

CAIA[®] Level II Study Guide

Learning objectives
and keywords to
facilitate your exam
study



March 2023

CAIA Level II Study Guide

March 2023 Exam

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Preparing for the Level II Examination

As part of the registration fee, all candidates receive a digital copy of the official CAIA Level 2 Curriculum. In addition, candidates should obtain the following material and follow the outline provided in this study guide.

CAIA Level II: Emerging Topics 2023.

These readings are available on the CAIA website.

Learning Objectives

The Learning Objectives (LOs) in each Lesson **form the basis for examination questions**. LOs and the accompanying Keywords provide guidance on the elements of the readings that are most important to understanding the CAIA curriculum. Mastering the LOs and keywords is an important way for candidates to organize their studies.

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.

The action words used within the learning objectives help candidates determine what they need to learn from the relevant passages and what type of questions they may expect to see on the examination. Note that actual examination questions are not limited in scope to the exact action word used within the learning objectives. For example, the action words "demonstrate knowledge" could result in examination questions that ask candidates to define, explain, calculate, and so forth. A list of action words used within learning objectives is provided in the back of this study guide in the Action Words table.

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 is a four-hour computer-administered examination. 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. Fewer than 30% of the questions on the exam will require calculations.

Except for “Ethics, Regulation, and ESG” and “Emerging Topics,” all 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 each section. All candidates have access to one sample exam available in the candidate Study Tools portion of the CAIA website. <https://caia.org/content/curriculum-study-tools>

Level II Examination Topic Weights and Question Format

Level II Topic	Question Format	
	Multiple-Choice	Constructed-Response
Emerging Topics	0%	10%
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 Investment	8% - 12%	0 – 10%
Accessing Alternative Investments	8% - 12%	0 – 10%
Due Diligence and Selecting Managers	8% - 12%	0 – 10%
Volatility and Complex Strategies	8% - 12%	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

Occasionally, errors in the readings and learning objectives are brought to our attention. If an error is considered material to a candidate’s understanding of the reading or learning objective, we will make the correction in the digital edition and post the erratum on the Curriculum and Study Materials page of the CAIA website: <https://caia.org/content/curriculum-study-tools>. It is the responsibility of the candidate to review all errata prior to taking the examination. Please report suspected errata to curriculum@caia.org.

CAIA Charter Program, 2023 Level II Curriculum

Topic 1: Emerging Topics <https://caia.org/curriculum-study-tools>

Reading 1.1: Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets

Reading 1.2: Technical Guide for Limited Partners: Responsible Investing in Private Equity

Reading 1.3: Channels for Exposure to Bitcoin

Reading 1.4: Assessing Long-Term Investor Performance: Principles, Policies and Metrics

Reading 1.5: Demystifying Illiquid Assets: *Expected* Returns for Private Equity

Reading 1.6: An Introduction to Portfolio Rebalancing Strategies

Reading 1.7: Longevity and Liabilities: Bridging the Gap

Reading 1.8: A Short Introduction to the World of Cryptocurrencies

Topic 2: Ethics, Regulation and ESG

Reading 2.1: Asset Manager Code

Reading 2.2: Recommendations and Guidance

Reading 2.3: Global Regulation

Reading 2.4: ESG and Alternative Investments

Reading 2.5: ESG Analysis and Application

Topic 3: Models

Reading 3.1: Modeling Overview and Interest Rate Models

Reading 3.2: Credit Risk Models

Reading 3.3: Multi-Factor Equity Pricing Models

Reading 3.4: Asset Allocation Processes and the Mean-Variance Model

Reading 3.5: Other Asset Allocation Approaches

Topic 4: Institutional Asset Owners and Investment Policies

Reading 4.1: Types of Asset Owners and the Investment Policy Statement

Reading 4.2: Foundations and the Endowment Model

Reading 4.3: Pension Fund Portfolio Management

Reading 4.4: Sovereign Wealth Funds

Reading 4.5: Family Offices and the family office Model

Topic 5: Risk and Risk Management

Reading 5.1: Cases in Tail Risk

Reading 5.2: Benchmarking and Performance Attribution

Reading 5.3: Liquidity and Funding Risks

Reading 5.4: Hedging, Rebalancing, and Monitoring

Reading 5.5: Risk Measurement, Risk Management, and Risk Systems

Topic 6: Methods for Alternative Investing

Reading 6.1: Valuation and Hedging Using Binomial Trees

Reading 6.2: Directional Strategies and Methods

Reading 6.3: Multivariate Empirical Methods and Performance Persistence

Reading 6.4: Relative Value Methods

Reading 6.5: Valuation Methods for Private Assets: The Case of Real Estate

Topic 7: Accessing Alternative Investments

Reading 7.1: Hedge Fund Replication

Reading 7.2: Diversified Access to Hedge Funds

Reading 7.3: Access to Real Estate and Commodities

Reading 7.4: Access through Private Structures

Reading 7.5: The Risk and Performance of Private and Listed Assets

Topic 8: Due Diligence and Selecting Managers

Reading 8.1: Active Management and New Investments

Reading 8.2: Selection of a Fund Manager

Reading 8.3: Investment Process Due Diligence

Reading 8.4: Operational Due Diligence

Reading 8.5: Due Diligence of Terms and Business Activities

Topic 9: Volatility and Complex Strategies

Reading 9.1: Volatility as a Factor Exposure

Reading 9.2: Volatility, Correlation, and Dispersion Products and Strategies

Reading 9.3: Complexity and Structured Products

Reading 9.4: Insurance-Linked and Hybrid Securities

Reading 9.5: Complexity and the Case of Cross-Border Real Estate Investing

Topic 1: Emerging Topics

Reading 1.1:

“Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets.” Fabian Schär. *Economic Research, Federal Reserve Bank of St. Louis*. 2021.

Keywords:

decentralized finance	smart contracts
decentralized exchange	stablecoins
off-chain collateral	tokenization
on-chain collateral	

Learning Objectives

1.1.1 Demonstrate knowledge of decentralized finance (DeFi).

Including:

- Define the building blocks of DeFi, including settlement, asset, protocol, application, and aggregation layers

1.1.2 Demonstrate knowledge of asset tokenization

Including:

- Define and discuss the risks of asset tokenization, including the use of off-chain collateral, on-chain collateral, and no collateral
- Explain the use of stablecoins in the DeFi system

1.1.3 Demonstrate knowledge of decentralized exchange protocols

Including:

- Contrast decentralized and centralized exchanges including advantages and disadvantages
- Explain decentralized exchange protocols and liquidity systems, such as decentralized order book exchanges, constant function market maker, smart contract-based reserve aggregation, and peer-to-peer protocols

1.1.4 Demonstrate knowledge of decentralized lending platforms

Including:

- Discuss collateralized debt positions and collateralized debt markets

1.1.5 Demonstrate knowledge of decentralized derivatives

Including:

- Explain asset-based and event-based derivative tokens

1.1.6 Demonstrate knowledge of the opportunities and risks of the DeFi ecosystem

Including:

- List and discuss the four opportunities and the six risks

Reading 1.2:

"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:

1.2.1 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

1.2.2 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

1.2.3 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

Reading 1.3:

"Channels for Exposure to Bitcoin," Jack Neureuter and Yassine Elemandjra, Fidelity Digital Assets, July 2021.

Keywords:

digital asset custodians	Self-Custody
open-ended private trust	passive bitcoin funds
cash-settled bitcoin futures	
physical-settled bitcoin futures	

Learning Objectives:

1.3.1 Demonstrate knowledge of institutional-level trading and custody of digital assets

Including:

- Outline the evolution of and current process for third-party custody of digital assets
- Describe the benefits of direct custody
- Discuss the challenges associated with custody of digital assets

1.3.2 Demonstrate knowledge of use of passive funds to gain exposure to digital assets

Including:

- Explain how institutional investors gain exposure to digital assets via private placement
- Describe the benefits of private placement in passive funds
- Discuss the challenges with private placement in passive funds
- Compare and contrast the two types of regulated futures markets for digital assets
- Describe the benefits of futures exposure
- Discuss the challenges with using futures to gain exposure to digital assets
- Analyze the regulatory environment for digital asset Exchange Traded Funds (ETFs)
- Describe the benefits of digital asset ETFs
- Discuss the challenges associated with digital asset ETFs

1.3.3 Demonstrate knowledge of actively managed investment vehicles offering exposure to digital assets

Including:

- Describe the structure and purpose of actively managed digital asset funds
- Compare actively traded funds with Exchange Traded funds holding digital assets

1.3.4 Demonstrate knowledge of the costs associated with adding exposure to digital assets

Including:

- Compare the costs of establishing bitcoin exposure across the different channels available to institutional investors

Reading 1.4:

“Assessing Long-Term Investor Performance: Principles, Policies and Metrics,” Gordon L Clark and Ashby Monk, January, 2019.

Keywords:

knowledge management	commitment
capital leverage	board engagement
culture	environmental enablers
production inputs	intermediate outputs metrics
organizational ambidexterity	measurements
long-term investors	time horizon
idiosyncratic advantages	governance

Learning Objectives:

1.4.1 Demonstrate knowledge of Long-Term Investors’ operating models

Including:

- Explain the three main advantages Long-Term Investors have relative to other investors
- Discuss the three environmental enablers (intangible advantages) of Long-Term Investors

1.4.2 Demonstrate knowledge of the measurements and metrics used to assess the effectiveness of the Long-Term Investors’ process

Including:

- Describe the three “intermediate” outputs LTI's can use to measure organizational performance
- Explain how LTI's measure Environmental Enablers
- Explain how LTI's measure Production Inputs
- Explain how LTI's measure Intermediate Outputs
- Explain how LTI's measure Investment Results
- Summarize the simple model of production used to quantitatively measure investment activities of Long-Term Investor
- Identify the challenges of using traditional measurements of long-term success (i.e., quarterly returns)

Reading 1.5:

“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 growth differential

levered yield differential

yield-based approach

Learning Objectives:

1.5.1 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

1.5.2 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

1.5.3 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

1.5.4 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

Reading 1.6:

"An Introduction to Portfolio Rebalancing Strategies," Hossein Kazemi, 2022.

Keywords:

buy-and-hold	multiplier
constant mix	concave payoff curves
constant-proportion portfolio insurance	stop-loss
option-based portfolio insurance	option replication
convex payoff curves	Contrarian strategy
cushion	Momentum Strategy

Learning Objectives:

1.6.1 Demonstrate knowledge of dynamic trading strategies

Including:

- Determine the portfolio's asset values after a given change in value of a liquid risk asset, using dynamic trading strategies (i.e., buy-and-hold, constant mix, constant-proportion portfolio insurance, and Option-Based 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

1.6.2 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)

1.6.3 Demonstrate knowledge of dynamic strategies with illiquid assets

Including:

- Explain how dynamic trading strategies are adapted for illiquid portfolios
- Determine the portfolio's asset values after a given change in value of an illiquid risk asset, using dynamic trading strategies and futures

Reading 1.7:

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

Keywords

life expectancy	pension buy-out
risk transfer	pension buy-in
actuarial tables	longevity insurance
longevity insurance	

Learning Objectives:

1.7.1 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

1.7.2 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

Reading 1.8:

"A Short Introduction to the World of Cryptocurrencies," Aleksander Berentsen and Fabian Schär, St. Louis Fed, First Quarter 2018.

Keywords:

bitcoin	cash
digital cash	double spending
centralized authority	distributed ledger
satoshis	wallet
mining	permissionless
hash value	proof-of-work
nodes	public key
transaction capability	transaction legitimacy
transaction consensus	

Learning Objectives:

1.8.1 Demonstrate knowledge of the original motivation behind Bitcoin

Including:

- Compare physical cash with digital cash and describe the history of electronic payment systems prior to the creation of Bitcoin
- Discuss the evolutions Bitcoin introduced to the existing payment systems process

1.8.2 Demonstrate knowledge of distributed ledgers and blockchain technology

Including:

- Explain a simple distributed ledger
- Illustrate how transactions are added to a blockchain
- Describe how the bitcoin blockchain consensus (Proof-of-Work) mechanism works
- Discuss how the Bitcoin blockchain avoids adopting false information
- Summarize the monetary policy rules for the Bitcoin network

1.8.3 Demonstrate knowledge of blockchain's applications, benefits, and challenges

Including:

- Identify the ways in which bitcoin improves upon current monetary systems
- Explain why decentralized cryptocurrencies may be value add to the existing currency system

Topic 2: Ethics, Regulation, and ESG

Reading 2.1 Asset Manager Code of Professional Conduct – General Principles

Learning Objectives

2.1.1 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

2.1.2 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

2.1.3 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

2.1.4 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

2.1.5 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

2.1.6 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

Reading 2.2 Asset Manager Code

Recommendations and Guidance

Learning Objectives

2.2.1 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

2.2.2 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

2.2.3 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

2.2.4 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

2.2.5 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

2.2.6 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

Reading 2.3 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)
The Kanto Local Finance Bureau of
Ministry of Finance Japan (KLFB)

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

Learning Objectives

2.3.1 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

2.3.2 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

2.3.3 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

2.3.4 Demonstrate knowledge of alternative investment 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

Reading 2.4 ESG and Alternative Investments

Keywords

ESG

open protocol

Learning Objectives

2.4.1 Demonstrate knowledge of ESG in alternative investments

Including:

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

2.4.2 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

2.4.3 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

2.4.4 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

2.4.5 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

2.4.6 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

Reading 2.5 ESG Analysis and Application

Keywords

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

Learning Objectives

2.5.1 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

2.5.2 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

2.5.3 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

2.5.4 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)

2.5.5 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

2.5.6 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

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

Including:

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

2.5.8 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 3: Models

Reading 3.1 Modeling Overview and Interest Rate Models

Keywords

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

Learning Objectives

3.1.1 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

3.1.2 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

3.1.3 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

3.1.4 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

3.1.5 Demonstrate knowledge of P-Measures and Q-Measures

Including:

- Interpret and discuss p-measures and q-measures

Reading 3.2 Credit Risk Models

Keywords

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

Learning Objectives

3.2.1 Demonstrate knowledge of the economics of credit risk.

Including:

- 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

3.2.2 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

3.2.3 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

3.2.4 Demonstrate knowledge of the Kealhover, McQuown, and Vasicek (KMV) creditrisk 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

3.2.5 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

3.2.6 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

Reading 3.3 Multi-Factor Equity Pricing Models

Keywords

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

Learning Objectives

3.3.1 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 relate 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

3.3.2 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

3.3.3 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

3.3.4 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

3.3.5 Demonstrate knowledge of the adaptive markets hypothesis (AMH)

Including:

- Describe the AMH

3.3.6 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

3.3.7 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

Reading 3.4 Asset Allocation Processes and the Mean-Variance Model

Keywords

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

Learning Objectives

3.4.1 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

3.4.2 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

3.4.3 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

3.4.4 Demonstrate knowledge of mean-variance optimization with hurdle rates

Including:

- Interpret and calculate hurdle rates

3.4.5 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

3.4.6 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

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

Including:

- Interpret and calculate factor exposure for mean-variance approach

3.4.8 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

Reading 3.5 Other Asset Allocation Approaches

Keywords

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

Learning Objectives

3.5.1 Demonstrate knowledge of the core-satellite approach

Including:

- Interpret the core-satellite approach

3.5.2 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

3.5.3 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

3.5.4 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

3.5.5 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

3.5.6 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

3.5.7 Demonstrate knowledge of the new investment model

Including:

- Discuss the new investment model

Topic 4: Institutional Asset Owners and Investment Policies

Reading 4.1 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 retirement accounts
 internal constraints
 investment policy statement (IPS)
 national pension funds

Learning Objectives

4.1.1 Demonstrate knowledge of endowments and foundations

Including:

- Understand the different purposes endowments and foundations serve

4.1.2 Demonstrate knowledge of pension funds

Including:

- Identify the four types of pension funds

4.1.3 Demonstrate knowledge of sovereign wealth funds

Including:

- Discuss the role of SWFs in today's market

4.1.4 Demonstrate knowledge of family offices

Including:

- Understand how family offices operate

4.1.5 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

4.1.6 Demonstrate knowledge of asset allocation objectives

Including:

- Explain asset owners' objectives within allocations

4.1.7 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

4.1.8 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

Reading 4.2 Foundations and the Endowment Model

Keywords

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

Learning Objectives

4.2.1 Demonstrate knowledge of foundations and endowments

Including:

- Contrast the differences between foundations and endowments

4.2.2 Demonstrate knowledge of spending challenges arising from inflation within intergenerational equity

Including:

- Discuss the issues facing intergenerational equity within endowments

4.2.3 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

4.2.4 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

4.2.5 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

4.2.6 Demonstrate knowledge of tactical asset allocation and liquidity rebalancing

Including:

- Understand the relationship between tactical asset allocation and liquidity rebalancing

4.2.7 Demonstrate knowledge of tail risk

Including:

- Discuss tail risk and its implications in endowments

Reading 4.3 Pension Fund Portfolio Management

Keywords

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

Learning Objectives

4.3.1 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

4.3.2 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

4.3.3 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

4.3.4 Demonstrate knowledge of governmental social security plans

Including:

- Identify the background and purpose of governmental social security plans

4.3.5 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

4.3.6 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

Reading 4.4 Sovereign Wealth Funds

Keywords

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

Learning Objectives

4.4.1 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

4.4.2 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

4.4.3 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

4.4.4 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

4.4.5 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)

Reading 4.5 Family Offices and the Family Office Model

Keywords

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

Learning Objectives

4.5.1 Demonstrate knowledge of how to identify family offices

Including:

- Recognize what qualifies as a family office

4.5.2 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

4.5.3 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

4.5.4 Demonstrate knowledge of the macroeconomic exposures of family offices.

Including:

- Discuss how macroeconomic factors affect family office investment decisions

4.5.5 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

4.5.6 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

4.5.7 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

4.5.8 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

4.5.9 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

4.5.10 Demonstrate knowledge of how to identify private wealth management firms

Including:

- Describe the differences between family office and private wealth management
- Understand the comprehensive wealth management process for individual clients
- Recognize the different client service models of private wealth management

4.5.11 Demonstrate knowledge of the considerations private wealth managers must make when investing client portfolios

Including:

- Identify the primary investment goals and constraints of individual investors
- Describe the time horizons, risk tolerance, and illiquidity tolerance of individual investors
- Describe the tax considerations for private wealth investors
- Identify important behavioral finance considerations when advising individual investors on investments
- Describe the barriers preventing individual investors from gaining access to alternative investments

Topic 5: Risk and Risk Management

Reading 5.1 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

5.1.1 Demonstrate knowledge of risks driven by market losses

Including:

- Identify the reasons why Amaranth Advisors, LLC collapsed
- Understand the processes that led 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

5.1.2 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.

5.1.3 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

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

Including:

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

Reading 5.2 Benchmarking and Performance Attribution

Keywords

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

Learning Objectives

5.2.1 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

5.2.2 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

5.2.3 Demonstrate knowledge of multifactor benchmarking

Including:

- Understand multifactor benchmarking
- Understand bias from omitted factors in benchmarking
- Contrast single and multi-factor methods

5.2.4 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

5.2.5 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

5.2.6 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

5.2.7 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

5.2.8 Demonstrate knowledge of group peer returns as benchmarks

Including:

- Understand the peer group method of benchmarking PE fund performance

5.2.9 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

Reading 5.3 Liquidity and Funding Risks

Keywords

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

Learning Objectives

5.3.1 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

5.3.2 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

5.3.3 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

5.3.4 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

5.3.5 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

5.3.6 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

5.3.7 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

Reading 5.4 Hedging, Rebalancing, and Monitoring

Keywords

diversification return
rebalancing yield
slack variable

Learning Objectives

5.4.1 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

5.4.2 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

5.4.3 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

5.4.4 Demonstrate knowledge of key observations on delta-hedging

Including:

- Identify the three key observations of delta-hedging

5.4.5 Demonstrate knowledge of key observations on rebalancing delta-neutral option portfolios

Including:

- Describe three observations on rebalancing delta-neutral option portfolios

5.4.6 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

5.4.7 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

5.4.8 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

Reading 5.5 Risk Measurement, Risk Management, and Risk Systems

Keywords

exception report
pricing matrix
risk management

risk manager
risk measurement
watch list

Learning Objectives

5.5.1 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

5.5.2 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

5.5.3 Demonstrate knowledge of risk measurement with daily data collection

Including:

- Recognize the role of daily data collection within risk measurement

5.5.4 Demonstrate knowledge of risk measurement with weekly data collection

Including:

- Recognize the role of weekly data collection within risk measurement

5.5.5 Demonstrate knowledge of risk measurement with monthly data collection

Including:

- Recognize the role of monthly data collection within risk measurement

5.5.6 Demonstrate knowledge of risk measurement with quarterly data collection

Including:

- Recognize the role of quarterly data collection within risk measurement

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

Including:

- Recognize the role of annual data collection within risk measurement

5.5.8 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

5.5.9 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 6: Methods for Alternative Investment

Reading 6.1 Valuation and Hedging Using Binomial Trees

Keywords

backward induction
visualization

Learning Objectives

6.1.1 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

6.1.2 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 generated by averaging compounded rates of return

6.1.3 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

6.1.4 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

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

Including:

- Understand the advantages to using computer programming to model

Reading 6.2 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

6.2.1 Demonstrate knowledge of efficiently inefficient markets

Including:

- Define an efficient inefficient market and identify how and why it exists

6.2.2 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

6.2.3 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

6.2.4 Demonstrate knowledge of directional strategies and behavioral finance

Including:

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

6.2.5 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

Reading 6.3 Multivariate Empirical Methods and Performance Persistence

Keywords

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

Learning Objectives

6.3.1 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

6.3.2 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

6.3.3 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

6.3.4 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

6.3.5 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

6.3.6 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

6.3.7 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

Reading 6.4 Relative Value Models

Keywords

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

Learning Objectives

6.4.1 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

6.4.2 Demonstrate knowledge of steps within pairs trading

Including:

- Identify the steps of pairs trading and types of pairs trading

- Describe risks related to equity market neutrality

6.4.3 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

6.4.4 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 hold for producers that are hedgers
- Calculate and interpret substitution spreads
- Describe quality spreads and location spreads
- Interpret intramarket relative value strategies

6.4.5 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

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

Including:

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

Reading 6.5 Valuation Methods for Private Assets: The Case of Real Estate

Keywords

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

Learning Objectives

6.5.1 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

6.5.2 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 leveraged real estate

6.5.3 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

6.5.4 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

6.5.5 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

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

Including:

- Identify the differences in various indices and biases

6.5.7 Demonstrate knowledge of appraisal-based indices

Including:

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

6.5.8 Demonstrate knowledge of noisy pricing

Including:

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

Topic 7: Accessing Alternative Investments

Reading 7.1 Hedge Fund Replication

Keywords

algorithmic approach
algorithmic 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
view commonality

Learning Objectives

7.1.1 Demonstrate knowledge of replication products

Including:

- Understand basics of hedge fund replication products

7.1.2 Demonstrate knowledge of the potential benefits of replication products.

Including:

- Discuss the potential benefits to investors of using replication products

7.1.3 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

7.1.4 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

7.1.5 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

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

Including:

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

7.1.7 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

Reading 7.2 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

7.2.1 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

7.2.2 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

7.2.3 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

7.2.4 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

7.2.5 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

7.2.6 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 investable hedge fund indices

7.2.7 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

Reading 7.3 Access to Real Estate and Commodities

Keywords

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

Learning Objectives

7.3.1 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
-

7.3.2 Demonstrate knowledge of the return drivers of private equity real estate funds

Including:

- Discuss how the return to private equity real estate funds varies by international exposure, GDP growth, vintage year, credit spreads, and public real estate returns.
- Discuss how diversification across vintage years impacts the risk of a portfolio of private real estate funds

7.3.3 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

7.3.4 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

7.3.5 Demonstrate knowledge of commodity trade financing and production financing

Including:

- Recognize the process of financing commodity trades and production

7.3.6 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

7.3.7 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

Reading 7.4 Access Through Private Structures

Keywords

advantages of secondary market PE purchases	most favored nation status
commitment risk	optimal overcommitment ratio
denominator effect	overcommitment
excuse rights	overcommitment strategy
exit value	secondary private equity market transactions
funding risk	synthetic secondaries
market clientele	three ILPA guiding principles

Learning Objectives

7.4.1 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

7.4.2 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

7.4.3 Demonstrate knowledge of side letters to limited partnership agreements

Including:

- Recognize the various issues involving side letters

7.4.4 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

7.4.5 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

Reading 7.5 The Risk and Performance of Private and Listed Assets

Keywords

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

Learning Objectives

7.5.1 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

7.5.2 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 private properties and listed properties
- State the case against unlisted real estate pools based upon risk-adjusted performance

7.5.3 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

7.5.4 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

7.5.5 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

7.5.6 Demonstrate knowledge of the proposed cases against private equity

Including:

- Understand various studies regarding private equity

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

Including:

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

Topic 8: Due Diligence and Selecting Managers

Reading 8.1 Active Management and New Investments

Keywords

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

Learning Objectives

8.1.1 Demonstrate knowledge of tactical asset allocation

Including:

- Understand tactical asset allocation and its various applications

8.1.2 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

8.1.3 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

8.1.4 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

8.1.5 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

Reading 8.2 Selection of a Fund Manager

Keywords

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

Learning Objectives

8.2.1 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

8.2.2 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

8.2.3 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

8.2.4 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

8.2.5 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

8.2.6 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

8.2.7 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

8.2.8 Demonstrate knowledge of fund culture

Including:

- Understand the importance of a fund's culture

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

Including:

- Understand how prior commitments may impact decisions regarding manager selection

Reading 8.3 Investment Process Due Diligence

Keywords

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

Learning Objectives

8.3.1 Demonstrate knowledge of investment due diligence

Including:

- Describe different approaches to due diligence
- Describe and compare quantitative due diligence and qualitative 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

8.3.2 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

8.3.3 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

8.3.4 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

8.3.5 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

8.3.6 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

8.3.7 Demonstrate knowledge of warning indicators and awareness signals in investments

Including:

- Identify warning indicators and awareness signals with respect to investments

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

Including:

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

Reading 8.4 Operational Due Diligence

Keywords

asset verification
blackout periods
covered securities
cutting the NAV
dedicated operational due diligence approach
emerging manager
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
IDD
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
quantitative due diligence
qualitative due diligence
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

Learning Objectives

8.4.1 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 an SEC risk alert with respect to a fund's investment process

8.4.2 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

8.4.3 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

8.4.4 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

8.4.5 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

8.4.6 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

8.4.7 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

8.4.8 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

8.4.9 Demonstrate knowledge performing operational due diligence on emerging managers

Including:

- Define emerging managers
- Describe the difficulties an emerging manager may encounter in the operational due diligence process

8.4.10 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

Reading 8.5 Due Diligence of Terms and Business Activities

Keywords

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

Learning Objectives

8.5.1 Demonstrate knowledge of the document collection process in due diligence

Including:

- Describe the role of the document collection process as part of due diligence

8.5.2 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

8.5.3 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

8.5.4 Demonstrate knowledge of terms for liquid private funds

Including:

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

8.5.5 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

8.5.6 Demonstrate knowledge of general terms for private funds

Including:

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

8.5.7 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

8.5.8 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

8.5.9 Demonstrate knowledge of private fund audited financial statement reviews

Including:

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

8.5.10 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 9: Volatility and Complex Strategies

Reading 9.1 Volatility as a Factor Exposure

Keywords

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

Learning Objectives

9.1.1 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

9.1.2 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

9.1.3 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

9.1.4 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 arbitrated

9.1.5 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

Reading 9.2 Volatility, Correlation, and Dispersion Products and Strategies

Keywords

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

Learning Objectives**9.2.1 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

9.2.2 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

9.2.3 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

9.2.4 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

9.2.5 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

9.2.6 Demonstrate knowledge of dispersion trades

Including:

- Understand the basics of dispersion trades

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

Including:

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

9.2.8 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

Reading 9.3 Complexity and Structured Products

Keywords

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

Learning Objectives

9.3.1 Demonstrate knowledge of uncertainty, ambiguity, and opacity

Including:

- Define Knightian uncertainty
- Define ambiguity
- Define opacity and understand the theoretical incentive to create complexity

9.3.2 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

9.3.3 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

9.3.4 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

9.3.5 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

9.3.6 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

Reading 9.4 Insurance-Linked Products and Hybrid Securities

Keywords

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

Learning Objectives

9.4.1 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

9.4.2 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

9.4.3 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

9.4.4 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

9.4.5 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

9.4.6 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

9.4.7 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

Reading 9.5 Complexity and the Case of Cross-Border Real Estate Investing

Keywords

economic risk
key traditional currency risk assumption
natural hedge
price stickiness

quanto derivative
quanto option
roundtrip costs

Learning Objectives

9.5.1 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

9.5.2 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

9.5.3 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

9.5.4 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 cash investment in foreign assets

9.5.5 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

9.5.6 Demonstrate knowledge of heterogeneous investment taxation across jurisdiction

Including:

- Discuss real estate investment taxes across jurisdictions

9.5.7 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

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	<p>George has identified an opportunity for a convertible arbitrage reverse hedge. What risks are associated with this hedge?</p> <ul style="list-style-type: none"> 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. 	<p>You have to analyze the positions and factors impacting them.</p> <p>Correct Answer: B</p>
Apply	Make use of	<p>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:</p> <ul style="list-style-type: none"> 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. 	<p>You have to apply CFA Institute Standard I to find the correct answer.</p> <p>Correct Answer: C</p>
Assess	Determine importance, size, or value	<p>How are lower capital gains taxes expected to impact firm commitments?</p> <ul style="list-style-type: none"> 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. 	<p>You must assess the significance of the change in the tax rate for firm commitments.</p> <p>Correct Answer: A</p>

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
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
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
State	Set forth in words or declare	State the main risks faced by distressed securities investors.	You have to present a list or set of sentences that states main ideas.
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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