further context. The format for each learning objective is as follows:

Learning objective in bold
Including:
- Supporting concept for the learning objective

However, it is important to note that these supporting concepts may not encompass the entire learning objective, yet candidates are responsible for understanding the learning objective in its entirety. Candidates should also be able to define all keywords provided, regardless of whether they are stated explicitly in a learning objective.

Preparation Time

Regarding the amount of time necessary to devote to the program, we understand that all candidates are different. Therefore, it is nearly impossible to provide guidelines that would be appropriate for everyone. However, based on candidate feedback, we estimate that Level II requires 200 hours or more of study.

Examination Format

The Level II examination, administered twice annually, is a four-hour computer-administered examination that is offered at test centers throughout the world. The format of the Level II examination includes 100 multiple-choice questions in Section 1, and three multi-part constructed-response (essay-type) questions in Section 2. For more information, visit the CAIA website at www.caia.org. Fewer than 30% of the questions on the exam will require calculations.

Except for "Ethics, Regulation, and ESG" and "Current and Integrated Topics," all Level II topics may be tested in a multiple- choice format, a constructed-response format, or both formats. The approximate weighting for each section is provided in the table below. Although constructed-response questions comprise only 30% of the total weight of the examination, additional time is provided so candidates can fully develop their responses.

Usually, any one part of a constructed-response question can be answered in one or two paragraphs. Responses to constructed-response questions need not be full sentences. Candidates are not penalized for improper grammar or spelling, although a clear stream of thought is the best way to obtain full points in a given section. Candidates are expected to type their answers to the constructed-response questions using a computer and should be familiar with how to use a point- and-click mouse.

Level II Examination Topic Weights and Question Format

Level II Topic	Question Format	
	Multiple-Choice	**Constructed-Response**
Ethics, Regulation, and ESG	0%	10%
Models	8% - 12%	0% - 10%
Institutional Asset Owners and Investment Policies	8% - 12%	0% - 10%
Risk and Risk Management	8% - 12%	0% - 10%
Methods for Alternative Investing	8% - 12%	0% - 10%
Accessing Alternative Investments	8% - 12%	0% - 10%
Due Diligence and Selecting Strategies	8% - 12%	0% - 10%
Volatility and Complex Strategies	8% - 12%	0% - 10%
Current and Integrated Topics	0%	10%
Total	**70%**	**30%**

Minutes	Format	Approximate Weight
120	Multiple-Choice (all parts)	70%
30	Optional Break	-
120	Constructed-Response (all parts)	30%
240	Total Examination Minutes	100%

Errata Sheet

Correction notes appear in this study guide to address known errors existing in the assigned readings. Additional errors in the readings and learning objectives are occasionally brought to our attention; in these cases, we will post the errata on the Curriculum and Study Materials page of the CAIA website. It is the responsibility of the candidate to review these errata prior to taking the examination. Please report suspected errata to curriculum@caia.org.

Calculator Policy

You will need to bring a calculator for the Level II examination. The calculations that candidates are asked to perform range from simple mathematical operations to more complex methods of valuation. CAIA Association allows candidates to bring into the examination the TI BA II Plus (including the Professional model) or the HP 12C (including the Platinum edition). **No other calculators or any other electronic devices will be allowed in the testing center, and calculators will not be provided at the test center.**

Completion of the Program

Upon successful completion of the Level II examination, and assuming that the candidate has met all the Association's membership requirements, the CAIA Association will confer the CAIA Charter upon the candidate. Candidates should refer to the CAIA website, www.caia.org, for information about examination dates and membership requirements.

CAIA Level II Outline

Topic 1: Ethics, Regulation and ESG

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part One: Ethics, Regulation, and ESG, Chapters 1 – 5.

Chapter 1: Asset Manager Code

Chapter 2: Recommendations and Guidance

Chapter 3: Global Regulation

Chapter 4: ESG and Alternative Investments

Chapter 5: ESG Analysis and Application

Topic 2: Models

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Two: Models, Chapters 6 – 10.

Chapter 6: Modeling Overview and Interest Rate Models

Chapter 7: Credit Risk Models

Chapter 8: Multi-Factor Equity Pricing Models

Chapter 9: Asset Allocation Processes and the Mean-Variance Model

Chapter 10: Other Asset Allocation Approaches

Topic 3: Institutional Asset Owners and Investment Policies

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Three: Institutional Asset Owners and Investment Policies, Chapters 11 – 15.

Chapter 11: Types of Asset Owners and the Investment Policy Statement

Chapter 12: Foundations and the Endowment Model

Chapter 13: Pension Fund Portfolio Management

Chapter 14: Sovereign Wealth Funds

Chapter 15: Family Offices and the Family Office Model

Topic 4: Risk and Risk Management

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Four: Risk and Risk Management, Chapters 16 – 20.

Chapter 16: Cases in Tail Risk

Chapter 17: Benchmarking and Performance Attribution

Chapter 18: Liquidity and Funding Risks

Chapter 19: Hedging, Rebalancing, and Monitoring

Chapter 20: Risk Measurement, Risk Management, and Risk Systems

Topic 5: Methods for Alternative Investing

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Five: Methods for Alternative Investments, Chapters 21 – 25.

Chapter 21: Valuation and Hedging Using Binomial Trees

Chapter 22: Directional Strategies and Methods

Chapter 23: Multivariate Empirical Methods and Performance Persistence

Chapter 24: Relative Value Methods

Chapter 25: Valuation Methods for Private Assets: The Case of Real Estate

Topic 6: Accessing Alternative Investments

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Six: Accessing Alternative Investments, Chapters 26 – 30.

Chapter 26: Hedge Fund Replication

Chapter 27: Diversified Access to Hedge Funds

Chapter 28: Access to Real Estate and Commodities

Chapter 29: Access through Private Structures

Chapter 30: The Risk and Performance of Private and Listed Assets

Topic 7: Due Diligence and Selecting Managers

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Seven: Due Diligence and Selecting Managers, Chapters 31 – 35.

Chapter 31: Active Management and New Investments

Chapter 32: Selection of a Fund Manager

Chapter 33: Investment Process Due Diligence

Chapter 34: Operational Due Diligence

Chapter 35: Due Diligence of Terms and Business Activities

Topic 8: Volatility and Complex Strategies

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Eight: Volatility and Complex Strategies, Chapters 36 - 40.

Chapter 36: Volatility as a Factor Exposure

Chapter 37: Volatility, Correlation, and Dispersion Products and Strategies

Chapter 38: Complexity and Structured Products

Chapter 39: Insurance-Linked and Hybrid Securities

Chapter 40: Complexity and the Case of Cross-Border Real Estate Investing

Topic 9: Current and Integrated Topics

CAIA Level II: Current and Integrated Topics. *These readings can be downloaded free of charge from the CAIA website*.

1. "Dynamic Strategies for Asset Allocation," Andre F. Perold and William F. Sharpe, *Financial Analyst Journal,* January-February 1995.

2. "Technical Guide for Limited Partners: Responsible Investing in Private Equity," Principles for Responsible Investing, 2020.

3. "Asset Owners, Investment Management, and Commitment: An Organizational Framework," Gordon L. Clark and Ashby H. B. Monk, *The Journal of Retirement*, Winter 2019.

4. "Building a Better Portfolio: Balancing Performance and Liquidity," Junying Shen, Ding Li, Grace Qiu, Vishv Jeet, Michelle Teng and Ki Cheong Wong, GIC EIS and PGIM IAS, 2020. Pages 1-24.

5. "Demystifying Illiquid Assets: *Expected Returns for Private Equity*," Antti Ilmanen, Swati Chandra, and Nicholas McQuinn, *The Journal of Alternative Investments*, Winter 2020.

6. "An executive's guide to AI," Michael Chui and Michael Chui, McKinsey Analytics, 2019.

7. "Longevity and Liabilities: *Bridging the Gap*," PGIM, Inc., 2017.

8. "Blockchain and Financial Market Innovation," *Economic Perspectives*, Federal Reserve Bank of Chicago, July 2017.

Topic 1: Ethics, Regulation, and ESG

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part One: Ethics, Regulation, and ESG, Chapters 1 – 5.

Chapter 1	Asset Manager Code of Professional Conduct – General Principles

Learning Objectives

1.A Demonstrate knowledge of Professional Code A: Loyalty to Clients

Including:

- State and Interpret Professional Code A with respect to client interests, preservation of confidentiality, and the maintenance of independence and objectivity

1.B Demonstrate knowledge of Professional Code B: Investment Process and Actions

Including:

- State and Interpret Professional Code B with respect to exercising reasonable care, fair dealing, having a reasonable and adequate basis, and in stating, evaluating, and determining the suitability of client objectives and constraints

1.C Demonstrate knowledge of Professional Code C: Trading

Including:

- State and Interpret Professional Code C with respect to material nonpublic information, commissions, execution of transactions, and policies that ensure a fair and equitable trade allocation among client accounts

1.D Demonstrate knowledge of Professional Code D: Risk Management, Compliance, and Support

Including:

- State and Interpret Professional Code D with respect to compliance with all applicable laws and regulations, the appointment of a compliance officer, independent third party reviews, record keeping, appointing qualified staff, and the establishment of business-continuity plans and risk management processes

1.E Demonstrate knowledge of Professional Code E: Performance and Valuation

Including:

- State and Interpret Professional Code E with respect to the fair and accurate presentation of client performance and the use of fair market prices to value client holdings

1.F Demonstrate knowledge of Professional Code F: Disclosures

Including:

- State and Interpret Professional Code F with respect to honest and accurate disclosures to clients, conflicts of interests, disciplinary actions, investment processes, fees and commissions, soft dollars, voting, trade allocations, audits, organizational changes, and risk management processes

Chapter 2 Asset Managers Code of Professional Conduct – Recommendations and Guidance

Learning Objectives

2.A Demonstrate knowledge of recommendations and guidance for Professional Code A: Loyalty to Clients

Including:

- Recognize recommendations and guidance with respect to client interests, preservation of confidentiality, and the maintenance of independence and objectivity

2.B Demonstrate knowledge of recommendations and guidance for Professional Code B: Investment Process and Actions

Including:

- Recognize recommendations and guidance with respect to exercising reasonable care, fair dealing, having a reasonable and adequate basis, and in stating, evaluating, and determining the suitability of client objectives and constraints

2.C Demonstrate knowledge of recommendations and guidance for Professional Code C: Trading

Including:

- Recognize recommendations and guidance with respect to material nonpublic information, commissions, execution of transactions, and policies that ensure a fair and equitable trade allocation among client accounts

2.D Demonstrate knowledge of recommendations and guidance for Professional Code D: Risk Management, Compliance, and Support

Including:

- Recognize recommendations and guidance with respect to compliance with all applicable laws and regulations, the appointment of a compliance officer, independent third-party reviews, record keeping, appointing qualified staff, and the establishment of business-continuity plans and risk management processes

2.E Demonstrate knowledge of recommendations and guidance for Professional Code E: Performance and Valuation

Including:

- Recognize recommendations and guidance with respect to the fair and accurate presentation of client performance and the use of fair market prices to value client holdings

2.F Demonstrate knowledge of recommendations and guidance for Professional Code F: Disclosures

Including:

- Recognize recommendations and guidance with respect to honest and accurate disclosures to clients, conflicts of interests, disciplinary actions, investment processes, fees and commissions, soft dollars, voting, trade allocations, audits, organizational changes, and risk management processes

Chapter 3 Global Regulation

Keywords

access persons
accredited investors
advertisement
adviser's legal obligation includes
AIFMD key features
AIFMD sovereignty exception
Alternative Investment Fund Managers Directive (AIFMD)
anti-fraud prohibitions
asset stripping rules
blue sky laws
cause exams
Chief Compliance Officer (CCO)
code of ethics
collective investment schemes (CIS)
competent authority
cybersecurity
Dodd-Frank Act
European Banking Authority (EBA)
European Insurance and Occupational Pensions Authority (EIOPA)
European Securities and Markets Authority (ESMA)
European Systemic Risk Board (ESRB)
Financial Industry Regulatory Authority (FINRA)
Financial Instruments and Exchange Act (FIEA)
Financial Investment Services and Capital Markets Act (FSCMA)
Financial Services Commission (FSC)
Financial Supervisory Service (FSS)
Form PF
home member state
host state
illegal insider trading
initial coin offerings (ICOs)
investment adviser
marketing of AIFs by AIFMs
marketing passport
Monetary Authority of Singapore (MAS)
National Futures Association (NFA)
national private placement rules
principles-based disclosure requirements
private interest theories of regulation
public interest theory of regulation
qualified opportunity zones
qualified purchaser
SEC registration requirements for non-U.S. hedge funds
SEC's responsibilities
Section 13(d) of the Exchange Act
Section 13(f) of the Exchange Act
Securities and Futures Act (SFA)
Securities and Futures Commission (SFC)
Securities and Futures Ordinance (SFO)
sweep exams
The Act on Investment Trust and Investment Corporation (ITIC)
The Investment Advisers Act of 1940 (Advisers Act)
The Investment Company Act of 1940 (40 Act)
Kanto Local Finance Bureau of Ministry of Finance Japan (KLFB)

The Securities Act of 1933 (Securities Act)
The Securities Exchange Act of 1934 (Exchange Act)
three types of SEC exams
twelve matters regulated under the Advisers Act
two tests for the private investment fund exemption
U.S. Commodity Futures Trading Commission (CFTC)
Undertakings for Collective Investments in Transferable Securities (UCITS)

Learning Objectives

3.1 Demonstrate knowledge of financial market regulation

Including:

- Identify theories of regulation
- Discuss principles of securities economic regulation
- Recognize the importance of regulation in some trading strategies

3.2 Demonstrate knowledge of alternative investment regulation in the United States

Including:

- Identify the main regulatory bodies and their jurisdictions
- Recognize regulatory frameworks and statues within the United States
- Understand regulation of private funds and why one must register as an investment advisor
- Identify investment advisor obligations within private fund regulations
- Understand the process of hedge fund registration in the United States
- Understand the process of registering both private and public securities and how the Securities Act affects this process
- Understand the exemptions from registration under the Investment Company Act
- Identify the role of the chief compliance officer and compliance culture
- Understand the importance of marketing material review
- Identify the various SEC Exams
- Identify reporting requirements

3.3 Demonstrate knowledge of alternative investment regulation in Europe

Including:

- Identify the European regulatory bodies and their jurisdictions
- Recognize regulatory frameworks within Europe
- Identify requirements regarding registration and exemptions from those requirements within Europe
- Understand disclosure requirements around the marketing of investment products
- Identify formal requirements in risk management
- Identify requirements around the reporting of regulations in Europe
- Analyze the legal structures within European regulatory frameworks
- Understand how European regulations are enforced
- Understand how non-EU managers may operate in Europe

3.4 Demonstrate knowledge of hedge fund regulation in Asia

Including:

- Identify regulatory requirements and frameworks within Hong Kong
- Identify regulatory requirements and frameworks within Singapore
- Identify regulatory requirements and frameworks within South Korea
- Identify regulatory requirements and frameworks within Japan

Chapter 4 ESG and Alternative Investments

Keywords

ESG

open protocol

Learning Objectives

4.1 Demonstrate knowledge of ESG in alternative investments

Including:

- Understand the growth of ESG principles in alternatives assets
- Understand how ESG principles are incorporated by institutional investors
- Identify and explain challenges in incorporating ESG principles into the investment decision

4.2 Demonstrate knowledge of how ESG impacts natural resources as a real asset

Including:

- Recognize how environmental issues can impact investments in natural resources
- Understand how social issues can impact investments in natural resources
- Recognize how governance issues can impact investments in natural resources

4.3 Demonstrate knowledge of how ESG impacts commodities as a real asset

Including:

- Explain the role of speculators and speculation in pricing commodity derivatives
- Understand the implication of changes in volatility on commodity speculation
- Understand how ESG factors can apply to direct investment in physical commodities

4.4 Demonstrate knowledge of how ESG impacts real estate as a real asset

Including:

- Identify the impacts ESG considerations can have on real estate development
- Describe how ESG considerations can impact the use of real estate
- Explain how issues in ESG can apply to the treatment of tenants, workers, and communities
- Describe the influence of ESG principles in recovery and disposal of real estate
- Identify ESG issues in refurbishment and retrofitting
- Understand the processes of waste management, resource conservation, and recycling in relation to the demolition of real estate assets
- Understand the process of land recovery and rehabilitation in real estate

4.5 Demonstrate knowledge of how ESG impacts hedge funds

Including:

- Describe how ESG principles guide hedge fund investment strategies
- Describe how ESG principles can guide hedge fund governance
- Explain the relationship between ESG principles and hedge fund transparency
- Demonstrate knowledge of how ESG interacts with hedge fund investment techniques and instruments
- Understand the relationship between hedge fund strategies and underlying investments
- Describe how hedge fund strategies are impacted by activism
- Describe how hedge fund strategies are impacted by avoidance

4.6 Demonstrate knowledge of how ESG impacts private equity

Including:

- Explain how partnership organizations can support ESG, including within the GP-LP relationship
- Describe how the private equity investment process can include ESG principles
- Understand the monitoring process and how it applies to ESG

Chapter 5 ESG Analysis and Application

Keywords

cap and trade
Coase theorem
engagement strategy
enviropreneurship
ESG materiality
G4 Materiality Principle
greenwashing
impact investing
mission related investments (MRI)
negative externalities
negative or exclusionary screening
positive screening
Principles for Responsible Investment (PRI)
program related investments (PRI)
proxy voting
SASB Materiality Map
sin stocks
The Global Reporting Initiative (GRI)
three characteristics of a program related investment
three phases of the impact of adverse ESG events
tragedy of the commons

Learning Objectives

5.1 Demonstrate knowledge of the background of ESG

Including:

- Describe the history of ESG
- Identify and describe the Global Reporting Initiative (GRI) Standards
- Recognize the relationship between social responsibility and evidence of stakeholder wealth within ESG

5.2 Demonstrate knowledge of how ESG is rated and scored within an entity's operating procedures

Including:

- Discuss ESG ratings and scores as part of operating procedures

5.3 Demonstrate knowledge of ESG materiality and disclosure

Including:

- Understand how the Global Reporting Initiative (GRI) governs ESG materiality and ESG disclosure
- Explain KPMG's framework for materiality assessments
- Interpret the ESG materiality map
- Discuss the measurement of ESG materiality

5.4 Demonstrate knowledge of the role the United Nations (UN) has in ESG issues

Including:

- Identify the Six Principles for Responsible Investment (PRI)
- Explain Sustainable Development Goals (SDGs)

5.5 Demonstrate knowledge of fiduciary responsibilities and regulation within ESG

Including:

- Discuss fiduciary responsibilities within the US as they relate to ESG
- Discuss fiduciary responsibilities within Europe as they relate to ESG
- Discuss fiduciary responsibilities within Asia as they relate to ESG
- Discuss how asset managers approach ESG compliance and risk management

5.6 Demonstrate knowledge of methods of ESG investing

Including:

- Distinguish between negative and positive screening
- Discuss engagement and proxy voting strategies
- Describe impact investing in the context of their categories, the steps of implementation, and illiquid investments

5.7 Demonstrate knowledge of market-based methods to address ESG issues

Including:

- Understand the background of externalities and markets
- Discuss the Coase Theorem

5.8 Demonstrate knowledge of special investment considerations as they apply to ESG

Including:

- Understand special consideration, cash flows, returns, and risk
- Describe the case for special consideration of ESG issues
- Describe the case against special consideration of ESG issues

Topic 2: Models

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Two: Models, Chapters 6 – 10.

Chapter 6 Modeling Overview and Interest Rate Models

Keywords

abstract models
arbitrage-free models of the term structure
Black-Derman-Toy Model (BDT model)
Cox, Ingersoll, and Ross model
cross-sectional models
empirical models
endogenous variable
equilibrium models of the term structure
exogenous variable
Ho and Lee model
normative model
P-Measure
panel data sets
positive model
Q-Measure
theoretical models
time-series models
Vasicek's model

Learning Objectives

6.1 Demonstrate knowledge of underlying models of investment strategy
Including:
- Compare normative strategies with positive strategies
- Distinguish between theoretical and empirical models
- Distinguish between applied versus abstract models
- Compare cross-sectional versus time-series models
- Discuss the importance of methodology in model building

6.2 Demonstrate knowledge of equilibrium models of the term structure.
Including:
- Describe, discuss, and apply Vasicek's model
- Describe, discuss, and apply the Cox, Ingersoll, and Ross (CIR) model

6.3 Demonstrate knowledge of arbitrage-free models of the term structure
Including:
- Describe arbitrage-free models of the term structure
- Describe, discuss and apply the Ho and Lee model

6.4 Demonstrate knowledge of the Black-Derman-Toy (BDT) model

Including:

- Interpret a binomial BDT tree
- Understand how to calibrate the level of rates based on average returns
- Understand how to calibrate the spread of rates based on volatilities
- Discuss BDT calibrations in general

6.5 Demonstrate knowledge of P-Measures and Q-Measures

Including:

- Interpret and discuss p-measures and q-measures

Chapter 7 Credit Risk Models

Keywords

credit events
credit score
default intensity
default trigger
distance to default (DD)
empirical approach to credit risk modeling
expected default frequency (EDF)
KMV model
the absolute values of Z-scores
three types of credit risk modeling approaches
Z-score model

Learning Objectives

7.1 Demonstrate knowledge of the economics of credit risk.
Including:
- Recognize the general characteristics of credit instruments typically traded by hedge funds
- List and describe types of credit events that may lead to an increase in credit risk, and define exposure at default (EAD) and loss given default (LGD)
- Define adverse selection and moral hazard, and describe how they relate to credit risk
- Discuss how probability of default (PD) and recovery rate (RR) affect credit risk, and calculate loss given default and expected loss from credit risk

7.2 Demonstrate knowledge of credit risk modeling.
Including:
- Describe the basic concepts of credit risk modeling, including the difference between sovereign and higher-levered entities, the related effects of credit risk, and credit risk modeling approaches

7.3 Demonstrate knowledge of the Merton model.
Including:
- Apply the Merton model to determine equity values and payoffs to bondholders for a given investment
- Use the Black-Scholes option pricing model in the Merton model to price a given firm's equity as a call option on the stock of the underlying company
- Use the Black-Scholes option pricing model in the Merton model to price a given firm's debt as a put option on the stock of the underlying company
- Analyze the role of credit spreads in structural models and how the credit spread can be used to calculate the price of risky debt
- Evaluate advantages and disadvantages of the Merton model
- Discuss four important properties of the Merton model

7.4 Demonstrate knowledge of the Kealhover, McQuown, and Vasicek (KMV) credit risk model.

Including:

- Describe the characteristics and application of the KMV model
- Use the KMV model to estimate the credit score (the distance to default) for a given firm
- Use the KMV model to estimate the expected default frequency for a given investment

7.5 Demonstrate knowledge of reduced-form models.

Including:

- Describe the characteristics of reduced-form models
- Discuss the role of default intensity in reduced-form models, and calculate default intensity for a given firm
- Demonstrate how default intensity can be incorporated into the valuation of risky debt
- Recognize the relationship among credit spreads, default intensities, and recovery rates, and use two of these factors as variables to solve for the third for a given investment
- Describe the two predominant reduced-form credit models

7.6 Demonstrate knowledge of empirical credit models.

Including:

- Describe empirical credit models, and recognize how they differ from structural and reduced-form models
- Describe the purpose and characteristics of the Altman Z-score model
- List and describe the five financial ratios that are used as inputs to determine Altman Z-scores
- Calculate and interpret Z-scores in Altman's credit scoring model

Chapter 7 Errata

Page 110, paragraph below Equation 7.5

Equation 7.5 indicates that bondholders will receive the face value unless the face value is **less** than the value of the assets**.**

Should say:

Equation 7.5 indicates that bondholders will receive the face value unless the face value is **greater** than the value of the assets.

Page113, Section 7.3.5

Equation 7.11: Remove "X" in "ln X"

Equation 7.12: Change "d" to "$d-\sigma A\sqrt{\tau}$"

Chapter 8 Multi-Factor Equity Pricing Models

Keywords

Adaptive Markets Hypothesis (AMH)
Bates model
conservative minus aggressive factor
factor
Fama-French model
Fama-French-Carhart model
fundamental, style, investment, or dynamic factors
Heston model
macroeconomic factors
momentum crash
multi-factor models
robust minus weak factor
statistical factors
stochastic discount factors
The Fama-French five-factor model
time-varying volatility
tradable assets

Learning Objectives

8.1 Demonstrate knowledge of multifactor asset pricing models
Including:
- Explain multifactor asset pricing
- Recognize the role of marginal investor utility in the CAPM and how it relates to asset factors
- Explain how multiple factors relates to "bad times"
- Discuss factors based on expected utility or anomalies
- Identify the three major categories of factors
- Compare theoretically versus empirically derived multifactor return models
- Identify the fundamentals of empirical models
- Discuss the tradability of factors and the intercepts

8.2 Demonstrate knowledge of the original Fama-French Model
Including:
- Describe the original Fama-French Model
- Describe the Fama-French-Carhart Model
- Calculate models with numerous factors

8.3 Demonstrate knowledge of the three challenges of empirical multifactor models
Including:
- Understand how factors can be falsely identified
- Differentiate factor correlation from factor causation
- Explain why the CAPM may not be sufficient

8.4 Demonstrate knowledge of factor investing

Including:

- Discuss the emergence of return factor analysis
- Identify how return factors are described
- Explain how risk premiums vary across return factors
- Explain how factor returns vary across market conditions
- Explain the relationship between return factors and investability
- Interpret risk allocation based on return factors
- Understand performance with allocations based on return factors

8.5 Demonstrate knowledge of the adaptive markets hypothesis (AMH)

Including:

- Describe the AMH

8.6 Demonstrate knowledge of time-varying volatility

Including:

- Explain how equity market volatility is predictable
- Explain how volatility is negatively correlated with average returns
- Discuss time-varying volatility and multiple factors
- Discuss time-varying volatility and higher moments

8.7 Demonstrate knowledge of stochastic discount factors

Including:

- Calculate traditional discount factors
- Interpret stochastic discount factors
- Understand the stochastic discount factors present value formula
- Discuss the importance of stochastic discount factors

Chapter 8 Errata

Page 144, Section 8.7.2

In the fourth and fifth line of the section **Change** "$60" to "$50" in two locations:

…flow and $14 for the $60 potential cash flow:
Bond Price = ($100 × 60%×0.833) + ($60 × 40%×0.70)

to

…flow and $14 for the $50 potential cash flow:
Bond Price = ($100 × 60%×0.833) + ($50 × 40%×0.70)

Page 145 (second paragraph under Equation 8.8):

"The stochastic discount factors for the two states, mu and xd took on the values 0.833 and 0.700, respectively."

This line should read "md" not "xd"

Chapter 9 Asset Allocation Processes and the Mean-Variance Model

Keywords

assumed investor preferences
degree of risk aversion
dominate
efficient frontier
expected utility
funding liquidity risk
hurdle rate
liquidity penalty function
market liquidity risk
modern portfolio theory (MPT)
resampling returns
risk averse
shrinkage
strategic asset allocation decision
tactical asset allocation
utility
utility function

Learning Objectives

9.1 Demonstrate knowledge of asset allocation processes and the mean-variance model

Including:

- Understand the origin of mean-variance optimization
- Discuss the tradeoff between expected returns and volatility
- Evaluate risk and return with utility
- Interpret and calculate risk aversion and interpret the shape of the utility function
- Interpret and calculate utility functions in terms of expected returns and variance
- Interpret and calculate utility functions with higher moments
- Interpret and calculate utility functions with value at risk
- Identify investor risk aversion based on the asset allocation decision
- Understand how to manage assets with risk aversion and growing liabilities

9.2 Demonstrate knowledge of how the mean-variance optimization is implemented

Including:

- Interpret and calculate mean-variance optimization
- Interpret and calculate mean-variance optimization with a risky and riskless asset
- Interpret and calculate mean-variance optimization with growing liabilities
- Interpret and calculate mean-variance optimization with various degrees of risk aversion

9.3 Demonstrate knowledge of mean-variance optimization with multiple risky assets

Including:

- Describe a riskless asset and the linearity of efficient frontier
- Describe a riskless asset with multiple risky assets
- Describe unconstrained optimization and unrealistic weights

9.4 Demonstrate knowledge of mean-variance optimization with hurdle rates

Including:

- Interpret and calculate hurdle rates

9.5 Demonstrate knowledge of issues using optimization for portfolio selection

Including:

- Interpret optimizers as error maximizers
- Discuss portfolio optimization and smoothing of illiquid returns
- Understand data issues for large-scale optimization
- Understand how mean-variance ignores higher moments
- Discuss three ways to address skewness and kurtosis

9.6 Demonstrate knowledge of adjustments of the mean-variance approach for illiquidity

Including:

- Interpret and calculate the liquidity penalty function
- Interpret and calculate adjustments for illiquidity
- Understand takeaway points on illiquidity adjustments

9.7 Demonstrate knowledge of adjustments of the mean-variance approach for factor exposure

Including:

- Interpret and calculate factor exposure for mean-variance approach

9.8 Demonstrate knowledge of how to mitigate estimation error risk in mean-variance optimization

Including:

- Discuss estimation error risk reduction through objective measures of estimation error risk
- Describe sampling to reduce the effect of estimation error
- Discuss shrinkage to reduce the effect of estimation error
- Understand the Black-Litterman approach to mean-variance optimization
- Discuss the use of constraints in mean-variance optimization

Chapter 9 Errata

Page 152, Application 9.1.5

The squared terms should be removed as shown here:

Investment A: $E[U(W)] = 0.10 - \left(\frac{0.8}{2}\right) \times (.04) = 0.084$

Investment B: $E[U(W)] = 0.13 - \left(\frac{0.8}{2}\right) \times (.09) = 0.094$

Page 158, Application 9.2.3:

In the fourth line of text inside Application 9.2.3"

Replace "L = 0.02" **with** "L=0.8 and δ=0.02"

Page 169, Section 9.8.2:

In the first sentence of the third paragraph **change** "five asset classes" **to** "eight asset classes"

Chapter 10 Other Asset Allocation Approaches

Keywords

betting against beta
bottom-up approach
core portfolio
core-satellite approach
funding liquidity risk
leverage aversion theory
minimum volatility portfolio
mixed approach
naïve asset allocation strategy
new investment model
risk bucket
risk budgeting
risk parity
satellite portfolio
top-down approach
volatility anomaly

Learning Objectives

10.1 Demonstrate knowledge of the core-satellite approach
Including:
- Interpret the core-satellite approach

10.2 Demonstrate knowledge of top-down and bottom-up asset allocation approaches
Including:
- Understand the bottom-up approach
- Understand the top-down approach
- Understand the mixed approach

10.3 Demonstrate knowledge of risk budgeting
Including:
- Identify specifications in risk budgeting
- Define risk in risk budgeting as well as risk buckets
- Understand the concept of defining an objective function to obtain a unique solution
- Understand how to include correlations and view of marginal risks
- Understand how to include expected returns with risk budgeting

10.4 Demonstrate knowledge of factor-based implementations of a risk budgeting approach
Including:
- Describe attributing the risk of a portfolio to three attributes of each asset
- Understand how to use factor-based returns and risk buckets
- Calculate the risk contribution to each risk factor

10.5 Demonstrate knowledge of risk parity

Including:

- Interpret risk parity with two risky assets
- Understand Sharpe Ratios and leverage within risk parity
- Identify the three steps in implementing the risk parity approach
- Discuss how to create a portfolio using the risk parity approach
- Understand the primary economic rationale for the risk parity approach
- Interpret the volatility anomaly and risk parity
- Discuss the criticisms of three popular rationales for risk parity

10.6 Demonstrate knowledge of other quantitative portfolio allocation strategies

Including:

- Understand the market-weighted strategy
- Interpret an equally-weighted or 1/N diversification strategy
- Describe inverse volatility-weighted portfolio strategies
- Discuss minimum volatility portfolio allocation strategies
- Understand equivalence between allocation strategies
- Describe risk allocation based on return factors
- Understand four practical issues with allocation based on return factors

10.7 Demonstrate knowledge of the new investment model

Including:

- Discuss the new investment model

Chapter 10 Errata

Page 183, paragraph in middle of page:

"Therefore 4.69% of the total risk of **8.11%** of the portfolio can be contributed to the volatility in oil prices."

Should read:

"Therefore 4.69% of the total risk of **8.21%** of the portfolio can be contributed to the volatility in oil prices."

Topic 3: Institutional Asset Owners and Investment Policies

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Three: Institutional Asset Owners and Investment Policies, Chapters 11 - 15.

Chapter 11 Types of Asset Owners and the Investment Policy Statement

Keywords

A common investment objective of endowments
A common investment objective of pension funds
constraint
external constraints
individually managed accounts
internal constraints
investment policy statement (IPS)
national pension funds
objective

Learning Objectives

11.1 Demonstrate knowledge of endowments and foundations
Including:
- Understand the different purposes endowments and foundations serve

11.2 Demonstrate knowledge of pension funds
Including:
- Identify the four types of pension funds

11.3 Demonstrate knowledge of sovereign wealth funds
Including:
- Discuss the role of SWFs in today's market

11.4 Demonstrate knowledge of family offices
Including:
- Understand how family offices operate

11.5 Demonstrate knowledge of risk and return within strategic asset allocations
Including:
- Discuss strategic asset allocations based on observation and reasoning
- Understand the reasons that alternative assets raise return estimation challenges
- Understand the reasons for placing caps and floors on asset allocations

11.6 Demonstrate knowledge of asset allocation objectives

Including:

- Explain asset owners' objectives within allocations

11.7 Demonstrate knowledge of constraints within investment policy

Including:

- Contrast internal and external constraints
- Identify the three types of internal constraints
- Identify the two types of external constraints

11.8 Demonstrate knowledge of investment policy statements (IPS) within institutional asset ownership

Including:

- Discuss the six benefits of a thoughtfully developed IPS
- Explain the introduction, scope, and purpose of an IPS
- Identify roles and responsibilities within an IPS
- Discuss investment objectives within an IPS
- Explain time horizons within an IPS
- Discuss risk tolerance within an IPS
- Discuss spending policies within an IPS
- Discuss asset allocation guidelines within an IPS
- Explain selection and retention criteria for investment managers or funds within an IPS
- Discuss strategic investment guidelines set within an IPS
- Discuss performance measurement and evaluation within an IPS
- Identify additional considerations within an IPS

Chapter 11 Errata

Page 198, Section11.2, Item #4:

In the last paragraph (#4) **change** "Individually managed accounts" in two places **to** "Individually managed retirement accounts"

Chapter 12 Foundations and the Endowment Model

Keywords

community foundations
corporate foundations
corpus
endowment model
equity option hedges
first-mover advantage
foundations
illiquidity premiums
independent foundations
inflation beta
intergenerational equity
liquidity-driven investing
market or tactical asset allocation
network effect
non-discretionary investment consultant
operating foundations
outsourced CIO (OCIO) model
rebalance
restricted gifts
return target
security selection
spending rate
total return investor

Learning Objectives

12.1 Demonstrate knowledge of foundations and endowments
Including:
- Contrast the differences between foundations and endowments

12.2 Demonstrate knowledge of spending challenges arising from inflation within intergenerational equity
Including:
- Discuss the issues facing intergenerational equity within endowments

12.3 Demonstrate knowledge of the endowment model
Including:
- Interpret asset allocation in the endowment model
- State the endowment model's case against bonds
- Understand the role of alternative investments in the endowment model

12.4 Demonstrate knowledge of the outperformance of endowments

Including:

- Identify the six attributes of the endowment model
- Discuss aggressive asset allocation within the endowment model
- Discuss effective investment manager research within the endowment model
- Understand first-mover advantage in the endowment model
- Discuss the advantage of access to a network of talented alumni within the endowment model
- Interpret the role of acceptance of liquidity risk in the endowment model
- Explain the advantage of sophisticated investment staff and board oversight within the endowment model
- Identify the outsourced CIO model

12.5 Demonstrate knowledge of the risks of the endowment model

Including:

- Understand spending rates and spending rules
- Explain the relationship between spending rates and inflation
- Interpret spending rates and liquidity issues
- Understand how spending rates relate to liquidity-driven investors
- Discuss avoiding liquidity issues from a financial crisis
- Identify leverage risk within the endowment model

12.6 Demonstrate knowledge of tactical asset allocation and liquidity rebalancing

Including:

- Understand the relationship between tactical asset allocation and liquidity rebalancing

12.7 Demonstrate knowledge of tail risk

Including:

- Discuss tail risk and its implications in endowments

Chapter 13 Pension Fund Portfolio Management

Keywords

accumulated benefit obligation (ABO)
accumulation phase
cash balance plan
cash flow matching approach
cost of living adjustment (COLA)
decumulation phase
deferred annuity
defined benefit plan
defined contribution plan
drifting asset allocation
duration matching approach
frozen pension plan
funded status
glide path
immediate annuity
inflation-protected bonds
liability-driven investing (LDI)
matching contribution
mortality tables
overlay approach
pension plans
pension surplus
portable
progressive system
projected benefit obligation (PBO)
retirement income-replacement ratio
surplus risk
target-date fund
terminated pension plan

Learning Objectives

13.1 Demonstrate knowledge of the development, motivations, and types of pension plans

Including:

- Understand how pension plans are developed
- Recognize motivations for using pension plans
- Identify the three basic types of pension plans

13.2 Demonstrate knowledge of risk tolerance and asset allocation in pension plans

Including:

- Describe three approaches to managing assets in defined benefit plans
- Identify four factors that drive the impact of liabilities on a plan's risk
- Identify five major factors that affect the risk tolerance of a plan's sponsor
- Understand the two buckets used to strategically allocate assets in a pension plan

13.3 Demonstrate knowledge of defined benefit plans

Including:

- Understand how job mobility and pension plan portability relate
- Define accumulated benefit obligation and projected benefit obligation as liabilities within pension plans
- Describe surplus risk and calculate funded status as they relate to pension plans
- Recognize why defined benefit plans are withering
- Understand asset allocation as it relates to liability-driven investing within pension plans
- Discuss liability-driven pension plan investing

13.4 Demonstrate knowledge of governmental social security plans

Including:

- Identify the background and purpose of governmental social security plans

13.5 Demonstrate knowledge of the differences between defined benefit and contribution plans

Including:

- Understand the basics of defined contribution plans
- Identify plan differences in portability, longevity risk, and investment options
- Explain asset allocation in defined contribution plans
- Understand the role of target-date funds and alternative investments within pension plans

13.6 Demonstrate knowledge of the role of annuities for retirement income

Including:

- Recognize the financial phases that are relative to retirement
- Identify three important risks to retirees
- Estimate exposure to longevity risk within annuities and calculate the expected economic life of a fund
- Identify two major types of annuities
- Calculate the value of a growth annuity

Chapter 13 Errata

Page 251, Section 13.3:

In the 9th line of Section 13.3 change "15%" to "1.5%"

Page 263, Equation 13.3:

Change 1 in numerator of first fraction **to** "-1" (as correctly shown in Application 13.6.3

Chapter 14 Sovereign Wealth Funds

Keywords

balance of payments
capital account surplus
conservative investment opportunity cost
current account deficit
depletion
development funds
Dutch disease
Linaburg-Maduell Transparency Index
Norway model
pension reserve funds
reserve account
reserve adequacy
reserve investment funds
savings funds
stabilization fund
sterilization

Learning Objectives

14.1 Demonstrate knowledge of the sources of sovereign wealth.
Including:
- Describe the reserve account of a central bank, calculate a given country's account surplus or deficit, and discuss the causes of account surpluses and deficits
- Describe the effects of changes in the reserve account, and list five drivers of currency exchange rates
- Discuss the effects of commodity exports on a nation's reserve account

14.2 Demonstrate knowledge of four types of SWFs.
Including:
- Describe the characteristics of stabilization funds
- Describe the characteristics of reserve funds and savings funds
- Describe the characteristics of development funds

14.3 Demonstrate knowledge of the establishment and management of SWFs.
Including:
- List four common motivations that may lead to the establishment of a SWF
- Discuss the investment management of various types of SWFs
- Describe Dutch disease, and discuss various types of sterilization policies
- Discuss managing the size of a SWF

14.4 Demonstrate knowledge of the governance and political risks of SWFs.
Including:
- Discuss factors that affect the governance of SWFs
- List the ten principles of the Linaburg-Maduell Transparency Index
- Summarize the Santiago Principles

14.5 Demonstrate knowledge of the economics of the management of three SWFs.
Including:
- Analyze the governance and management of the Norwegian Government Pension Fund Global
- Analyze the governance and management of China Investment Corporation (CIC)
- Analyze the governance and management of Temasek Holdings (Singapore)

Chapter 15 Family Offices and the Family Office Model

Keywords

balancing portfolios
beneficiaries
charity
completion portfolio
concentrated wealth
concierge services
dynastic wealth
estate taxes
family estate planning
finance first
free ports
impact alpha
impact first
impact investing
inheritance
lifestyle assets or passion assets
liquidity event
long-term capital gains
negative screening
new money
old money
philanthropy
positive screening
short-term capital gains
succession planning
tax efficiency
ultra-high net worth

Learning Objectives

15.1 Demonstrate knowledge of how to identify family offices
Including:
- Recognize what qualifies as a family office

15.2 Demonstrate knowledge of the goals, benefits, and business models of family offices.
Including:
- Recognize various general goals of family offices
- Describe the benefits provided by a family office, as compared to a private bank or traditional asset manager
- Discuss the characteristics of the various models and structures of family offices

15.3 Demonstrate knowledge of generational family office goals
Including:
- Describe the goals of first-generation wealth
- Understand the risk management practices of first-generation wealth
- Identify the process of benchmarking first-generation wealth
- Describe the goals of the second generation and generations beyond

15.4 Demonstrate knowledge of the macroeconomic exposures of family offices.
Including:
- Discuss how macroeconomic factors affect family office investment decisions

15.5 Demonstrate knowledge of the constraint of income taxes for family offices.
Including:
- Discuss how the importance of tax efficiency affects how family office investments are structured
- Describe the taxability of short-term and long-term capital gains in the United
- States, describe how Section 1256 contracts can benefit investors, and calculate after-tax profits for a given portfolio
- Discuss how family offices can increase tax efficiency with hedge funds

15.6 Demonstrate knowledge of the lifestyle assets of family offices.
Including:
- Discuss the treatment of art as a lifestyle asset in the management of family wealth
- Discuss storage costs and other costs of lifestyle assets, and describe the function of free ports
- Recognize the consideration and use of lifestyle assets as constraints in the asset allocation process when constructing a family office investment portfolio
- List concierge services offered through family offices

15.7 Demonstrate knowledge of family office governance
Including:
- Identify structures of governance within family offices
- Recognize the challenges of family wealth sustainability
- Identify strategies to maintain family wealth
- Understand the process of family office inheritance and strategies of succession

15.8 Demonstrate knowledge of charity, philanthropy, and impact investing.
Including:
- Describe and distinguish the primary characteristics of charity and philanthropy
- Describe the characteristics and goals of impact investing

15.9 Demonstrate knowledge of the ten competitive advantages of family offices.
Including:
- List and describe ten natural advantages family offices have that help them manage their overall portfolios

Topic 4: Risk and Risk Management

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Four: Risk and Risk Management, Chapters 16 - 20.

Chapter 16 Cases in Tail Risk

Keywords

affinity fraud
behavioral biases
behavioral finance
circuit breaker
crowded trade
fraud
painting the tape
Ponzi scheme
return on assets (ROA)
return on equity (ROE)
spoofing
unwind hypothesis
window dressing

Learning Objectives

16.1 Demonstrate knowledge of risks driven by market losses

Including:

- Identify the reasons why Amaranth Advisors, LLC collapsed
- Understand the processes that lead to the collapse of Long-Term Capital Management
- Identify the reasons why Carlyle Capital Corporation collapsed
- Understand the relationship between declining investment opportunities and leverage
- Describe the link between behavioral biases and risk taking
- Understand the concept of volatility of volatility derivatives

16.2 Demonstrate knowledge of the impact of trading technologies in financial crises.

Including:

- Discuss how the unwind hypothesis and crowded trades explain the Quant Meltdown of August 2007.
- Discuss how a circuit breaker can help prevent a flash crash.
- Discuss how technical issues at one large market participant can impact the financial markets.

16.3 Demonstrate knowledge of cases of failures that occurred due to fraud

Including:

- Understand the reasons for the failures of Bayou Management
- Understand the reasons for the failure of Bernie Madoff
- Understand the reasons for the failure of Lancer Group
- Understand the reasons for the failure of the venture capital startup Theranos

16.4 Demonstrate knowledge of four major lessons from analysis of fund failures.

Including:

- Discuss the lessons that emerge from the analysis of various types of hedge fund failures.

Chapter 17 Benchmarking and Performance Attribution

Keywords

Bailey criteria
cap rate spread
excess return index
first-generation commodity indices
fund style index
futures curve positioning
listed PE index
LN PME method
optimal benchmark
peer-group cohort
public market equivalent (PME) method
quantity-based index
second-generation commodity indices
third-generation commodity indices
total return index
value-based index

Learning Objectives

17.1 Demonstrate knowledge of basics in benchmarking and performance attribution
Including:
- Recognize the role of active return in benchmarking
- Interpret and apply the Bailey criteria for a useful benchmark
- Understand how to select a benchmark for alternatives
- Explain the process of benchmarking liquid alternative investments

17.2 Demonstrate knowledge of single factor benchmarking and performance attribution
Including:
- Describe examples of single-factor benchmarking
- Recognize considerations to be used in benchmarking
- Interpret and apply single-factor market model performance in benchmarking
- Examine time-series returns with a single-factor market-based regression model
- Understand how to apply single-factor benchmarking

17.3 Demonstrate knowledge of multifactor benchmarking
Including:
- Understand multifactor benchmarking
- Understand bias from omitted factors in benchmarking
- Contrast single and multi-factor methods

17.4 Demonstrate knowledge of distinctions in alternative asset benchmarking

Including:

- Recognize why the CAPM is unable to be applied to alternative investments
- Explain multiperiod issues in the CAPM
- Understand non-normality issues in the CAPM
- Discuss the illiquidity of returns and other issues with diversification in the CAPM
- Identify investor specific assets and liabilities in the CAPM
- Understand why multiple factor models may be preferable in alternative investments

17.5 Demonstrate knowledge of how to benchmark commodities

Including:

- Contrast the weighting of all positions on value versus quality
- Recognize three schemes used to weight commodities sectors and components
- Contrast total return with excess return
- Explain the roll method on returns of commodity indexes
- Interpret three generations of commodity indices

17.6 Demonstrate knowledge of approaches to benchmarking managed futures funds

Including:

- Recognize how to benchmark with long-only futures contracts
- Understand how to benchmark CTAs with peer groups
- Understand how to benchmark CTAs with algorithmic indices
- Interpret conclusions drawn from evidence on CTA benchmarking

17.7 Demonstrate knowledge of how to benchmark private equity funds

Including:

- Describe listed asset-based benchmarks
- Understand public market equivalents (PME) and calculate a PE fund's IRR using PMEs
- Understand the key computations in the PME method
- Recognize extensions to the PME Method and other metrics

17.8 Demonstrate knowledge of group peer returns as benchmarks

Including:

- Understand the peer group method of benchmarking PE fund performance

17.9 Demonstrate knowledge of benchmarking real estate

Including:

- Understand how to benchmark core real estate with cap rates
- Interpret and apply the risk premium formula to benchmark core real estate
- Recognize the approaches to benchmarking non-core real estate
- Describe examples of benchmark return estimates for noncore style assets

Chapter 17 Errata

Page 359, Application 17.9.2

"Using Equation 17.5…

should be:

"Using Equation 17.3…..

Chapter 18 Liquidity and Funding Risks

Keywords

capital at risk (CaR)
cross-margin benefit
decay function
funding level
margin-to-equity
notional funding
omega ratio
scenario analysis
stop limit order
stop loss order limit order
stop losses
stress test
trading level
unsmoothing
value at risk (VaR)
variation margin

Learning Objectives

18.1 Demonstrate knowledge of margin accounts and collateral management
Including:
- Recognize three specialized value terms for futures account levels and calculate trading level
- Understand the role of collateral and margin within futures portfolios
- Understand how margin applies across multiple clearing houses
- Measure capital at risk for managed futures

18.2 Demonstrate knowledge of value at risk for managed futures
Including:
- Understand how to calculate value at risk (VaR) for a portfolio
- Describe VaR using a parametric approach
- Describe parametric VaR using a variance based on unequal return weighing
- Calculate confidence intervals with parametric VaR

18.3 Demonstrate knowledge of other methods of estimating liquidity needs
Including:
- Understand how a simulation analysis can be used to determine managed futures losses
- Describe the omega ratio and calculate this ratio using investment returns
- Interpret the omega ratio

18.4 Demonstrate knowledge of smoothed returns in illiquid funds

Including:

- Understand the concept of smoothing asset returns and unsmoothing
- Interpret price smoothing and arbitrage in a perfect market
- Explain persistence in price smoothing
- Identify problems that arise as a result of price smoothing

18.5 Demonstrate knowledge of model price and return smoothing

Including:

- Calculate reported prices as lags of true prices
- Understand how to model true returns from smoothed returns
- Identify four reasons for smoothed prices and delayed price changes in an index

18.6 Demonstrate knowledge of how to unsmooth a hypothetical return series

Including:

- Understand and apply how to unsmooth returns using first-order autocorrelation
- Identify the three steps of unsmoothing
- Calculate unsmoothed returns using the aforementioned three steps

18.7 Demonstrate knowledge of how to unsmooth real estate return data

Including:

- Compare smoothed data with market data
- Estimate the first-order autocorrelation coefficient of real estate returns
- Understand how to unsmooth a real estate return series
- Understand the relationship between the variances of true and reported returns and calculate true volatility from smoothed volatility
- Describe the relationship between the betas of true and reported returns and calculate the beta of a true return series
- Interpret the results of unsmoothing a real estate return series

Chapter 18 Errata

Page 373, Exhibit 18.4:

In Row "Mean" **change** 20% **to** 2.5%

Chapter 19 Hedging, Rebalancing, and Monitoring

Keywords

diversification return
rebalancing yield
slack variable

Learning Objectives

19.1 Demonstrate knowledge of managing alpha and systematic risk
Including:
- Understand the separating of alpha and beta
- Understand how to hedge systematic risk and calculate the positions necessary to hedge
- Understand and apply the porting of alpha

19.2 Demonstrate knowledge of managing the risk of a portfolio with options
Including:
- Calculate put-call parity as a foundation for risk analysis
- Understand option sensitivities
- Calculate the delta of both call options and put options
- Understand how to view options as volatility bets

19.3 Demonstrate knowledge of delta hedging of option positions
Including:
- Describe the construction of a binomial stock and call option tree in a risk-neutral world
- Describe arbitrage on a properly priced call option and the calculation of a delta neutral position
- Understand how to perform arbitrage on a mispriced call option and the calculation of a delta neutral position
- Perform delta hedging with geometric motion

19.4 Demonstrate knowledge of key observations on delta-hedging
Including:
- Identify the three key observations of delta-hedging

19.5 Demonstrate knowledge of key observations on rebalancing delta-neutral option portfolios
Including:
- Describe three observations on rebalancing delta-neutral option portfolios

19.6 Demonstrate knowledge of rebalancing portfolios with directional exposures

Including:

- Explain rebalancing from the perspective of the expected value of a portfolio
- Understand how to rebalance when assets follow a random walk
- Calculate portfolio rebalancing when individual assets trend
- Calculate portfolio rebalancing when individual asset prices mean-revert
- Interpret the empirical evidence on the effect of rebalancing
- Calculate the effects of rebalancing when prices do not mean-revert

19.7 Demonstrate knowledge of mean reversion and diversification return

Including:

- Identify the benefits of mean reversion in commodity investing
- Understand the benefits of mean reversion through portfolio rebalancing
- Identify how volatility reduction enhances geometric mean returns but not expected values
- Summarize the process of rebalancing

19.8 Demonstrate knowledge of investment monitoring

Including:

- Compare portfolio monitoring and individual asset monitoring
- Identify six activities of monitoring private partnerships
- Recognize the objectives of monitoring
- Identify forms of active involvement in the fund's governance process
- Identify forms of active involvement outside the fund's governance process
- Recognize three ways to create value through monitoring
- Understand limits to the detail and extent of information available from monitoring

Chapter 20 Risk Measurement, Risk Management, and Risk Systems

Keywords

exception report
pricing matrix
risk management
risk manager
risk measurement
watch list

Learning Objectives

20.1 Demonstrate knowledge of risk measurement and aggregation
Including:
- Understand what is contained in the investment policy statement
- Recognize the five components of risk measurement
- Understand risk measurement at the investment or position level
- Understand how the frequency of data collection affects risk measurement
- Recognize the relationship between risk aggregation and systems development
- Identify dimensions of risk within risk measurement
- Interpret examples of dimensions of risk reporting for an alternative investment

20.2 Demonstrate knowledge of information categories to consider
Including:
- Interpret quantitative information categories and their associated statistics
- Interpret due diligence tracking matrices
- Recognize qualitative information categories

20.3 Demonstrate knowledge of risk measurement with daily data collection
Including:
- Recognize the role of daily data collection within risk measurement

20.4 Demonstrate knowledge of risk measurement with weekly data collection
Including:
- Recognize the role of weekly data collection within risk measurement

20.5 Demonstrate knowledge of risk measurement with monthly data collection
Including:
- Recognize the role of monthly data collection within risk measurement

20.6 Demonstrate knowledge of risk measurement with quarterly data collection
Including:
- Recognize the role of quarterly data collection within risk measurement

20.7 Demonstrate knowledge of risk measurement with annual data collection or rolling time periods

Including:

- Recognize the role of annual data collection within risk measurement

20.8 Demonstrate knowledge of cybersecurity issues for fund managers

Including:

- Recognize the vulnerabilities to cybersecurity issues within investment organizations
- Understand how to be prepared regarding cybersecurity
- Interpret evidence of regularity of cybersecurity functions
- Interpret evidence of improved policies within certain areas
- Interpret evidence of robust policies and procedures to emulate
- Understand how EU regulations affect cybersecurity
- Understand how Asian regulations affect cybersecurity

20.9 Demonstrate knowledge of risk management structures and their processes

Including:

- Recognize three models of risk management structure
- Understand the investment process as primarily a risk process
- Understand the evolution of risk reporting

Topic 5: Methods for Alternative Investment

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Five: Methods for Alternative Investment, Chapters 21 - 25.

Chapter 21 Valuation and Hedging Using Binomial Trees

Keywords

backward induction
visualization

Learning Objectives

21.1 Demonstrate knowledge of one-period binomial trees and risk-neutral modelling
Including:
- Create a one-period binomial model of default risk with risk neutrality
- Understand the modeling of a default risk premium
- Utilize p-measures and q-measures in risk-neutral modelling
- Identify four key components of risk-neutral modelling

21.2 Demonstrate knowledge of multi-period binomial trees, values, and mean rates
Including:
- Construct a one-period trinomial tree model based on prices
- Construct a two-period binomial tree model with compounded returns
- Identify three fallacies generate by averaging compounded rates of return

21.3 Demonstrate knowledge of valuation of convertible securities with a binomial tree model
Including:
- Understand the formation of a binomial tree of stock prices
- Apply a binomial tree of prices to determine the value of options on equity
- Create a tree of prices for a convertible bond's underlying stock
- Interpret a tree of prices for the convertible bond's underlying stock
- Understand how to value a convertible bond one period prior to its maturity
- Determine, through backward induction, the current value of a convertible bond

21.4 Demonstrate knowledge of valuing callable bonds with a tree model

Including:

- Describe a two-period binomial interest rate tree
- Understand how to model the spread between upward and downward shifting rates
- Calculate the price of a straight bond using a two-period binomial tree
- Calculate the price of a callable bond using a two-period binomial tree

21.5 Demonstrate knowledge of tree models, visualization, and two benefits to spreadsheets

Including:

- Understand the advantages to using computer programming to model

Chapter 22 Directional Strategies and Methods

Keywords

anchoring
bottom-up fundamental analysis
cognitive psychology
confirmation bias
crisis alpha
cross-sectional momentum
directional strategies
divergence
dividend premium
DuPont model
efficiently inefficient markets
enterprise value
feedback-based global macro managers
free cash flow to the firm (FCFF)
fundamental risk
genetic algorithms
growth approach
information-based global macro managers
loss aversion/disposition effect
market divergence index (MDI)
market frictions
mean-reversion
model-based global macro managers
momentum strategy
neural network
noise traders
point and figure chart
prospect theory
sentiment
signal-to-noise ratio
six sentiment indicators
technical directional strategies
time-series momentum
top-down fundamental analysis
two paradoxes of informational market efficiency
value long/short managers

Learning Objectives

22.1 Demonstrate knowledge of efficiently inefficient markets
Including:
- Define an efficient inefficient market and identify how and why it exists

22.2 Demonstrate knowledge of technical directional strategies
Including:
- Identify the metrics of technical analysis
- Define the various trendsetting or momentum models
- Understand market divergence
- Interpret the signal to noise ratio
- Define market divergence and calculate the signal to noise ratio
- Understand and calculate the market divergence index
- Identify technical strategies based on machine learning
- Interpret the risks of directional technical strategies

22.3 Demonstrate knowledge of fundamental directional strategies

Including:

- Define fundamental directional strategies
- Understand the bottom-up approach of fundamental analysis
- Describe fundamental bottom-up equity in valuation models and calculate free cash flow to the firm
- Identify four procedures within the fundamental investment process
- Identify four mechanics of fundamental strategies
- Understand the top-down approach of fundamental analysis
- Describe schools of thought within top-down fundamental analysis
- Recognize risks of directional fundamental strategies

22.4 Demonstrate knowledge of directional strategies and behavioral finance

Including:

- Define sentiment and sentiment sensitivity
- Describe overconfidence and its role in finance
- Recognize behavioral biases from over-reliance on the past
- Identify other potential sources of pricing anomalies

22.5 Demonstrate knowledge of factors in directional trading

Including:

- Understand investment style classifications such as value and growth
- Define directional trading based on momentum
- Discuss emphasis on illiquidity premiums

Chapter 23 Multivariate Empirical Methods and Performance Persistence

Keywords

conditional correlation
eigenvalue
factor analysis (FA)
factor loadings
joint hypothesis
look-back option
multicollinearity
multiple regression model
nonlinear exposure
nth order partial autocorrelation coefficient
overfitted models
Principal Component Analysis (PCA)
rolling window analysis
specialized market factors
stepwise regression
style analysis
three dynamic risk exposure models
two primary adverse effect of multicollinearity

Learning Objectives

23.1 Demonstrate knowledge of statistical factors in principal component analysis
Including:
- Define principal component analysis and its factors
- Understand the basics of principal component analysis
- Identify two primary outputs of principal component analysis
- Interpret examples of applying and interpreting principal component analysis
- Contrast principal component analysis and factor analysis

23.2 Demonstrate knowledge of multifactor models and regression
Including:
- Interpret the multifactor regression model such as the Fama French model
- Define multicollinearity
- Explain the selection of the number of factors and overfitting of a regression model

23.3 Demonstrate knowledge of partial autocorrelations and regression
Including:
- Understand return autocorrelation and partial autocorrelation
- Estimate partial autocorrelation
- Interpret partial autocorrelations of a return series based on appraisals

23.4 Demonstrate knowledge of dynamic risk exposure models

Including:

- Understand positions with nonlinear exposures
- Understand the dummy variable approach to dynamic risk exposures
- Define the separate regression approach to dynamic risk exposures
- Describe the use of a quadratic model to explain market timing performance

23.5 Demonstrate knowledge of approaches to modeling changing correlation

Including:

- Define the conditional correlation modeling approach
- Discuss examples of conditional correlations
- Interpret variations on conditional empirical analyses
- Describe and apply the rolling window modeling approach

23.6 Demonstrate knowledge of multifactor approaches to understanding returns

Including:

- Understand style analysis and fund groupings based on asset classes
- Identify funds based on strategies
- Describe funds based on market-wide factors
- Understand funds based on specialized market factors

23.7 Demonstrate knowledge of evidence on fund performance persistence

Including:

- Understand performance persistence based on return correlations
- Understand performance persistence based on risk-adjusted returns
- Understand performance persistence based on portfolio returns

Chapter 23 Errata

Page 490, Section 23.5.2:

At end of last line immediately above Exhibit 23.5.2 **change** "-3.8%" to "-3.7%"

Chapter 24 Relative Value Models

Keywords

arbitrage
bear calendar spread
beta neutral
bull calendar spread
calendar spread
carry trade
co-integrated stock prices
co-integration approach
commodity spreads
correlation trade
covered interest rate parity
crack spread
crush spreads
limits to arbitrage
location spreads
monetary neutral
noise traders' risk
pairs trading
processing spreads
pure arbitrage
quality spreads
relative value strategy
risk arbitrage
sector neutral
short-sale risk
stationary
statistical pairs trading
storage strategies
substitution spreads
synchronization risk
synthetic weather derivative
three dimensions of commodity relative value strategies
transportation strategies
two types of commodity substitutes

Learning Objectives

24.1 Demonstrate knowledge of relative value methods
Including:
- Understand the importance of market inefficiencies with respect to relative value strategies
- Contrast pure arbitrage with risk arbitrage
- Identify the limits to arbitrage
- Interpret examples of nearly pure arbitrage
- Discuss examples illustrating risk arbitrage opportunities

24.2 Demonstrate knowledge of steps within pairs trading
Including:
- Identify the steps of pairs trading and types of pairs trading

24.3 Demonstrate knowledge of statistical pairs trading of equities

Including:

- Calculate statistical pairing with the co-integration approach
- Define and understand the timing of trade entry opportunities
- Define the nature and performance of pairs trading strategies

24.4 Demonstrate knowledge of pairs trading in commodity markets based on spreads

Including:

- Identify different commodity derivatives calendar spreads
- Estimate the profitability of calendar spread trading
- Understand processing spreads
- Understand the two conditions that that hold for producers that are hedgers
- Calculate and interpret substitution spreads
- Describe quality spreads and location spreads
- Interpret intramarket relative value strategies

24.5 Demonstrate knowledge of pairs trading in rates from fixed income and currency markets

Including:

- Understand and apply the concept of a carry trade such as covered interest rate parity

24.6 Demonstrate knowledge of relative value market-neutral strategies and portfolio risks

Including:

- Identify different risks of pairs trading strategies
- Describe equity market-neutral strategies
- Describe risks related to equity market neutrality

Chapter 24 Errata

Page 513 (Equation above last paragraph)

^{r}DCU = 13.3%
Should be:
^{r}FCU = 13.3%

Chapter 25 Valuation Methods for Private Assets: The Case of Real Estate

Keywords

accelerated depreciation
appraisal error
appraisal-based indices
cost approach
depreciation tax shield
discount rate for the depreciation tax shield
effective tax rate
first principle of depreciation and returns
fourth principle of depreciation and returns
hedonic pricing method (HPM)
income approach
main problems of transaction-based indices
purely random error or noise
recaptured depreciation
repeat-sales method (RSM)
reservation price
sales comparison approach
second principle of depreciation and returns
stated rate of income tax
temporal lag bias
third principle of depreciation and returns
transaction price error
transaction price noise
transaction-based real estate indices

Learning Objectives

25.1 Demonstrate knowledge of depreciation tax shields

Including:

- Understand the depreciation tax advantage and how to calculate the present value of depreciation tax shields
- Define recaptured depreciation
- Describe depreciation as generating an interest free loan

25.2 Demonstrate knowledge of deferral of taxation of gains

Including:

- Calculate after-tax return without tax deferral
- Calculate after-tax returns with the tax deferral of gains
- Understand the income tax benefits of leverage real estate

25.3 Demonstrate knowledge of how to compare after-tax returns for various taxation scenarios

Including:

- Interpret real estate without taxation
- Interpret after-tax returns when depreciation is not allowed
- Calculate returns when accounting depreciation equals economic depreciation
- Calculate returns when accounting depreciation is accelerated
- Calculate returns when capital expenditures can be immediately and fully expensed
- Understand the relationship between an investor's tax bracket and tax advantaged investments

25.4 Demonstrate knowledge of repeat-sales in transaction-based indices

Including:

- Define, calculate, and interpret the repeat-sales method
- Identify advantages of the repeat-sales method
- Identify disadvantages of the repeat-sales method

25.5 Demonstrate knowledge of hedonic transaction-based indices

Including:

- Define and interpret the hedonic pricing method
- Identify steps in calculating a hedonic price index
- Interpret and calculate the hedonic pricing approach
- Identify primary advantages of the hedonic pricing model
- Identify primary disadvantages of the hedonic pricing model

25.6 Demonstrate knowledge of the role of sample bias in repeat-sales and hedonic price methods

Including:

- Identify the differences in various indices and biases

25.7 Demonstrate knowledge of appraisal-based indices

Including:

- Recognize various approaches to appraisals
- Identify advantages of appraisal-based models
- Identify disadvantages of appraisal-based models

25.8 Demonstrate knowledge of noisy pricing

Including:

- Understand random pricing errors and reservation prices
- Define appraisal errors
- Understand the square root of N rule

Topic 6: Accessing Alternative Investments

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Six: Accessing Alternative Investments, Chapters 26 - 30.

Chapter 26 Hedge Fund Replication

Keywords

algorithmic approach
algorithmic factor replication approach
alternative betas
capacity constraint hypothesis
exposure inertia
fund bubble hypothesis
hedge fund replication products
increased allocation to active funds hypothesis
payoff-distribution approach
underlying assumption of the factor-based replication approach
Approach commonality

Learning Objectives

26.1 Demonstrate knowledge of replication products
Including:
- Understand basics of hedge fund replication products

26.2 Demonstrate knowledge of the potential benefits of replication products.
Including:
- Discuss the potential benefits to investors of using replication products

26.3 Demonstrate knowledge of the case for using hedge fund replication.
Including:
- Estimate the risk and return of a given fund of hedge funds
- Describe three theories for the increased beta and decreased alpha in hedge fund returns
- Analyze the level of alpha that is generated by the aggregate of hedge fund managers, and compare this with the alpha available to investors who select individual managers
- Discuss how replication products can serve as a source of alpha or alternative beta

26.4 Demonstrate knowledge of the benefits of replication products

Including:

- Identify two reasons to use replication products
- Recognize issues regarding the benefits of fund replication
- Understand potential unique benefits from hedge fund replication

26.5 Demonstrate knowledge factor-based approaches to replication

Including:

- Identify primary issues in constructing a factor-based replication product
- Recognize the steps involved in factor-based replication
- Identify concepts regarding factor-based replication
- Understand current research on factor-based replication
- Describe the payoff-distribution approach to factor replication

26.6 Demonstrate knowledge of the algorithmic (bottom-up) approach

Including:

- Understand the basics of the algorithmic (or bottom up) approach

26.7 Demonstrate knowledge of how to interpret models of the algorithmic approach

Including:

- Describe the algorithmic approach to merger arbitrage factor replication
- Describe the algorithmic approach to convertible arbitrage factor replication
- Describe the algorithmic approach to momentum factor replication

Chapter 26 Errata

Page 543, Section 26.1:

The bolded term in the bottom paragraph should be changed from:

algorithmic factor replication approach
to:
algorithmic replication approach

Chapter 27 Diversified Access to Hedge Funds

Keywords

Bifurcated Fund Analysis Model
concentrated funds of hedge funds
diversified funds of hedge funds
single-strategy funds of hedge funds
tactical funds of hedge funds

Learning Objectives

27.1 Demonstrate knowledge of evidence regarding hedge fund risk and returns
Including:
- Interpret evidence regarding performance of hedge funds by strategies
- Interpret evidence regarding the systematic and total risk of hedge funds
- Interpret evidence regarding correlations and diversification of hedge funds

27.2 Demonstrate knowledge of the approaches used by investors to gain hedge fund exposure.
Including:
- Discuss the advantages and disadvantages of the direct approach to obtaining hedge fund exposure in portfolios
- Describe the five services provided as part of the delegated approach to obtaining hedge fund exposure in portfolios
- Describe the index approach to obtaining hedge fund exposure in portfolios

27.3 Demonstrate knowledge of the characteristics of funds of hedge funds
Including:
- Understand the approach to manager selection of funds of hedge funds
- Identify ways that funds of hedge funds can be grouped or categorized
- Understand how typical hedge fund biases can be reduced when applied to funds of hedge funds
- Recognize key issues comparing funds of hedge funds to multistrategy funds

27.4 Demonstrate knowledge of approaches to fund of hedge funds portfolio construction.

Including:

- Describe the assets under management (AUM)-weighted approach to constructing a fund of hedge funds portfolio
- Describe the equally weighted approach to constructing a fund of hedge funds portfolio
- Describe the equally risk-weighted approach to constructing a fund of hedge funds portfolio
- Describe the mean-variance optimization approaches (unconstrained and constrained) to constructing a fund of hedge funds portfolio
- Describe the mean-variance with constraints on higher moments approach to constructing a fund of hedge funds portfolio
- Describe the personal allocation biases approach to constructing a fund of hedge funds portfolio

27.5 Demonstrate knowledge of how funds of hedge funds add value for investors.

Including:

- Discuss three approaches used by funds of hedge funds managers to add value for their investors (i.e., through strategic allocation, through tactical allocation, and through fund selection)
- Analyze evidence regarding value added using these approaches by fund of hedge fund managers

27.6 Demonstrate knowledge of hedge fund indices.

Including:

- Recognize factors contributing to the development of hedge fund indices, and arguments presented against hedge fund index investing
- Describe the desirable characteristics of investment indices, and the challenges of creating representative, investable hedge funds indices
- Discuss noninvestable hedge fund indices, including five issues that complicate tracking of broad-based noninvestable hedge fund indices
- Discuss investable hedge fund indices

27.7 Demonstrate knowledge of alternative mutual funds.

Including:

- Describe the three potential benefits of offering alternative mutual funds
- Describe the three benefits of alternative mutual funds to investors
- Describe the three risks of alternative mutual funds
- Describe the three advantages of exchange-traded alternative funds

Chapter 28 Access to Real Estate and Commodities

Keywords

authorized PUTs (APUTs)
cash-and-call strategy or participation note
closed-end real estate funds
closed-end real estate mutual funds (CEMFs)
commodity exchange-traded note
commodity index swap
commodity index-linked note
constant proportion portfolio insurance (CPPI)
indirect commodity investments
leveraged note
life cycle of a non-traded REIT
matched-bargain system
non-traded REITs
open-end real estate funds
prepaid forward contracts
principal-guaranteed commodity notes
property authorized investment funds (PAIFs)
property unit trusts (PUTs)
real estate funds of funds
real estate operating company (REOC)
return to commodity beta
tax-transparent investment vehicle
three main criticisms of non-listed REITs
unauthorized PUTs

Learning Objectives

28.1 Demonstrate knowledge of unlisted real estate funds

Including:

- Understand the role and purpose of open-end real estate funds
- Understand the role and purpose of closed-end real estate funds
- Describe real estate funds of funds
- Recognize the role of non-traded REITs
- Understand the potential advantages of unlisted real estate funds

28.2 Demonstrate knowledge of listed real estate funds

Including:

- Contrast REITS with REOCs
- Interpret exchange-traded funds based on real estate indices
- Identify potential advantages of listed real estate funds
- Identify potential disadvantages of listed real estate funds
- Understand the role and accessibility of global REITs

28.3 Demonstrate knowledge of commodities

Including:

- Describe the concept and process of direct physical ownership of commodities
- Describe the concept and process of indirect ownership of commodities
- Interpret commodity index swaps
- Understand and interpret public commodity-based equities
- Describe the ownership of commodities through bonds
- Understand how commodity-based mutual funds and exchange-traded products allow for exposure
- Describe public and private commodity partnerships
- Understand how commodity-linked investments operate
- Understand how commodity-based hedge funds operate

28.4 Demonstrate knowledge of commodity trade financing and production financing

Including:

- Recognize the process of financing commodity trades and production

28.5 Demonstrate knowledge of leveraged and option-based structured commodity exposures

Including:

- Recognize exposures that leveraged and inverse commodity index-based products create
- Recognize exposures of leveraged notes
- Recognize the role of principal-guaranteed notes

28.6 Demonstrate knowledge of key concepts in managing commodity exposure

Including:

- Understand roll return in the context of commodity exposure
- Describe potential cycles of commodity prices and returns
- Describe the relationship between commodity prices and key economic variables

Chapter 29 Access Through Private Structures

Keywords

advantages of secondary market PE purchases
annex fund
blind pool equity fund
bridging
co-investment
commitment risk
denominator effect
excuse rights
exit value
funding risk
lock-step provision
market clientele
most favored nation status
optimal overcommitment ratio
overcommitment
overcommitment strategy
promote
secondary private equity market transactions
synthetic secondaries
three alternative co-investing structures
three ILPA guiding principles
top-up fund
use of name clauses

Learning Objectives

29.1 Demonstrate knowledge of issues in private and listed investment access
Including:
- Define financial market segmentation
- Identify potential advantages of listed assets
- Identify potential advantages of privately organized assets
- Understand the relative amount of fees charged on investments
- Describe the role that governance plays in the creation of wealth through private equity

29.2 Demonstrate knowledge of unlisted manager-investor relationships
Including:
- Understand guiding principles with respect to fund economics
- Understand guiding principles with respect to fund term and structure
- Understand guiding principles with respect to roles of key people
- Understand guiding principles with respect to fund governance
- Understand guiding principles with respect to financial disclosures
- Understand guiding principles with respect to notification and policy disclosures

29.3 Demonstrate knowledge of side letters to limited partnership agreements

Including:

- Recognize the various issues involving side letters

29.4 Demonstrate knowledge of co-investments

Including:

- Define and understand the basics of co-investing
- Identify the investment processes for co-investing
- Interpret evidence on the performance of co-investing
- Identify advantages of co-investing
- Identify expected disadvantages of co-investing

29.5 Demonstrate knowledge of cash commitments and illiquidity

Including:

- Understand the costs of excess illiquidity
- Identify the costs of illiquidity
- Define overcommitment strategies
- Recognize challenges of identifying illiquidity and managing cash flows
- Identify benefits of private equity cash flow models
- Utilize the overcommitment ratio
- Identify the optimal overcommitment ratio
- Interpret commitments, the global financial crisis, and liquidity

29.6 Demonstrate knowledge of secondary markets for PE partnerships

Including:

- Describe the development of the secondary PE market
- Interpret the size of the secondary market
- Identify PE buyer motivations
- Identify PE seller motivations
- Recognize the secondary market PE investment process
- Interpret and calculate the valuation of secondary PE stakes
- Recognize limitations of the PE secondary market

Chapter 30 The Risk and Performance of Private and Listed Assets

Keywords

asset illiquidity
commitment-weighted IRR
distribution to paid-in (DPI) ratio
illiquidity of assets
on-the-run issue
PME ratio
pooled IRR or IIRR
residual value to paid-in (RVPI) ratio
subscription-secured line of credit (SLOC)
three key empirical findings regarding PE fund performance
time-zero based pooling (or time-zero pooling)
total value to paid-in (TVPI) ratio

Learning Objectives

30.1 Demonstrate knowledge of evidence regarding illiquidity premiums from listed assets

Including:

- Understand a factor-pricing-based explanation for illiquidity premiums
- Interpret empirical evidence of illiquidity premiums in US treasuries
- Interpret empirical evidence of an illiquidity premium in US equities

30.2 Demonstrate knowledge of private and listed real performance in real estate

Including:

- State the case against unlisted real estate pools based upon historical performance
- Explain the divergent performance between privet properties and listed properties
- State the case against unlisted real estate pools based upon risk-adjusted performance

30.3 Demonstrate knowledge of challenges in the PME method to evaluate private asset performance

Including:

- Understand and apply the interim internal rate of return
- Recognize why IRRs under the PME method cannot be calculated in some cases
- Identify why IRRs fail to adjust for scale and timing
- Recognize why the PME method can be effective in evaluating performance
- Analyze how the PME method can be manipulated

30.4 Demonstrate knowledge of multiple evaluation tools

Including:

- Understand and apply simple cash flow multiples as an evaluative performance metric
- Understand and apply PME multiples as an evaluative performance metric
- Interpret private equity fund benchmark analysis
- Understand how to apply a PME analysis to PE funds
- Interpret results using multiple evaluation tools

30.5 Demonstrate knowledge of IRR aggregation problems for portfolios

Including:

- Calculate equal weighting IRRs or IIRRs as measures of performance
- Calculate commitment weighting IRRs or IIRRs as measures of performance
- Calculate pooled cash flows for weighting IRRs or IIRRs as measures of performance
- Interpret and apply time-zero based pooling
- Contrast the weighting approaches for IRR or IIRR

30.6 Demonstrate knowledge of the proposed cases against private equity

Including:

- Understand various studies regarding private equity

30.7 Demonstrate knowledge of propositions regarding access through private versus listed structures

Including:

- Understand two propositions regarding allocating assets in private or listed markets

Chapter 30 Errata

Page 645, Exhibit 30.4:

Please see highlighted changes to the original chart in this exhibit below:

PMEs for Three Scenarios									
Case #1: Example from Chapter 30 (Exhibit 30.4)									
Period	0	1	2	3	4	5	6	7	8
PE Fund Flows	-100	-50	-40	0	0	0	70	80	280
Market Index	100	60	75	90	99	110	132	165	198
Market Return	n.a.	-0.40	0.25	0.20	0.10	0.1111	0.20	0.25	0.20
Hyp Mkt Acc	100	110.0	177.5	213.0	234.3	260.3	242.4	223.0	-12.4
Hyp Cash Flows	-100	-50	-40	0	0	0	70	80	267.6
Case #2: Slightly Lower PE Fund Distribution in Year 8									
Period	0	1	2	3	4	5	6	7	8
PE Fund Flows	-100	-50	-40	0	0	0	70	80	200
Market Index	100	60	75	90	99	110	132	165	198
Market Return	n.a.	-0.40	0.25	0.20	0.10	0.1111	0.20	0.25	0.20
Hyp Mkt Acc	100	110.0	177.5	213.0	234.3	260.3	242.4	223.0	67.6
Hyp Cash Flows	-100	-50	-40	0	0	0	70	80	267.6
Case #3: Slightly Higher Public Equity Market Return in Period 1									
Period	0	1	2	3	4	5	6	7	8
PE Fund Flows	-100	-50	-40	0	0	0	70	80	280
Market Index	100	70	88	105	116	128	154	192	231
Market Return	n.a.	-0.30	0.25	0.20	0.10	0.1111	0.20	0.25	0.20
Hyp Mkt Acc	100	120.0	190.0	228.0	250.8	278.7	264.4	250.5	20.6
Hyp Cash Flows	-100	-50	-40	0	0	0	70	80	300.6
Case #1: PE Fund IRR = 12.75%; PME IRR = 12.30%									
Case #2: PE Fund IRR = 9.57%; PME IRR = 12.30%									
Case #3: PE Fund IRR = 12.75%; PME IRR = 13.48%									

Page 650, Section 30.4.2:

The left side of Equation 30.6 should be FV(C) rather than FV(D)

Topic 7: Due Diligence and Selecting Managers

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Seven: Due Diligence and Selecting Managers, Chapters 31 - 35.

Chapter 31 Active Management and New Investments

Keywords

breadth
conditional empirical analysis approach to asset allocation
exit timing
foregone loss carryforward
Fundamental Law of Active Management (FLOAM)
information coefficient
information ratio
transfer coefficient
unconditional empirical analysis approach to asset allocation

Learning Objectives

31.1 Demonstrate knowledge of tactical asset allocation
Including:
- Understand tactical asset allocation and its various applications

31.2 Demonstrate knowledge of the fundamental law of active management (FLOAM)
Including:
- Interpret the central relation equation of the FLOAM and the calculation of its components
- Calculate the transfer coefficient using a modified version of the FLOAM
- Recognize the tradeoff between the information coefficient and breadth and its key driver

31.3 Demonstrate knowledge of costs related to actively reallocating across alternative investments

Including:

- Understand incentive fees, foregone loss carryforward costs and the calculation of after-fee return
- Identify two potential costs of staying with a manager below its high-water mark
- Recognize two types of potential costs of replacing managers unrelated to incentive fees

31.4 Demonstrate knowledge of successful tactical asset allocation process

Including:

- Understand the TAA process and return predictability
- Understand the TAA process and model-based return prediction
- Identify important characteristics of sound TAA model development
- Describe an unconditional analysis using SAA models
- Conduct conditional analyses using TAA models
- Describe technical analysis underlying TAA models

31.5 Demonstrate knowledge of adjusting exposures to illiquid partnerships

Including:

- Identify the primary markets for PE funds
- Recognize PE funds as intermediaries
- Understand PE fund incentives and terms

31.6 Demonstrate knowledge of the secondary market for PE LP interests

Including:

- Describe the emergence and development of the secondary PE market
- Describe the size and activity of the PE secondary market
- Identify PE LP seller motivations
- Identify PE LP buyer motivations
- Recognize how to source secondary PE fund opportunities
- Determine how to value secondary stakes
- Understand the limitations of the secondary market for PE interests

Chapter 31 Errata

Page 669 Application 31.3.1:

11.11% = *r*(100%–20%)

r = 11.11%/80% = 13.89%

Should be:

11.11% = *r*(100%–15%)

r = 11.11%/85% = 13.07%

Chapter 32 Selection of a Fund Manager

Keywords

adverse selection within funds
bias blind spot
blue-chip management team
build and harvest phase
consequence of adverse selection in PE funds
emerging management team
entry and establish phase
established management team
expectation bias
fund culture
fund performance persistence
fund performance persistence hypothesis
fund screening process
gaming
gatekeepers
(-LP lifecycle
h rd behavior
holdup problem
information filtering
information gathering
investment process risk
reactive deal sourcing
reemerging management team
transition matrix

Learning Objectives

32.1 Demonstrate knowledge of the importance of fund selection across managers through time

Including:

- Compare the performance of high and low quartile PE fund managers through time

32.2 Demonstrate knowledge of the relationship between PE GPs and LPs

Including:

- Understand the dynamic between PE GPs and LPs
- Recognize adverse selection in GP-LP relationships
- Describe the life cycle aspect of the GP-LP relationship
- Identify the entry and establish phase of PE Funds
- Identify the build and harvest phase of PE Funds
- Identify the decline or exit phase

32.3 Demonstrate knowledge of fund return persistence

Including:

- Describe the fund performance persistence hypothesis
- Interpret evidence regarding fund performance persistence
- Explain transition matrices and return persistence in PE funds
- Understand the persistence of return persistence in PE funds
- Identify challenges to the performance persistence hypothesis
- Describe performance persistence implementation issues

32.4 Demonstrate knowledge of moral hazard, adverse selection, and the holdup problem in fund management

Including:

- Understand how moral hazard, adverse selection, and the holdup problem impact fund management

32.5 Demonstrate knowledge of how to screen fund management

Including:

- Identify questions regarding the nature of a fund's investment program
- Identify questions regarding the investment objective of PE funds
- Identify questions regarding the investment process of PE funds
- Identify questions regarding the value added by the fund manager of PE Funds

32.6 Demonstrate knowledge of historical performance review

Including:

- Identify critical decisions regarding performance review
- Understand implications of relying on past performance
- Discuss the importance of analyzing past assets under management
- Interpret drawdown
- State five classic statistical issues when using past data to predict the future
- Apply statistical systems to understand portfolio risk management systems

32.7 Demonstrate knowledge of manager selection and deal sourcing

Including:

- Determine the wish list of fund characteristics
- Classify systems to assess a management team's competence
- Understand how to source deals

32.8 Demonstrate knowledge of fund culture

Including:

- Understand the importance of a fund's culture

32.9 Demonstrate knowledge of how decision-making and commitment in manager selection

Including:

- Understand how prior commitments may impact decisions regarding manager selection

Chapter 33 Investment Process Due Diligence

Keywords

bias ratio
business activities
chief risk officer (CRO)
custody
desk review
fund capacity
fund due diligence
investment process
investment process risk
investment strategy or mandate of a fund
level 1 assets
level 2 assets
level 3 assets
mark to model
portfolio information aggregators (risk aggregators)
position-level transparency
stated investment strategy of a fund
synergistic risk effect

Learning Objectives

33.1 Demonstrate knowledge of investment due diligence
Including:
- Describe different approaches to due diligence
- Understand the importance of investment due diligence
- Recognize internal fund functions
- Differentiate between investment process and operational due diligence
- Recognize costs and importance of due diligence
- Identify the role of due diligence checklists and questionnaires

33.2 Demonstrate knowledge of the investment strategy or investment mandate
Including:
- Describe details of investment strategies
- Discuss strategy drift within the investment mandate
- Understand leverage within strategy drift
- Understand how investment markets and securities are related
- Describe the relationship between the due diligence process and competitive advantage
- Identify key persons within investment strategies

33.3 Demonstrate knowledge of investment implementation processes and accompanying risks
Including:
- Recognize how to implement investment strategies
- Interpret risks within investment processes
- Understand how to detect investment process risks

33.4 Demonstrate knowledge of asset custody and valuation

Including:

- Understand the role of custodians in safeguarding assets
- Describe the role of the current portfolio position in the due diligence process
- Recognize principles of fund asset valuation
- Discuss conflicts of interest with respect to fund asset valuation
- Identify challenges in listed asset valuation
- Understand the relationship between asset level and fair asset values
- Interpret internal valuation of assets

33.5 Demonstrate knowledge of risk alert advantages and observations

Including:

- Identify advantages of portfolio information aggregators
- Understand risk alert observations on third party information regarding asset values
- Understand risk alert observations on trends in due diligence

33.6 Demonstrate knowledge of portfolio risk review

Including:

- Define and understand the role of risk review
- Identify the role of the chief risk officer
- State general questions that must be asked in a risk review
- Identify risks of special concern in the risk review
- Understand the relationship between risk review and leverage
- Understand how leverage magnifies losses and probabilities of various loss levels
- Identify subscription and redemption risks

33.7 Demonstrate knowledge of warning indicators and awareness signals in investments

Including:

- Identify warning indicators and awareness signals with respect to investments

33.8 Demonstrate knowledge of warning indicators and awareness signals in risk management

Including:

- Identify warning indicators and awareness signals with respect to risk management

Chapter 34 Operational Due Diligence

Keywords

asset verification
blackout periods
covered securities
cutting the NAV
dedicated operational due diligence approach
equity ownership model
expert networks
factor weighting in the context of ODD
four areas commonly overseen by the compliance department
front running
fund prime brokers
hardship exemption procedure
hybrid operational due diligence approach
internal settlement
investment decision-making authority model
maximum number of trades
meta risks
minimum holding periods
modular operational due diligence approach
net asset value (NAV)
operational benchmarking
operational decision
operational due diligence (ODD)
operational fraud
operational risk of a fund
operational scalability
operational threshold issue
personal account dealing
post-clearance
posting
pre-clearance
pro rata allocation
reconciliation
restricted list
risk control model
rogue trader
shared operational due diligence approach
subscriptions and redemptions
T+1 basis
tasks of portfolio management
three-way reconciliation (or triangular reconciliation)
trade allocation
trade blotter
trade break
trade execution
two-way reconciliation
unencumbered cash
valuation agent

Learning Objectives

34.1 Demonstrate knowledge of risks and remedies in operations

Including:

- Identify operational errors, agency conflicts, and operational fraud of a fund
- Understand why operational due diligence is driven by operational risk
- List the major components to controlling operational risk
- Understand how investors can mitigate operational risk
- Describe how perverse incentives can motivate the reporting of performance
- Recognize oversight procedures of the trade life cycle
- Explain the role of a n SEC risk alert with respect to a fund's investment process

34.2 Demonstrate knowledge of key operational activities

Including:

- Understand due diligence with respect to the execution of trades
- Understand due diligence with respect to posting of trades
- Understand due diligence with respect to trade allocation
- Understand due diligence with respect to trade reconciliation

34.3 Demonstrate knowledge of cash fund management and movement

Including:

- List the primary purposes of fund cash
- Analyze the use of cash to meet fund expenses
- Analyze the use of cash to facilitate trading
- Recognize reasons for analyzing cash to and from investors
- Discuss the role of unencumbered cash

34.4 Demonstrate knowledge of how to analyze external parties and check principals

Including:

- Understand the role of fund prime brokers
- Analyze the role of fund administrators
- Understand the role of investigative due diligence
- Describe various models for selecting personnel for investigation
- List areas that are commonly included in background investigations
- Understand how to organize and interpret information from investigations
- Understand the process of asset verification
- Recognize the value of due diligence checks with current and former investors

34.5 Demonstrate knowledge of analysis of fund compliance

Including:

- Understand the importance of personal trading compliance of fund employees
- Identify common compliance risks regarding personal trading
- Discuss compliance risks regarding nonpublic and inside information
- Understand the role of electronic communication monitoring
- Analyze the work of third-party compliance consultants

34.6 Demonstrate knowledge of processes and role of on-site manager visits

Including:

- Understand how to select visit locations
- Recognize why desk reviews are not best practice
- Identify the risk alert's three tasks on desk and site review

34.7 Demonstrate knowledge of elements and key concerns of the ODD process

Including:

- Identify core elements of the ODD process
- Understand explanations for the expanding scope of operational due diligence
- Discuss the use of third-party sources for due diligence review

34.8 Demonstrate knowledge of meta risks and information technology

Including:

- Understand the due diligence role played by information technology
- List five due diligence questions that surround information technology
- Define meta risk

34.9 Demonstrate knowledge of funding, applying, and concluding ODD

Including:

- Identify approaches to resource allocation for operational due diligence
- Understand how to document the operational due diligence process
- Recognize the relationship between due diligence and the operational decision

Chapter 35 Due Diligence of Terms and Business Activities

Keywords

audit holdback
bad-leaver clause
business continuity planning
chief financial officer (CFO)
common duties of fund board members
common types of fund insurance coverage
disaster recovery (DR)
E&O insurance
exculpation
feeder fund
five common operational fund committees
fund advisory committees
fund governance
fund's board of directors
gate
hard lockup period
hurt money
indemnification
limited liability shield
limited partnership agreement (LPA)
lockup period
LP advisory committee
master trust
notice period
operational risk profile
primary equity investor motivations of designing fund legal structures
purpose of the mast trust
qualified majority
risk assignment
side letter
side pocket arrangement
soft lockup period
structural review
terms regarding redemptions

The offering memorandum (OM) or private placement memorandum (PPM)

Learning Objectives

35.1 Demonstrate knowledge of the document collection process in due diligence
Including:
- Describe the role of the document collection process as part of due diligence

35.2 Demonstrate knowledge of fund governance
Including:
- Understand the role of internal committees in fund governance
- Understand the role of the board of directors in fund governance
- Understand the role of limited partner control and communication in fund governance

35.3 Demonstrate knowledge of structural review of funds and fund managers

Including:

- Understand the importance of legal fund structures
- Describe how master-feeder trusts work
- Understand how side pocket arrangements operate
- Discuss the role of the documentation of registrations
- Recognize the role of fund manager organization and ownership

35.4 Demonstrate knowledge of terms for liquid private funds

Including:

- Understand redemption terms
- Describe potential benefits of lockups
- Define gates

35.5 Demonstrate knowledge of terms for illiquid private funds

Including:

- Understand the relationships between the LPA, fund term, and distributions
- Define the role of advisory committees
- Understand terminations and divorces within funds

35.6 Demonstrate knowledge of general terms for private funds

Including:

- Describe investment limits and legal liability limits
- Define subscription amounts
- Understand investor relations

35.7 Demonstrate knowledge of private-placement memorandums (PPM)

Including:

- Recognize key functions of the offering memorandum (OM) and PPM
- Understand the function of side letters
- Identify different purposes of legal counsel reviews and ODD document reviews
- Analyze other common private placement memorandum terms

35.8 Demonstrate knowledge of fund fees and expenses

Including:

- Identify the timing of fee collections
- Understand the role of fee offsets
- Recognize details of incentive fees
- Understand the contribution of GPs contribution with respect to fund risk taking

35.9 Demonstrate knowledge of private fund audited financial statement reviews

Including:

- Define the role of audited financial statements
- Understand valuation policies

35.10 Demonstrate knowledge of business activities, continuity planning, disaster recovery, and insurance

Including:

- Understand the process of business continuity planning and disaster recovery
- Describe the role of information technology in continuity planning and disaster recovery
- Recognize the role of fund insurance in operational due diligence

Topic 8: Volatility and Complex Strategies

Reading:

Alternative Investments: An Allocator's Approach, Fourth Edition, Wiley, 2020. Part Eight: Volatility and Complex Strategies, Chapters 36 - 40.

Chapter 36 Volatility as a Factor Exposure

Keywords

implied return volatility
implied volatility structure
long volatility
mixture model or a regime switching model
negative volatility risk premium
options volatility surface
realized return volatility
regime change
short volatility
smile or a smirk
volatility clustering
volatility derivatives
volatility diffusion risk
volatility jump risk
volatility risk
volatility skew

Learning Objectives

36.1 Demonstrate knowledge of measures of volatility
Including:
- Understand differences between implied volatility and realized volatility
- Identify limitations of realized volatility as a measure of dispersion
- Recognize properties of realized volatility

36.2 Demonstrate knowledge of volatility and the vegas, gammas, and thetas of options
Including:
- Describe option vegas
- Interpret the scaling of the vega of an option
- Interpret and apply vega as an option for finite shifts
- Understand how vega shifts as underlying variables change
- Interpret option gammas
- Understand the interrelationships between option vegas, gammas, and thetas

36.3 Demonstrate knowledge of exposures to volatility as a factor

Including:

- Contrast long volatility with short volatility
- Understand distinctions between positive vega and long volatility exposures
- Explain how volatility can be used to hedge risk
- Understand volatility as an unobservable but unique risk factor
- Understand how a long volatility carry a negative risk premium
- Explain how short volatility earns a positive risk premiums

36.4 Demonstrate knowledge of modeling volatility processes

Including:

- Understand volatility processes with jump risk
- Model volatility processes and regime changes
- Discuss reasons why volatility strategies recover
- Identify reasons why volatility mean reversion cannot be arbitraged

36.5 Demonstrate knowledge of implied volatility structures

Including:

- Describe methods of computing implied volatility
- Identify structures regarding implied volatility and moneyness
- Identify an implied volatility surface
- Recognize key reasons for implied volatility structures and surfaces
- Discuss reasons for high implied volatility and out-of-the-money puts

Chapter 36 Errata

Page 668, last sentence of third paragraph:

The word "equation" should be "equate".

Page 795, Section 36.5.2 (The third sentence in the second paragraph):

"Exhibit 36.5 indicates ITM options as having lower implied volatility than ATM options, which in turn have lower implied volatility than OTM options."

Should be:

"Exhibit 36.5 indicates ITM options as having higher implied volatility than ATM options, which in turn have higher volatility than OTM options."

Chapter 37 Volatility, Correlation, and Dispersion Products and Strategies

Keywords

black swan
Cboe Volatility Index (VIX)
correlation swap
horizontal spread
inter-asset option spread
iron butterfly
iron condor
ratio spread
S&P 500 Short-Term VIX Futures Index
short straddle
short strangle
tail risk funds
vega normalization
vertical spread
VIX term structure

Learning Objectives

37.1 Demonstrate knowledge of common option strategies and their volatility exposures

Including:

- Understand and apply theta as a measure of time decay in an option
- Describe writing option straddles and strangles as short volatility strategies
- Describe writing option butterflies and condors as short volatility strategies

37.2 Demonstrate knowledge of volatility and delta-neutral portfolios with options

Including:

- State the general performance drivers of delta-neutral portfolios with options
- Identify the key points that surround delta-neutral option portfolios
- Interpret delta normalization and exposure to volatility

37.3 Demonstrate knowledge of advanced option-based volatility strategies

Including:

- Describe vertical intra-asset option spreads
- Create vertical spreads with delta hedging
- Understand horizontal intra-asset (skew) spreads
- Understand inter-asset option spreads

37.4 Demonstrate knowledge on variance-based and volatility-based derivative products

Including:

- Describe derivative strategies that create payoffs driven by realized variance
- Interpret implied volatility indices
- Understand how the Cboe Volatility Index is calculated
- Interpret futures contracts on the Cboe Volatility Index
- Understand how to calculate the hypothetical price of an S&P VIX short-term futures contract

- Describe the process of engineering VIX-related financial derivatives
- Relate the VIX term structure to portfolio insurance

37.5 Demonstrate knowledge of correlation swaps

Including:

- Understand and apply the mechanics of a correlation swap
- Model the relationship between correlations, security volatility, and portfolio volatility
- Recognize motivations to correlation trading

37.6 Demonstrate knowledge of dispersion trades

Including:

- Understand the basics of dispersion trades

37.7 Demonstrate knowledge of commonalities of volatility, correlation, and dispersion trading

Including:

- Understand the basics of volatility, correlation, and dispersion trading

37.8 Demonstrate knowledge of volatility hedge funds and their strategies

Including:

- Distinguish between the categories of volatility hedge funds
- Describe relative value of volatility funds
- Describe short volatility funds
- Describe long volatility and tail risk funds
- Describe the historical performance of four volatility fund indices

Chapter 38 Complexity and Structured Products

Keywords

advance rate
ambiguity
asset-based loan (ABL)
attachment of security interest
auto loan-backed securities (ALBS)
borrowing base
collateral amount
complexity risk premium
credit card receivable (CCR)
fixed charge coverage ratio
Knightian uncertainty
lockbox
net leverage covenant
non-recourse loans
perfecting the security interest
recourse loans
revolver
revolving line of credit
seasonal overadvance
shadow banking system
term loan
traditional overadvance
US Treasury Strips

Learning Objectives

38.1 Demonstrate knowledge of uncertainty, ambiguity, and opacity
Including:
- Define Knightian uncertainty
- Define ambiguity
- Define opacity and understand the theoretical incentive to create complexity

38.2 Demonstrate knowledge of asset and strategy complexities
Including:
- Understand the role of complexity and passive indexation in active management
- Define complexity crashes
- Describe the complexity risk premium
- Interpret complexity as a return characteristic or factor

38.3 Demonstrate knowledge of cases involving complexity and perverse incentives
Including:
- Understand the role played by Treasury strips in the 1980s
- Understand the role and process of collateralized mortgage obligations in the 1990s
- Understand the role and process of residential mortgage-backed securities in the 2000s
- Identify key takeaways from three fixed income cases

38.4 Demonstrate knowledge of asset-based lending

Including:

- Recognize the characteristics of a typical borrower in asset-based lending
- Consider why borrowers select asset-based lending
- Identify features of asset-based lending
- Discuss discount rates for various assets in asset-based lending
- Describe the use of asset-based lending proceeds
- Recognize asset-based loan structures and collateral
- Understand and apply covenants in asset-based lender protection

38.5 Demonstrate knowledge of the risks involved in asset-based loans

Including:

- Consider collateral valuation risk of asset-based loans and lender remedies
- Recognize risks regarding process and people in asset-based loans
- Understand risks regarding hedging of asset-based loans
- Describe the legal risks of asset-based loans
- Recognize risks in exit timing from asset-based loans

38.6 Demonstrate knowledge of asset-backed securities

Including:

- Understand how asset-backed securities are created
- Interpret models showing the growth of various types of asset-backed securities
- Define auto loan-backed securities and describe their roles
- Understand how prepayments affect auto loan-backed securities
- Recognize the role and effect of credit card receivables
- Understand credit card receivables credit enhancements

Chapter 38 Errata

Page 836, Application 38.4.7:

($10,000,000 + $5,000,000) / ($5,000,000) = 3.00

Should be:

($10,000,000 + $5,000,000) / ($5,000,000) = 3.00 since the firm is unlevered and interest would be $0.

Chapter 39 Insurance-Linked Products and Hybrid Securities

Keywords

attachment probability
cash surrender value of a life insurance policy
cat bond attachment point of the trigger
catastrophe bonds (cat bonds)
complexity arbitrage
credit wrap
exhaustion point
extreme mortality risk
five mortality rate factors
indemnity trigger
industry loss trigger
insurance-linked securities (ILS)
life insurance settlements
longevity risk
longevity swap contract
modeled trigger
mortality risk
parametric trigger
payment-in-kind (PIK) interest
PIK toggle notes or bonds
project finance
public-private partnerships (PPPs)
reinsurance
subordinated debt with profit participation scheme
subordinated debt with step-up rates
subordinated debt with warrants
three main elements of mortality rates
ticking fee
viatical settlement
warrants

Learning Objectives

39.1 Demonstrate knowledge of catastrophe bonds
Including:
- Define catastrophe bonds
- Understand the mechanics of catastrophe bonds
- Describe the risk and returns of catastrophe bonds
- Understand the role of catastrophe bonds in managing risk

39.2 Demonstrate knowledge of four trigger types of catastrophe bonds
Including:
- Define indemnity as a trigger
- Define industry loss as a trigger
- Define parametric as a trigger
- Define modeled as a trigger

39.3 Demonstrate knowledge of catastrophe bond valuation, performance, and drawbacks

Including:

- Analyze how the coupon rate on catastrophe bonds is constructed
- Identify catastrophe bond index returns over a recent historical period
- Understand potential drawbacks and alpha of investing in catastrophe bonds
- Discuss catastrophe-related derivative securities

39.4 Demonstrate knowledge of longevity and mortality risk-related products

Including:

- Define longevity risk
- Explain how longevity risk can be hedged
- Identify the risks of longevity hedging
- Interpret mortality risk
- Understand mortality risk and structured products
- Recognize main risks of catastrophic mortality bonds

39.5 Demonstrate knowledge of life insurance settlements

Including:

- Define the mechanics and details of life insurance settlements
- Recognize the path of life insurance policy values through time
- Calculate the present value of a life insurance policy to the policyholder

39.6 Demonstrate knowledge of viatical settlements

Including:

- Understand viatical settlement insurance policies
- Describe the benefits, risks, and drawbacks of viatical settlement policies
- Describe the returns of life insurance settlements over a historical period

39.7 Demonstrate knowledge of mezzanine debt

Including:

- Describe subordinated debt with step-up rates
- Understand and apply subordinated debt with payment-in-kind (PIK) interest
- Describe subordinated debt with profit participation
- Interpret subordinated debt with warrants
- Understand project finance and public-private partnerships

Chapter 40 Complexity and the Case of Cross-Border Real Estate Investing

Keywords

economic risk
key traditional currency risk assumption
price stickiness
quanto derivative
quanto option
roundtrip costs

Learning Objectives

40.1 Demonstrate knowledge of views regarding currency hedging for cross-border real estate investing

Including:

- Understand the concept of cross-border return and calculate its total return
- Identify key traditional currency risk assumptions of cross-border investing
- Calculate the variance of an investor's total return viewed from the home currency
- Understand and apply the role of the correlation coefficient in the volatility of dollar-based returns
- Explain the relationship between an investor's wealth and risk and currencies

40.2 Demonstrate knowledge of fundamentals of currency risk and hedging in perfect markets

Including:

- Understand and apply the law of one price
- Discuss currency risk and the law of one price with no currency hedging
- Discuss currency risk and the law of one price with currency hedging
- Consider currency risk and currency hedging of fixed income securities

40.3 Demonstrate knowledge of currency risk and hedging within alternative investments

Including:

- Define price stickiness and its relationship with asset values and expected future cash flows
- Understand price stickiness and its relationship with currency risk and unlevered corporate assets
- Recognize levered assets in currency risk

40.4 Demonstrate knowledge of access to foreign assets with futures and quanto futures

Including:

- Define quanto future derivatives
- Understand quanto futures contracts

- Contrast futures-based strategies with direct cask investment in foreign assets

40.5 Demonstrate knowledge of international real estate investing

Including:

- Identify characteristics of international real estate markets
- Discuss transaction costs and taxes in global real estate
- Identify the benefits of international real estate investing

40.6 Demonstrate knowledge of heterogenous investment taxation across jurisdiction

Including:

- Discuss real estate investment taxes across jurisdictions

40.7 Demonstrate knowledge of challenges in international real estate investing

Including:

- Identify reasons why agency relationships are important in real estate investing
- Understand relative inefficiencies in global real estate markets
- Recognize the role of information asymmetries in real estate investing
- Understand the role of liquidity and transaction costs in real estate investing
- Identify political, economic, and legal risks in international real estate investing

Chapter 40 Errata

Page 866, Application 40.1.1 (second paragraph)

Should say: "The first scenario's total return from Equation 1 is 2% approximated as (4%-2%) with a next period approximated value of €102. The second scenario's total return from Equation 1 is 6%, generating a next-period value of €106."

Page 872, Application 40.2.2, second paragraph:

Both 3% **should be** -3%

Page 867, Section 40.1.3, third paragraph:

"Under the scenario in Application 40.1.1 of a European investor, recall that a 2% depreciation in the value of the US dollar relative to the euro would **add** 2% to the return measured in euros. Therefore, the total return in euros would be **6%**, found as the sum of the US dollar return (4%) and the -2% effect from the strengthening in the euro relative to the dollar."

Should be:

"Under the scenario in Application 40.1.1 of a European investor, recall that a 2% depreciation in the value of the US dollar relative to the euro would **subtract** 2% to the return measured in euros. Therefore, the total return in euros would be **2%**, found as the sum of the US dollar return (4%) and the -2% effect from the strengthening in the euro relative to the dollar."

Topic 9: Current and Integrated Topics

Readings:

"Dynamic Strategies for Asset Allocation," Andre F. Perold and William F. Sharpe, *Financial Analyst Journal,* January-February 1995.

Keywords:

buy-and-hold concave payoff curves

convex payoff curves decision rule

constant-proportion portfolio insurance constant mix

exposure diagram floor

multiplier option-based portfolio insurance

Learning Objectives

DSAA.1 **Demonstrate knowledge of dynamic trading strategies.**

Including:

- Recognize and apply the portfolio's asset values after a given change in the equity value, using dynamic trading strategies (i.e., buy-and-hold, constant mix, and constant-proportion portfolio insurance)
- Compare the payoff, exposure diagrams, and risk tolerance of the buy-and-hold, constant mix, constant-proportion portfolio insurance, and option-based portfolio insurance strategies

DSAA.2 **Demonstrate knowledge of the payoff curves related to dynamic trading strategies.**

Including:

- Describe the expected performance and cost of implementing strategies with concave payoff curves relative to those with convex payoff curves under various market situations (i.e., trending markets and flat markets)

DSAA.3 **Demonstrate knowledge of resetting in dynamic strategies.**

Including:

- Discuss the motivations for, and impact of, resetting the parameters of dynamic strategies

Readings:

"Technical Guide for Limited Partners: Responsible Investing in Private Equity," Principles for Responsible Investing, 2020.

Keywords:

Value creation
Risk mitigation
PRI principles for private equity
Responsible investment

Learning Objectives:

TG.1 Demonstrate knowledge of responsible investment and private equity
Including:
- Describe the steps for value creation and risk mitigation in private equity
- Describe and discuss five actions LPs can take when building capacity to apply the PRI principles for private equity
- List and discuss the myths and facts of responsible investment in private equity

TG.2 Demonstrate knowledge of recent developments in responsible investment and private equity
Including:
- List and explain the key drivers for increased interest in ESG investment, including regulatory and legal developments, industry evolution, increased competition and complexity, reporting, and industry collaboration

TG.3 Demonstrate knowledge of integrating ESG and private equity
Including:
- Understand the four modules of the PRI reporting and assessment framework
- List and describe the steps in module I: Responsible Investment Policy, Beliefs, and Goals
- List and describe the steps in module II: Governance
- List and describe the steps in modules III and IV: Investment Processes
- Explain the importance of due diligence when evaluating responsible investing in private equity
- Discuss how considerations differ by fund structures, including funds of funds, secondaries, and co-investments
- Explain the importance of monitoring and disclosure when evaluating responsible investing in private equity

Readings:

"Asset Owners, Investment Management, and Commitment: An Organizational Framework," Gordon L. Clark and Ashby H. B. Monk, *The Journal of Retirement*, Winter 2019.

Keywords:

Principal-agent problem
Insourcing
Outsourcing
Re-intermediation of the investment process
Three-tiered functional model of investment management
Knowledge Management Systems
Culture
Governance
Asymmetry of expertise
Asymmetry of information
Asymmetry of market power

Learning Objectives:

AO.1 Demonstrate knowledge of the shortcomings of the asset management industry

Including:

- List and discuss the three asymmetries in the asset management industry
- Describe and explain the three-tiered functional model of investment management

AO.2 Demonstrate knowledge of investment management in theory and practice

Including:

- Explain the management problem as a tradeoff between commitment and performance
- List the three responsibilities of asset owners

AO.3 Demonstrate knowledge of insourcing and re-intermediation

Including:

- Describe insourcing and explain why it is a response to concerns about the industry
- Describe outsourcing and explain why it is a response to concerns about the industry
- Discuss how the scope and scale of the asset owner are related to the decision to insource or outsource
- Discuss how the temporal and geographic reach of the asset owner are related to the decision to insource or outsource

AO.4 Demonstrate knowledge of the building blocks of investment management

Including:

- Explain an asset management firm through its organizational framework, capabilities and resources, and market and non-market relationships

AO.5 Demonstrate knowledge of commitment and performance metrics

Including:

- List and discuss the five metrics used to measure performance and commitment
- List and discuss the characteristics of effective metrics

Readings:

"Building a Better Portfolio: Balancing Performance and Liquidity," Junying Shen, Ding Li, Grace Qiu, Vishv Jeet, Michelle Teng and Ki Cheong Wong, GIC EIS and PGIM IAS, 2020. Pages 1-24.

Keywords:

Private asset commitment strategy
Nevins' commitment model
Target NAV strategy
Distribution model
Portfolio liquidity demands
Takahashi-Alexander (TA) Model
Contribution model
NAV model

Learning Objectives:

BP.1 Demonstrate knowledge of portfolio construction with illiquid private assets
Including:
- Describe a rule of thumb for the rate of capital commitment to private assets
- Describe the four parameters of Nevins' commitment model
- List and discuss the challenges for investors and the three important questions for private asset investors

BP.2 Demonstrate knowledge of the asset allocation framework
Including:
- List and discuss the five major components of the asset allocation framework
- Discuss the objective, commitment amount, pros and cons of two LP commitment strategies

BP.3 Demonstrate knowledge of portfolio structure and liquidity events
Including:
- List the three types of assets by liquidity and which liquidity demands each can be used for
- Recognize four categories of portfolio liquidity demands
- List and describe liquidity events and their severity

BP.4 Demonstrate knowledge of formulating a commitment strategy to maintain the desired allocation
Including:
- Explain the impact of simulations for various commitment strategies on cash flows and allocations to private assets
- Compare and contrast the cash flow matching and target NAV strategies relative to portfolio performance and liquidity
- Explain the tradeoff between performance and liquidity in asset allocation
- Discuss portfolio liquidity and performance during various types of market crises

- Apply the formulas for the contribution, distribution, and NAV models of Takahashi-Alexander (TA)

Readings:

"Demystifying Illiquid Assets: *Expected Returns for Private Equity*," Antti Ilmanen, Swati Chandra, and Nicholas McQuinn, *The Journal of Alternative Investments*, Winter 2020.

Keywords:

Multiple expansion	Levered yield differential
Levered growth differential	Yield-based approach

Learning Objectives:

DIA.1 Demonstrate knowledge of the factor tilts in private equity portfolios

Including:

- Explain equity risk, illiquidity premium, size, and value and the role of each as a driver of private equity returns

DIA.2 Demonstrate knowledge of private equity performance relative to public equity benchmarks

Including:

- Identify the challenges of comparing private equity returns directly to public equity returns and list more appropriate benchmarks
- Explain the historical performance of private equity relative to public equity after accounting for leverage and factor tilts
- Contrast IRR and PME as appropriate measures of private equity performance
- Explain how changes in leverage, fundraising activity, and private company purchase multiples have influenced the excess returns of private equity since 2006

DIA.3 Demonstrate knowledge of the building blocks of US private equity returns

Including:

- Apply and discuss the yield-based approach to derive the expected return of private equity

DIA.4 Demonstrate knowledge of the decomposition of excess returns of private equity over public equity

Including:

- Apply and discuss net-of-fee excess returns for private equity and public equity

Readings:

"An executive's guide to AI," Michael Chui and Michael Chui, McKinsey Analytics, 2019.

Keywords:

Machine Learning
Artificial Intelligence
Linear Regression
Logistic Regression
Decision Tree
Convolutional Neural Networks
Recurrent Neural Networks
AdaBoost
Gradient-Boosting Trees
Gaussian Mixture Model
Support Vector Machine
Naïve Bayes
Random Forest
K-means clustering
Hierarchial clustering
Deep Learning
Supervised Learning
Unsupervised Learning
Reinforcement Learning
Recommender System

Learning Objectives:

AI.1 Demonstrate knowledge of supervised machine learning models and their business use cases

Including:

- Define linear regression and logistic regression and list the business use cases
- Define the decision tree and Naïve Bayes and list the business use cases
- Define support vector machine and random forest and list the business use cases

AI.2 Demonstrate knowledge of unsupervised machine learning models and their business use cases

Including:

- Define K-means and hierarchical clustering models and list the business use cases

AI.3 Demonstrate knowledge of deep learning models and their business use cases

Including:

- Define convolutional and recurrent neural networks and list the business use cases

Readings:

"Longevity and Liabilities: *Bridging the Gap*," PGIM, Inc., 2017.

Keywords

Life expectancy
Risk transfer
Actuarial tables
Longevity insurance
Pension buy-out
Pension buy-in
Longevity insurance

Learning Objectives:

LL.1 Demonstrate knowledge of the challenges of predicting longevity risk and the impact on pension plan funded status

Including:

- Identify the factors leading to underestimation of longevity
- Describe the impact of discount rate changes and increased longevity on the funded status of pension plans
- Discuss the impact of changes in accounting standards and actuarial tables on the funded status of pension plans
- Compare the magnitude of changes in life expectancy to changes in the discount rate regarding their impact on the future liabilities of pension plans
- Discuss the interaction of longevity risk with interest rates, inflation, and duration

LL.2 Demonstrate knowledge of the management of longevity risk

Including:

- Describe the three-pronged approach to addressing longevity risk
- Discuss the three steps in building a framework to measure and analyze the impact of longevity risk
- Discuss the two steps in assessing the toolbox of investment actions to mitigate the impact of longevity
- Explain the elevated duration risks associated with longevity
- Evaluate the desirability, timing, and impact of risk transfer actions
- Describe pension risk transfers including longevity insurance, buy-outs, and buy-ins

Readings:

"Blockchain and Financial Market Innovation," *Economic Perspectives*, Federal Reserve Bank of Chicago, July 2017.

Keywords:

Blockchain Digital ledger
Distributed ledger technology (DLT)
Public network
Permissioned network
Permissionless network
Smart contract

Learning Objectives:

BFMI.1 **Demonstrate knowledge of blockchain technology.**
Including:
- Understand a simple distributed ledger
- Understand how transactions are added to a blockchain
- Contrast permissioned and permissionless networks
- Contrast public and private networks
- Understand how a blockchain consensus mechanism works
- Understand immutability of records on a blockchain

BFMI.2 **Demonstrate knowledge of blockchain's applications, benefits, and challenges.**
Including:
- Discuss smart contracts and digital assets
- Discuss the potential of blockchain to reduce the post-trade settlement period
- Discuss technical and business challenges posed by blockchain technology

Equation Exception List

Candidates should be aware that all equations are important to understand and that an equation sheet will not be provided on the exam. The following is a list of equations that serve as exceptions and will be provided if needed to answer a specific question. For example, a question asking candidates to describe the implication of a large kurtosis can be answered without having access to the kurtosis formula. On the other hand, a question asking candidates to calculate the kurtosis of a return series would require the kurtosis equation.

$$d = \frac{\ln(A_t / K) + (r + 0.5\sigma_A^2) \times \tau}{\sigma_A \sqrt{\tau}}$$

(7.7)

$$s_t = -\frac{1}{\tau} \times \ln \times \left[N\left(d - \sigma_A \sqrt{\tau}\right) + \frac{A_t}{K} e^{r \times \tau} \times N(-d) \right]$$

(7.11)

$$d = \frac{\ln(A_t / K) + (r + 0.5\sigma_A^2) \times \tau}{\sigma_A \sqrt{\tau}}$$

(7.13)

$$Z = (1.2 \times X_1) + (1.4 \times X_2) + (3.3 \times X_3) + (0.6 \times X_4) + (1.0 \times X_5)$$

(7.22)

$$E[U(W)] = V \times E[R_p] - \frac{\lambda}{2} \times \text{Var}[V \times R_p - L \times G]$$

(9.6)

$$\Sigma = \begin{bmatrix} \sigma_{11} & \cdots & \sigma_{1N} \\ \vdots & \sigma_i & \vdots \\ \sigma_{N1} & \cdots & \sigma_{NN} \end{bmatrix}$$

(9.11)

$$\max_{w_1, \ldots w_N} E\left[\sum_{i=1}^{N} w_i (R_i - R_0) + R_0\right] - \frac{\lambda}{2} \times \text{Var}\left[\sum_{i=1}^{N} w_i (R_i - R_0) + R_0\right]$$

(9.12)

$$\begin{bmatrix} w_1 \\ \vdots \\ w_N \end{bmatrix} = \frac{1}{\lambda} \Sigma^{-1} \times \begin{bmatrix} E[R_1 - R_0] \\ \vdots \\ E[R_N - R_0] \end{bmatrix} \tag{9.13}$$

Action Words

In each of the above learning objectives, action words are used to direct your study focus. Below is a list of all action words used in the study guide, along with definitions and two examples of usage in a question example and in a description. Should you not understand what is required for any learning objective, we suggest that you refer to the table below for clarification.
NOTE: The question examples in this table are NOT sample questions for the current exam.

Term	Definition	Question Example	Example of Term Use
Analyze	Study the interrelations	George has identified an opportunity for a convertible arbitrage reverse hedge. What risks are associated with this hedge? A. The convertible may remain overvalued, causing the positive cash flow to harm the position's return profile. B. The short convertible may be called in and the position must be delivered, forcing the hedge to be unwound at an inopportune time. C. The implied volatility may decrease, lowering the bond's value. D. The implied volatility may increase, lowering the bond's value.	You have to **analyze** the positions and factors impacting them. Correct Answer: B
Apply	Make use of	Alicia Weeks, CFA, Real Estate Investment Advisor, works in an Asian country where there are no securities laws or regulations. According to CFA Institute Standard I, Fundamental Responsibilities, Alicia: A. Must adhere to the standards as defined in a neighboring country that has the strictest laws and regulations. B. Need not concern herself with ethics codes and standards. C. Must adhere to the CFA Institute's codes and standards. D. Must adhere to the standards as defined in a neighboring country that has the least strict laws and regulations.	You have to apply CFA Institute Standard I to find the correct answer. Correct Answer: C
Argue	Prove by reason or by presenting the associated pros and cons; debate	Why did the shape of the supply curve for venture capital funds change after 1979?	You have to describe how the curve has changed AND **argue** why it changed by providing reasons and supporting the reasons with statements of facts (e.g., change in regulations).
Assess	Determine importance, size, or value	How are lower capital gains taxes expected to impact firm commitments? A. Through increased supply of capital, firm commitments are expected to rise. B. Through decreased supply of capital, firm commitments are expected to rise. C. Through decreased after-tax return on venture investments, firm commitments are expected to rise. D. Through increased after-tax return on venture investments, firm commitments are expected to decline.	You must **assess** the significance of the change in the tax rate for firm commitments. Correct Answer: A

Term	Definition	Question Example	Example of Term Use
Compare	Describe similarities and differences	Which of the following least accurately compares the Sharpe and Treynor ratios? A. Both ratios contain excess return in the numerator. B. Both ratios express a measure of return per unit of some measure of risk. C. The Sharpe ratio is based on total risk, while the Treynor ratio is based on systematic risk. D. The Sharpe ratio is the inverse of the Treynor ratio.	You have to **compare** the ratios based on their most important similarities and their most important differences. Correct Answer: D
Compare and Contrast	Examine in order to note similarities or differences	A comparison of monthly payments and loan balances of a constant payment mortgage with a constant amortization mortgage with the same loan terms will show that: A. The initial payment will be the same. B. The payments of the constant payment mortgage are initially greater than those of the constant amortization mortgage, but at some point the payments of the constant payment mortgage become less. C. The present value of the payment streams of the two loan types are the same. D. The constant payment mortgage loan balance exceeds that of the constant amortization mortgage during the first six months of the loan.	You have to **compare** indices to arrive at the answer. Correct Answer: C
Construct	Make or form by combining or arranging parts or elements	A reverse convertible arbitrage hedge consists of a: A. Short convertible position plus a put option on the stock. B. Long convertible position plus a put option on the stock. C. Short convertible position plus a call option on the stock. D. Short convertible position plus a long position in the stock.	You have to combine positions to **construct** the hedge. Correct Answer: D
Contrast	Expound on the differences	Which of the following best characterizes a difference between value at risk (VaR) and modified VaR? A. Modified VaR is expressed as a percent while VaR is a dollar value. B. Modified VaR uses a user defined confidence interval while VaR uses a 99% interval. C. Modified VaR incorporates non-normality while traditional VaR assumes normality. D. Modified VaR is for a single trading period while traditional VaR is multiple period.	You have to **contrast** the assumptions of the first model to those of the second model so that the differences are clear. Correct Answer: C
Define	State the precise meaning	The interest rate charged by banks with excess reserves at a Federal Reserve Bank to banks needing overnight loans to meet reserve requirements is called the: A. Prime rate. B. Discount rate. C. Federal funds rate. D. Call money rate.	You have to **define**, in this case, the federal funds rate. Correct Answer: C
Describe	Convey or characterize an idea	Which of the following words best describes expected return? A. Spread B. Average C. Spread squared D. Average squared	You need to choose the word that best **describes** the concept from a list. Correct Answer: B

Term	Definition	Question Example	Example of Term Use
Differentiate	Constitute the distinction between; distinguish	What type of convertible hedge entails shorting a convertible and going long in the underlying stock? A. Call-option hedge B. Traditional convergence hedge C. Implied volatility convergence hedge D. Reverse hedge	You have to **differentiate** one type of hedge from another. Correct Answer: D
Discuss	Examine or consider a subject	Discuss the limitations of private equity data.	You have to present a **discussion** of a set of ideas in a list or paragraph.
Explain	Illustrate the meaning	1. Explain why return on assets (ROA) rather than return on equity (ROE) might be the preferred measure of performance in the case of hedge funds. or 2. Which of the following best explains risk from the standpoint of investment? A. Investors will lose money. B. Terminal wealth will be less than initial wealth. C. Final wealth will be greater than initial wealth. D. More than one outcome is possible.	1. You have to place a series of thoughts together as an **explanation** of a term or issue. 2. You need to identify the term that best **explains** a term or issue. Correct Answer: D
Identify	Establish the identity	The investments that have historically performed best during periods of recession are: A. Commodities. B. Treasury bills. C. Stocks and bonds. D. Gold.	You have to **identify** the term that best meets the criterion of the question. Correct Answer: C
Illustrate	Clarify through examples or comparisons	For two types of convergence hedges, what situations present profitable opportunities, how are the hedges set up, and what are the associated risks?	You have to provide an example for each hedge or compare the two to **illustrate** how they work.
Interpret	Explain the meaning	Your certificate of deposit will mature in one week, and you are considering how to invest the proceeds. If you invest in a 30-day CD, the bank will pay you 4% interest. If you invest in a 2-year CD, the bank will pay you 6% interest. You should choose the: A. 30-day CD, no matter what you expect interest rates to do in the future. B. 2-year CD, no matter what you expect interest rates to do in the future. C. 30-day CD if you expect that interest rates will fall in the future. D. 2-year CD if you expect that interest rates will fall in the future.	You have to **interpret** the features of an investment scenario. Correct Answer: D
List	Create a series of items	List the determinants of real interest rates.	You have to differentiate from a **list** those items that are consistent with the question.

Term	Definition	Question Example	Example of Term Use
Outline	Summarize tersely	Which of the following best characterizes the steps in computing a geometric mean return based on a series of periodic returns from *T* time periods? A. Add one to each return, add them together, divide by T and subtract one. B. Add one to each return, multiply them together, divide by T and subtract one. C. Add one to each return, add them together, take the T^{th} root and subtract one. D. Add one to each return, multiply them together, take the T^{th} root and subtract one.	You must **outline** the study's most important findings rather than explain them in detail. Correct Answer: D
Relate	Show or establish logical or causal connection	Which of the following effects does NOT help to explain growth in the venture capital industry? A. Amendments to the prudent man rule B. The rise of limited partnerships as an organizational form C. Decline in the valuations of small capitalization stocks D. The activities of investment advisors in the venture capital market	You must **relate** effects or factors (e.g., the prudent man rule) to another result or concept (e.g., growth in an industry). Correct Answer: C
Summarize	Cover all the main points succinctly	Summarize the performance of trend and momentum strategies and compare their performance to the buy-and-hold strategy.	You have to **summarize** a longer discussion or complicated concept or set of results by focusing on the main ideas.

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