



# CAIA<sup>®</sup> Level II Study Guide

## September 2019

Chartered Alternative Investment  
Analyst Association<sup>®</sup>

# CAIA Level II Study Guide

## For the September 2019 Exam

### Contents

Introduction to the Level II Program .....	1
Preparing for the Level II Examination.....	2
Level II Examination Topic Weights and Question Format.....	3
Errata Sheet.....	4
Calculator Policy .....	4
Completion of the Level II Program .....	4
CAIA Level II Outline.....	5
<b>Topic 1: Professional Standards and Ethics</b> .....	8
<b>Topic 2: Current and Integrated Topics</b> .....	9
<b>Topic 3: Asset Allocation and Institutional Investors</b> .....	19
<b>Topic 4: Private Equity</b> .....	32
<b>Topic 5: Real Assets</b> .....	50
<b>Topic 6: Commodities</b> .....	67
<b>Topic 7: Hedge Funds and Managed Futures</b> .....	75
<b>Topic 8: Structured Products</b> .....	99
Action Words.....	103

## Introduction to the Level II Program

Welcome to Level II of the CAIA<sup>®</sup> Charter program. The CAIA Charter program is organized by the CAIA Association<sup>®</sup>, which was co-founded by the Alternative Investment Management Association (AIMA) and the Isenberg School Center for International Securities and Derivatives Markets (CISDM). It is the only globally recognized professional designation in the area of alternative investments, the fastest growing segment of the investment industry.

The CAIA curriculum provides breadth and depth by first placing emphasis on understanding alternative asset classes and then building applications in manager selection, risk management, and asset allocation. The Level I curriculum builds a foundation by introducing candidates to alternative asset classes and the role of active management in asset allocation and portfolio construction. Level II provides advanced coverage of several Level I topics and introduces candidates to recent academic and industry research in alternative investments, asset allocation, and risk management.

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

Passing the Level II examination is an important accomplishment and will require a significant amount of preparation. All candidates will need to study and become familiar with the CAIA Level II curriculum material in order to develop the knowledge and skills necessary to be successful on examination day.

Our study guides are organized to facilitate quick learning and easy retention. Each topic is structured around learning objectives and keywords that define the content that is eligible to be measured on the exam. The learning objectives and keywords are an important way for candidates to organize their study, as they form the basis for examination questions. All learning objectives reflect content in the CAIA curriculum, and all exam questions are written to directly address the learning objectives. A candidate who is able to meet all learning objectives in the study guide should be well prepared for the exam. For all these reasons, we believe that the CAIA Association has built a rigorous program with high standards, while also maintaining an awareness of the value of candidates' time.

Upon a candidate's successful completion of the Level II examination and meeting the membership requirements, the CAIA Association will confer the CAIA Charter upon the candidate.

## Preparing for the Level II Examination

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

- *Standards of Practice Handbook*, 11th Edition, CFA Institute, 2014. ISBN: 978-0-938367-85-7. The link to download the Handbook can be found on the CAIA website.
- *Alternative Investments: CAIA Level II*, 3rd Edition, Wiley, 2016. ISBN: 978-1-119-01639-7.
- *CAIA Level II: Current and Integrated Topics*, 2018. These readings can be downloaded free of charge from the CAIA website.

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

The learning objectives in this study guide are an important way for candidates to organize their study, as they form the basis for examination questions. Learning objectives provide guidance on the concepts and keywords that are most important to understanding the CAIA curriculum. Candidates should be able to define all keywords provided, whether or not 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 reading materials and what types of questions they may expect to see on the examination. Note that actual examination questions are not limited in scope to the exact action words used within the learning objectives. Action words have broad interpretation; 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.

Candidates should be aware that all equations in the readings are important to understand and that an equation sheet will *not* be provided on the exam.

### Preparation Time

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

## Examination Format

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

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

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

## Level II Examination Topic Weights and Question Format

Level II Topic	Question format	
	Multiple-Choice	Constructed-Response
Professional Standards and Ethics	0%	10%
Current and Integrated Topics	0%	10%
Asset Allocation and Institutional Investors	8%–12%	0%–10%
Private Equity	11%–15%	0%–10%
Real Assets	13%–17%	0%–10%
Commodities	5%–7%	0%–10%
Hedge Funds and Managed Futures	18%–22%	0%–10%
Structured Products	5%–7%	0%–10%
<b>Total</b>	<b>70%</b>	<b>30%</b>

Minutes	Format	Approximate Weight
120	Multiple-Choice (all parts)	70%
30	Optional break	–
120	Constructed-Response (all parts)	30%
<b>240</b>	<b>Total Examination Minutes</b>	<b>100%</b>

## Errata Sheet

Correction notes appear in this study guide to address known errors existing in the assigned readings. Additional errors in the readings and learning objectives are occasionally brought to our attention; in these cases, we will post the errata on the [Curriculum and Study Materials page](#) of the CAIA website: [https://caia.org/content/curriculum-study-tools?qt-curriculum\\_study\\_tools\\_quicktab=1](https://caia.org/content/curriculum-study-tools?qt-curriculum_study_tools_quicktab=1) It is the responsibility of the candidate to review these errata prior to taking the examination. Please report suspected errata to [curriculum@caia.org](mailto:curriculum@caia.org).

## Calculator Policy

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

## Completion of the Program

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

## CAIA Level II Outline

### Topic 1: Professional Standards and Ethics

*Standards of Practice Handbook*, 11th Edition, CFA Institute, 2014.

- Standard I: Professionalism
- Standard II: Integrity of Capital Markets
- Standard III: Duties to Clients
- Standard IV: Duties to Employers
- Standard V: Investment Analysis, Recommendations, and Actions
- Standard VI: Conflicts of Interest

### Topic 2: Current and Integrated Topics

1. *A Guide to Hedge Fund Business & Operational Due Diligence*, Skybridge Capital, March 2016.
2. *Understanding the Cost of Investment Management*, William F. Jarvis, Commonfund Institute, October 2015.
3. *Dynamic Strategies for Asset Allocation*, Andre F. Perold and William F. Sharpe, Financial Analyst Journal, January-February 1995.
4. *Developing an Asset Owner Climate Change Strategy*, Principles for Responsible Investment, May 2015.
5. *Private Equity Secondaries*, Capital Dynamics, June 2016.
6. *Making Waves: Cresting Co-Investment Opportunity*, Cambridge Associates, March 2015.
7. *Longevity Risk Transfer Markets: Market Structure, Growth Drivers and Impediments, and Potential Risks*, Bank for International Settlements, 2013.
8. *Private Credit Strategies*, Cambridge Associates, 2017.
9. *Blockchain and Financial Market Innovation*, Economic Perspectives, Federal Reserve Bank of Chicago, July 2017.

### **Topic 3: Asset Allocation and Institutional Investors**

*Alternative Investments: CAIA Level II*, Third Edition, Wiley, 2016.

Part Three: Asset Allocation and Institutional Investors, Chapters 1-6.

- Asset Allocation Processes and the Mean-Variance Model
- Tactical Asset Allocation, Mean-Variance Extensions, Risk Budgeting, Risk Parity, and Factor Investing
- The Endowment Model
- Pension Fund Portfolio Management
- Sovereign Wealth Funds
- The Family Office Model

### **Topic 4: Private Equity**

*Alternative Investments: CAIA Level II*, Third Edition, Wiley, 2016.

Part Four: Private Equity, Chapters 7-13.

- Private Equity Market Structure
- Private Equity Benchmarking
- Fund Manager Selection and Monitoring
- Private Equity Operational Due Diligence
- Private Equity Investment Process and Portfolio Management
- Measuring Private Equity Risk
- The Management of Liquidity

### **Topic 5: Real Assets**

*Alternative Investments: CAIA Level II*, Third Edition, Wiley, 2016.

Part Five: Real Assets, Chapters 14-21.

- Real Estate as an Investment
- Real Estate Indices and Unsmoothing Techniques
- Investment Styles, Portfolio Allocation, and Real Estate Derivatives
- Listed Versus Unlisted Real Estate Investments
- International Real Estate Investments
- Infrastructure as an Investment
- Farmland and Timber Investments
- Investing in Intellectual Property

### **Topic 6: Commodities**

*Alternative Investments: CAIA Level II*, Third Edition, Wiley, 2016.

Part Six: Commodities, Chapters 22-24.

- Key Concepts in Commodity Markets
- Allocation to Commodities
- Accessing Commodity Investment Products

## Topic 7: Hedge Funds and Managed Futures

*Alternative Investments: CALA Level II*, Third Edition, Wiley, 2016.

Part Seven: Hedge Funds and Managed Futures, Chapters 25-34.

- Managed Futures
- Investing in CTAs
- Relative Value Strategies
- Hedge Funds: Directional Strategies
- Hedge Funds: Credit Strategies
- Volatility, Correlation, and Dispersion Products and Strategies
- Hedge Fund Replication
- Funds of Hedge Funds and Multistrategy Funds
- Hedge Fund Operational Due Diligence

## Topic 8: Structured Products

*Alternative Investments: CAIA Level II*, Third Edition, Wiley, 2016.

Part Eight: Structured Products, Chapters 35-36.

- Structured Products I - Fixed-income Derivatives and Asset-backed Securities
- Structured Products II - Insurance-Linked Products and Hybrid Securities

## Topic I: Professional Standards and Ethics

### Readings

*Standards of Practice Handbook*, 11th edition, CFA Institute, 2014. ISBN: 978-0-938367-85-7.

### Learning Objectives

**A.1 Demonstrate knowledge of Standard I: Professionalism.**

*For example:*

- Apply Standard I with respect to knowledge of the law, independence and objectivity, misrepresentation, and misconduct

**A.2 Demonstrate knowledge of Standard II: Integrity of Capital Markets.**

*For example:*

- Apply Standard II with respect to material nonpublic information and market manipulation

**A.3 Demonstrate knowledge of Standard III: Duties to Clients.**

*For example:*

- Apply Standard III with respect to loyalty, prudence and care, fair dealing, suitability, performance presentation, and preservation of confidentiality

**A.4 Demonstrate knowledge of Standard IV: Duties to Employers.**

*For example:*

- Apply Standard IV with respect to loyalty, additional compensation arrangements, and responsibilities of supervisors

**A.5 Demonstrate knowledge of Standard V: Investment Analysis, Recommendations, and Actions.**

*For example:*

- Apply Standard V with respect to diligence and reasonable basis, communication with clients and prospective clients, and record retention

**A.6 Demonstrate knowledge of Standard VI: Conflicts of Interest.**

*For example:*

- Apply Standard VI with respect to disclosure of conflicts, priority of transactions, and referral fees

## Topic 2: Current and Integrated Topics

### Readings

1. *A Guide to Hedge Fund Business & Operational Due Diligence*, Skybridge Capital, March 2016.

#### Keywords:

business risk	operational risk
non-investment risks	fund jurisdiction
redemption, restrictions, & impediments	master/feeder structure
side-by-side structure	alignment of interest
cash control	trading process
valuation process	prime brokers
futures commission merchants	custodians
fund administrator	

#### Learning Objectives:

#### **GHBO.1 Demonstrate knowledge of the role played by non-investment related risks in the due diligence process.**

*For example:*

- Identify the importance of both business risk and operational risk in generating potential losses
- Describe, through four case studies, the potential impact business and operational risk can present to a hedge fund investment

#### **GHBO.2 Demonstrate knowledge of the scope and process of due diligence from the perspective of the hedge fund itself.**

*For example:*

- Summarize the process of due diligence from the perspective of the hedge fund itself

#### **GHBO.3 Demonstrate knowledge of the scope and process of due diligence from the perspective of the hedge fund manager.**

*For example:*

- Summarize the process of due diligence from the perspective of the hedge fund manager

#### **GHBO.4 Demonstrate knowledge of the scope and process of due diligence with respect to obtaining information necessary to make assessments.**

*For example:*

- Summarize the process of due diligence with respect to obtaining information necessary to make assessments

2. *Understanding the Cost of Investment Management*, October 2015, Commonfund.

**Keywords:**

fund servicing costs	investment oversight costs
activity- and transaction-related fees and costs	outsourcing costs
investment costs	disclosed costs
	undisclosed costs

**Learning Objectives:**

**UCIM.1 Demonstrate knowledge of investment costs.**

*For example:*

- Define and describe the structure, components, and determinants of the total cost of investment management
- Explain the structure and cost implications of investment management models using traditional consultants, funds of funds, and internal or outsourced CIOs

**UCIM.2 Demonstrate knowledge of the importance of investment costs.**

*For example:*

- Differentiate between fees and costs and explain the degree to which each are disclosed
- List and explain the reasons why investors need to better understand investment costs

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

**Keywords:**

buy-and-hold	concave payoff curves
constant-proportion portfolio insurance	constant mix
convex payoff curves	decision rule
exposure diagram	floor
multiplier	option-based portfolio insurance

**Learning Objectives:**

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

*For example:*

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

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

*For example:*

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

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

*For example:*

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

4. *Developing an Asset Owner Climate Change Strategy*, Principles for Responsible Investment, May 2015.

**Keywords:**

principles of responsible investment  
carbon budget  
stranded assets

climate change  
portfolio emissions  
engagement

**Learning Objectives:**

**DCCS.1 Demonstrate knowledge of the six Principles for Responsible Investment.**

*For example:*

- List the six Principles for Responsible Investment

**DCCS.2 Demonstrate knowledge of the three steps for developing a climate change strategy.**

*For example:*

- Discuss the measurement of climate risks in a portfolio and strategies for reducing portfolio emissions and portfolio risks
- Discuss steps for acting on the climate change strategy, including engaging specific groups of people in discussions, planning, and implementation
- Discuss the process of reviewing and monitoring climate change risks in a portfolio

**DCCS.3 Demonstrate knowledge of the three key strategies for managing the climate impact of portfolio investments.**

*For example:*

- Discuss how to engage companies and public policy makers
- Discuss the process and impact of including low-carbon investments in a portfolio
- Discuss the process and impact of avoiding high-carbon investments in a portfolio

**DCCS.4 Demonstrate knowledge of case studies of institutional investors implementing climate change strategies.**

*For example:*

- Discuss case studies of institutional investors' climate change decisions, discussions, and investment processes

**DCCS.5 Demonstrate knowledge of climate change risks and opportunities within asset classes.**

*For example:*

- Discuss areas to invest, engage, and avoid within equities, fixed income, private equity/venture capital, property/real estate, and green infrastructure

## 5. *Private Equity Secondaries*, Capital Dynamics, June 2016.

### **Keywords:**

secondaries

post-reference date

seller financing

valuation (reference) date

secondary conversion rate

in-house team

### **Learning Objectives:**

#### **PES.1 Demonstrate knowledge of the mechanics of the private equity secondary market.**

*For example:*

- Identify the three parties involved and their roles in secondary market transactions
- Describe the importance of the valuation (reference) date
- Explain the effects of distributions, capital calls, and changes in the NAV on the final payment

#### **PES.2 Demonstrate knowledge of the history, growth, and pricing evolution of the secondary markets.**

*For example:*

- Describe the relationship between transactions in the secondary market and primary fundraising
- Identify the effect of recent regulatory changes on the potential growth of secondary market
- Identify the typical historical conversion rate between primary fundraising and secondary transactions
- Describe the two methods of debt financing in secondary market
- Explain the implications of the observation that the bulk of secondary market transactions are conducted by large funds
- Explain the preference of general partners for integrated versus pure play platforms in the secondary market
- Explain fund restructuring

#### **PES.3 Demonstrate knowledge of the benefits of investing in secondary transactions.**

*For example:*

- Explain the qualitative benefits of secondary investments, such as improved visibility, shallower J-curve, access to funds, and lower loss rate

- In a portfolio context, explain the qualitative benefits of secondary investments such as accelerated build up, smoother cash flows, and increased diversification
- Explain the reasons for quantitative differences between characteristics of primary and secondary investments such as higher IRR, lower TPVI, lower return volatility, lower loss rate, accelerated cash back, and narrower return dispersion for secondary investments

**PES.4 Demonstrate knowledge of the development of a secondaries program.**

*For example:*

- Compare and contrast the advantages and challenges of in-house versus outsource solutions

6. *Making Waves: Cresting Co-Investment Opportunity*, Cambridge Associates, March 2015.

**Keywords:**

co-investment	multi-sponsor funds
single-sponsor funds	direct co-investment
multiple of invested capital (MOIC)	venture co-investment

**Learning Objectives:**

**MW.1 Demonstrate knowledge of co-investment strategy.**

*For example:*

- Describe four ways that co-investment can be made
- Identify the risk-return profiles of the four methods by which co-investments can be made
- Describe the benefits of co-investment in terms of risk-return, J-curve mitigation, higher efficiency, tailored portfolios, and becoming a skilled limited partner
- Describe the challenges of co-investment in having the right skillset, finding co-investment opportunities, timing, decision making process, adverse selection. and benchmarking
- Identify the key factors that can improve co-investment's outcome in terms of its unique risks, resource requirements, and avoiding adverse selection

7. *Longevity Risk Transfer Markets: Market Structure, Growth Drivers and Impediments, and Potential Risks*, Bank for International Settlements, December 2013.

**Keywords:**

longevity risk  
buy-out, buy-in  
longevity risk transfer (LRT)  
lemons risk

longevity bonds  
longevity swap  
reverse mortgage  
systemic risk

**Learning Objectives:**

**LRTM.1 Demonstrate knowledge of longevity risk transfer instruments.**

*For example:*

- Describe buy-in and buy-out transactions in terms of structure and cost
- Describe longevity swap transactions in terms of structure, and in comparison, to buy-ins and buy-outs

**LRTM.2 Demonstrate knowledge of longevity risk transfer market drivers and impediments.**

*For example:*

- Identify the drivers of the longevity risk transfer market in terms of funding status of pension funds, regulation and other potential benefits to buyers of longevity risk
- Describe reverse mortgages and the role of regulatory arbitrage in this market
- Identify the impediments to the growth of longevity risk transfer markets in terms of asymmetric information, basis risk, and regulation.

**LRTM.3 Demonstrate knowledge of risk management challengers in longevity risk transfer transactions.**

*For example:*

- Describe the role of counterparty risk in various types of longevity risk transfer transactions
- Explain the presence of systemic risk in longevity risk transfer markets in terms of concentration and liquidity

8. *Private Credit Strategies*, Cambridge Associates, 2017.

**Keywords:**

capital preservation strategies	return-maximizing strategies
opportunistic strategies	mezzanine debt
direct lending	senior debt
capital appreciation strategies	distressed credit
credit opportunities	specialty finance

**Learning Objectives:**

**PCS.1 Demonstrate knowledge of investments in private credit.**

*For example:*

- Explain the variety of strategies, including their risk and return
- Explain the interaction between the economic cycle and investments in specific private credit strategies
- Discuss the risks of private credit investments, including scale, leverage, and jurisdiction

**PCS.2 Demonstrate knowledge of capital preservation strategies.**

*For example:*

- Discuss the risk, return, characteristics, and strategy of mezzanine and senior debt

**PCS.3 Demonstrate knowledge of return-maximizing strategies.**

*For example:*

- Discuss the risk, return, characteristics, and strategy of capital appreciation strategies and distressed credit

**PCS.4 Demonstrate knowledge of opportunistic and niche strategies.**

*For example:*

- Discuss the risk, return, characteristics, and strategy of credit opportunities and specialty finance

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

**Keywords:**

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

**Learning Objectives:**

**BFMI.1 Demonstrate knowledge of blockchain technology.**

*For example:*

- Understand a simple distributed ledger
- Understand how transactions are added to blockchain
- Contrast permissioned and permissionless networks
- Contrast public and private networks
- Understand how blockchain consensus mechanism works
- Understand immutability of records on blockchain

**BFMI.2 Demonstrate knowledge of blockchain's applications, benefits, and challenges.**

*For example:*

- Discuss smart contracts and digital assets
- Discuss the potential of blockchain to reduce the post-trade settlement period
- Discuss technical and business challenges posed by blockchain technology

## Topic 3: Asset Allocation and Institutional Investors

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 1 Asset Allocation Processes and the Mean-Variance Model

#### Keywords

asset allocation	investment policy statement
constraint	national pension funds
degree of risk aversion	objective
efficient frontier	private defined benefit funds
endowments	private defined contribution funds
expected utility	risk averse
external constraints	security selection
hurdle rate	utility
individually managed accounts	utility function
internal constraints	

#### Learning Objectives

#### Chapter 1: Asset Allocation Processes and the Mean Variance Model

##### **1.1 Demonstrate knowledge of the importance of asset allocation.**

*For example:*

- Describe asset allocation and security selection
- Discuss how to evaluate the importance of asset allocation and security selection for the performance of a portfolio

##### **1.2 Demonstrate knowledge of the five steps of the asset allocation process.**

*For example:*

- Describe the five typical steps that must be taken to implement a systematic asset allocation program

**1.3 Demonstrate knowledge of categories of asset owners.**

*For example:*

- Describe the characteristics of endowments and foundations
- Describe the characteristics of various types of pension funds
- Describe the characteristics of sovereign wealth funds
- Describe the characteristics of family offices

**1.4 Demonstrate knowledge of the objectives and constraints of asset owners.**

*For example:*

- Discuss the role played by investment objectives and investment constraints

**1.5 Demonstrate knowledge of investment policy objectives.**

*For example:*

- Recognize how asset owners set investment policy objectives
- Evaluate investment choices given an asset owner's investment objectives with regard to expected return and standard deviations
- Evaluate investment choices given an asset owner's investment objectives with regard to utility, and calculate expected utility for a given investment
- Describe how utility functions are expressed in terms of expected return and variance, and calculate expected utility using expected return and variance to identify attractive investments
- Describe how utility functions are expressed in terms of higher moments, and calculate expected utility using higher moments to identify attractive investments
- Describe how utility functions are expressed in terms of value at risk, and calculate expected utility using value at risk to identify attractive investments
- Demonstrate how risk aversion can be used to manage a defined benefit pension fund
- Use information regarding asset allocation decisions to calculate investor risk aversion
- Demonstrate how to use risk aversion and growing liabilities to manage assets

**1.6 Demonstrate knowledge of investment policy constraints.**

*For example:*

- Recognize and describe internal constraints in the context of investment policy
- Recognize and describe external constraints in the context of investment policy

**1.7 Demonstrate knowledge of the preparation of an investment policy statement (IPS).**

*For example:*

- List and describe the seven common components of an IPS
- Discuss how risk and return estimates inform strategic asset allocation (SAA)
- Describe the development of a SAA for inclusion in an IPS
- Describe tactical asset allocation

**1.8 Demonstrate knowledge of the implementation of an IPS.**

*For example:*

- Describe how the mean-variance optimization (MVO) approach can be used to implement an IPS
- Calculate optimal investment in risky and riskless assets in the context of MVO
- Describe the process for using information about the value of a portfolio's liabilities to achieve an optimal portfolio in the context of MVO
- Describe the process of MVO for a portfolio containing multiple risky assets
- Discuss the role of a hurdle rate when performing a MVO, and calculate the hurdle rate for a given asset
- Identify issues in using optimization
- Discuss portfolio optimizers and how they may act as error maximizers
- Discuss optimization-related data issues for illiquid assets and for large-scale optimization
- Determine and explain the level of incorporation of higher moments by MVO
- Identify additional issues related to MVO, and discuss the Black-Litterman approach to asset allocation modeling and additional constraints to the optimization model used by asset allocators

**Chapter 2** Tactical Asset Allocation, Mean-Variance Extensions, Risk Budgeting, Risk Parity, and Factor Investing

**Keywords**

betting against beta anomaly	market liquidity risk
conditional expectation models	momentum crash
economically meaningful signals	risk budgeting
estimation risk	risk parity
foregone loss carryforward	robust optimization
funding liquidity risk	underwater
leverage aversion theory	volatility anomaly
liquidity penalty function	

**Learning Objectives**

Chapter 2: Tactical Asset Allocation, Mean-Variance Extensions, Risk Budgeting, Risk Parity, and Factor Investing

**2.1 Demonstrate knowledge of tactical asset allocation (TAA).**

*For example:*

- Define tactical asset allocation
- Describe the Fundamental Law of Active Management (FLOAM), and perform calculations to determine a given manager's information coefficient
- Explain the cost of actively managing alternative investments, and perform calculations regarding the information ratio
- Discuss the costs of actively managing portfolios with alternative investments (i.e., the cost of foregone loss carryforward and four other costs associated with the replacement of an external manager)
- Summarize three observations regarding TAA and reallocation costs, and perform calculations regarding portfolio betas
- Identify and discuss the keys to a successful TAA investment process (i.e., return prediction, three notable characteristics of sound TAA model development, and fundamental and technical analysis that underlies TAA models)

**2.2 Demonstrate knowledge of extensions to the mean-variance approach.**

*For example:*

- Discuss and demonstrate an adjustment of the mean-variance approach to account for the issue of illiquidity
- Discuss and demonstrate an adjustment of the mean-variance approach to account for the issues related to factor exposures
- Discuss and demonstrate an adjustment of the mean-variance approach to take estimation risk into account

**2.3 Demonstrate knowledge of risk budgeting.**

*For example:*

- Discuss the specifications required and not required as part of the risk budgeting process
- Describe the implementation of a risk budgeting approach, and calculate total risk and standard deviation for a given portfolio
- Apply the risk budgeting technique for a given three-asset portfolio
- Apply the risk budgeting approach to decompose the total risk of a portfolio using factors

**2.4 Demonstrate knowledge of risk parity.**

*For example:*

- List and describe the three steps that are used to implement the risk parity approach when performing the asset allocation component of managing an investment portfolio, and calculate the contribution of an asset to the total risk of a given portfolio
- Describe how the risk parity approach is used to create and analyze a portfolio
- Discuss the primary economic rationale for the risk parity approach
- Describe four invalid arguments often put forth to support the use of the risk parity approach to allocating assets in an investment portfolio
- Describe and compare equally weighted portfolios and volatility-weighted portfolios

**2.5 Demonstrate knowledge of factor investing.**

*For example:*

- Discuss the emergence of using risk factor analysis as the basis for implementing practical investment decisions, and describe three important observations regarding risk factor investing
- Discuss how risk factors are described
- Discuss how risk premiums vary across risk factors, and how risk factor returns vary across differing market conditions
- Describe the characteristics of investability, and assess the investability of risk factors
- Describe how the analysis of risk factors is applied when performing a risk allocation
- Discuss the effect of allocations based on risk factors on portfolio performance

**See next page for correction to reading.**

**Correction to Reading (*printed version only*):**

CAIA Level II, Section 2.2.3, Page 49:

The first equation:

$$0.83\% - 1.96 \times \frac{2.89}{\sqrt{60}} \leq \bar{R} \leq 0.83\% + 1.96 \times \frac{2.89}{\sqrt{60}}$$

Should read

$$0.83\% - 1.96 \times \frac{2.89\%}{\sqrt{60}} \leq \bar{R} \leq 0.83\% + 1.96 \times \frac{2.89\%}{\sqrt{60}}$$

<b>Chapter 3</b> The Endowment Model
--------------------------------------

### Keywords

community foundations	market timing
corporate foundations	network effect
corpus	non-discretionary investment consultant
equity options hedges	operating foundations
endowment model	outsourced CIO
foundations	overcommitment strategy
first-mover advantage	rebalance
independent foundations	return target
inflation beta	spending rate
intergenerational equity	total return investor
liquidity premiums	
liquidity-driven investing	

### Learning Objectives

#### Chapter 3: The Endowment Model

##### **3.1 Demonstrate knowledge of endowments and foundations.**

*For example:*

- Define and describe endowments and foundations
- Discuss types of foundations

##### **3.2 Demonstrate knowledge of intergenerational equity, inflation, and spending challenges for endowments and foundations.**

*For example:*

- Discuss the concept of intergenerational equity
- Compare spending rates of endowments and foundations
- Discuss the implications of inflation on managing endowments and foundations

##### **3.3 Demonstrate knowledge of the endowment model.**

*For example:*

- Describe the defining characteristics of the endowment model, and how it has evolved over time

**3.4 Demonstrate knowledge of key advantages enjoyed by large endowments.**

*For example:*

- List six advantages large endowments have
- Discuss how an aggressive asset allocation may lead to investment outperformance
- Describe advantages of large endowments in selecting alternative asset managers
- Describe the effect of the first-mover advantage on the performance of endowments
- Describe the effect of access to a network of talented alumni on the performance of endowments
- Describe the effect of tolerance for liquidity risk on the performance of endowments
- Describe the effect of sophisticated investment staff and board oversight on the performance of endowments

**3.5 Demonstrate knowledge of the risks of the endowment model.**

*For example:*

- Discuss the tension that exists between the spending rate of an endowment, the risk of the endowment portfolio, and the goal of maintaining the endowment as a permanent source of capital
- Discuss liquidity risk in the context of endowments
- Describe approaches to rebalancing an endowment portfolio
- Define and discuss tail risk methods for hedging it

## Chapter 4 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	progressive system
defined contribution plan	projected benefit obligation (PBO)
drifting asset allocation	retirement income-replacement ratio
duration matching approach	surplus risk
frozen pension plan	target-date fund
funded status	terminated pension plan
immediate annuity	

### Learning Objectives

#### Chapter 4: Pension Fund Portfolio Management

#### 4.1 Demonstrate knowledge of the development of pension plans, the motivations driving the use of pension plans, and types of pension plans.

*For example:*

- Describe the historical development of pension plans
- Discuss the reasons for why pension plans may be considered attractive, from the perspectives of both employers and employees
- List three basic types of pension plans

#### 4.2 Demonstrate knowledge of pension plan risk tolerance and asset allocation.

*For example:*

- Discuss the three approaches that may be used by DB plan managers to measure their risk (i.e., asset-focused risk management, asset-liability risk management, and integrated asset-liability risk management)
- Recognize the four factors that drive the effect of liabilities on the risk of a pension plan
- Recognize and describe the role of five major factors affecting the risk tolerance of a pension plan sponsor
- Describe the strategic asset allocation of a pension plan using two separate buckets

**4.3 Demonstrate knowledge of defined benefit plans.**

*For example:*

- Describe the portability and job mobility of defined benefit (DB) plans
- Describe the roles of an accumulated benefit obligation (ABO) and a projected benefit obligation (PBO) in modeling the liabilities of a DB plan, and list the assumptions necessary to calculate the ABO and PBO of retiree benefits
- Describe both the funded status and the surplus risk of DB plans, and calculate the percentage change in liabilities for a given pension plan's PBO
- Discuss reasons why DB plans are waning as measured by the proportion of total pension assets that DB plans manage
- Discuss asset allocations and liability-driven investing in the context of DB plan investment management

**4.4 Demonstrate knowledge of governmental social security plans.**

*For example:*

- Describe governmental social security plans, and identify ways in which they differ from DB plans

**4.5 Demonstrate knowledge of the contrasts between DB plans and defined contribution (DC) plans.**

*For example:*

- Describe the characteristics of DC plans
- Distinguish between DC plans and DB plans in terms of their portability, longevity risk, and investment options
- Discuss asset allocation in DC plans, and how it differs from asset allocation in DB plans
- Describe target-date funds, and discuss issues surrounding the inclusion of alternative investments in DC plans

**4.6 Demonstrate knowledge of annuities used for retirement income.**

*For example:*

- Identify and describe financial phases related to retirement
- Discuss three important investment risks for retirees
- Determine a given retiree's estimated exposure to longevity risk
- Describe two major types of annuities
- Analyze and calculate the value of a given growth annuity

**Correction to Reading (*printed version only*):**

Section 4.3.5, Page 112, 4th paragraph:

**Inflation-protected bonds** earn a nominal coupon while the principal value rises with the rate of inflation.

Should be:

**Inflation-protected bonds** earn a real coupon while the principal value rises with the rate of inflation.

## Chapter 5 Sovereign Wealth Funds

### Keywords

capital account surplus	protectionist policies
conservative investment opportunity cost	reserve account
current account deficit	reserve adequacy
depletion	reserve investment funds
development funds	savings funds
Dutch disease	stabilization funds
Norway model	sterilization
pension reserve funds	

### Learning Objectives

#### Chapter 5: Sovereign Wealth Funds

##### 5.1 Demonstrate knowledge of the sources of sovereign wealth.

*For example:*

- 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

##### 5.2 Demonstrate knowledge of four types of SWFs.

*For example:*

- Describe the characteristics of stabilization funds
- Describe the characteristics of reserve funds and savings funds
- Describe the characteristics of development funds

##### 5.3 Demonstrate knowledge of the establishment and management of SWFs.

*For example:*

- 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

##### 5.4 Demonstrate knowledge of the emergence of SWFs.

*For example:*

- Identify factors that have driven growth in the establishment of SWFs
- Identify the basic characteristics of the world's largest SWFs

**5.5 Demonstrate knowledge of the governance and political risks of SWFs.**

*For example:*

- Discuss factors that affect the governance of SWFs
- List the ten principles of the Linaburg-Maduell Transparency Index
- Summarize the Santiago Principles

**5.6 Demonstrate knowledge of the economics of the management of three SWFs.**

*For example:*

- Analyze the governance and management of the Norwegian Government Pension Fund Global
- Analyze the governance and management of China Investment Corporation (CIC)
- Analyze the governance and management of Temasek Holdings (Singapore)

**Chapter 6** The Family Office Model

**Keywords**

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

**Learning Objectives**

Chapter 6: The Family Office Model

**6.1 Demonstrate knowledge of the identification of family offices.**

*For example:*

- Describe the characteristics of family offices

**6.2 Demonstrate knowledge of the goals, benefits, and business models of family offices.**

*For example:*

- 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

**6.3 Demonstrate knowledge of how the goals of family offices are affected by the stage of the family life cycle.**

*For example:*

- Describe factors affecting risk management of first-generation wealth
- Discuss the benchmark considerations used to manage and assess the investment of first-generation wealth
- Discuss the goals of family offices that are responsible for managing the investment of post-first-generation wealth, and compare asset allocations and liquidity profiles for family offices to those of endowments

**6.4 Demonstrate knowledge of the macroeconomic exposures of family offices.**

*For example:*

- Discuss how macroeconomic factors affect family office investment decisions

**6.5 Demonstrate knowledge of the constraint of income taxes for family offices.**

*For example:*

- 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

**6.6 Demonstrate knowledge of the lifestyle assets of family offices.**

*For example:*

- 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

**6.7 Demonstrate knowledge of the governance of family offices.**

*For example:*

- Discuss the governance structures of family offices
- Describe the challenges associated with sustaining family wealth
- Describe strategies used to maintain family wealth across generations
- Discuss considerations involved in inheritance and succession planning

**6.8 Demonstrate knowledge of charity, philanthropy, and impact investing.**

*For example:*

- Describe and distinguish the primary characteristics of charity and philanthropy
- Describe the characteristics and goals of impact investing

**6.9 Demonstrate knowledge of the ten competitive advantages of family offices.**

*For example:*

- List and describe ten natural advantages family offices have that help them manage their overall portfolios

## Topic 4 Private Equity

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 7 Private Equity Market Structure

### Keywords

adverse selection	in-kind distributions
bad-leaver clause	lemons
blind-pool	life cycle of the GP–LP relationship
build and harvest	limited partners (LPs)
co-investment	limited partnership agreement (LPA)
decline	LP advisory committee (LPAC)
direct investment in private equity	organized PE market
distribution waterfall	pay promote
drawdowns	qualified majority
early stage	realizations
entry and establish	replacement capital
exit	rescue
expansion stage	scaling down
fee-offset	scaling up
general partners (GPs)	secondary transactions in private equity
good-leaver clause	spinouts
hurt money	start-up stage
informal PE market	

## Learning Objectives

### Chapter 7: Private Equity Market Structure

#### 7.1 **Demonstrate knowledge of the main strategies of private equity investment.**

*For example:*

- Recognize the differences between the organized private equity market and the informal private equity market
- Describe the three primary investment strategies (i.e., venture capital, buyout, and mezzanine) used by private equity managers, along with two other strategies (i.e., rescue and replacement capital)

#### 7.2 **Demonstrate knowledge of the main differences between venture capital and buyout.**

*For example:*

- Compare the key characteristics and performance of venture capital and buyout
- Discuss the business models of both venture capital and buyout funds
- Describe the structuring of venture capital and buyout deals
- Discuss the role of the private equity manager in venture capital and buyout investment

#### 7.3 **Demonstrate knowledge of how private equity funds as intermediaries.**

*For example:*

- Describe the conditions under which private equity funds typically enter into the funding process, and the advantages of doing so for private equity investors
- Discuss how private equity funds benefit from inefficiencies in traditional corporate structures
- Discuss the different forms of private equity fund intermediation
- Describe the structure of the organized private equity marketplace

#### 7.4 **Demonstrate knowledge of private equity funds of funds as intermediaries.**

*For example:*

- Summarize the characteristics and activities of private equity funds of funds
- Describe the costs of private equity funds of funds
- Discuss the value added by private equity funds of funds (i.e., diversification and intermediation, resources and information, selection skills and expertise, and incentives and oversight)

#### 7.5 **Demonstrate knowledge of the relationship life cycle between private equity limited partners (LPs) and general partners (GPs).**

*For example:*

- Discuss the symbiotic relationship between LPs and GPs, and its advantages for both LPs and GPs
- Recognize the stages of the relationship life cycle of the GP-LP relationship, and discuss how the GP-LP relationship changes throughout the life cycle

**7.6 Demonstrate knowledge of the key features of private equity limited partnerships.**

*For example:*

- Describe the conditions addressed in the two main categories of clauses in limited partnership agreements (LPAs)
- Discuss factors that affect how well LPAs fit into the private equity market environment
- Describe key elements of corporate governance of private equity limited partnerships
- Discuss decisions regarding investment objectives, size, and term of a private equity fund
- Describe management fees and expenses in private equity limited partnerships
- Discuss carried interest in private equity limited partnerships, and calculate carried interest
- Discuss preferred returns, or hurdle rates, in private equity limited partnerships
- Discuss GP capital contributions to private equity funds
- Describe the key-person provision in private equity limited partnerships
- Discuss termination and divorce in private equity limited partnerships
- Explain the distribution waterfall of a private equity fund, and calculate distributions for a given fund

**7.7 Demonstrate knowledge of private equity co-investments.**

*For example:*

- Compare direct investments and co-investments in the private equity space
- Recognize the expected advantages of private equity co-investing
- Recognize the expected disadvantages of private equity co-investing
- Describe the investment process for private equity co-investment

**Correction to Reading (*printed version only*):**

**Page 199, first paragraph of Section 7.7.2:**

“In addition to avoiding the double layer of management fees, co-investing potentially offers the LP a number of advantages. Theoretically, it provides maximization of the fund investment’s upside by increasing the exposure to the best-performing portfolio companies.”

Should read:

“In addition to avoiding the double layer of management fees, co-investing potentially offers the LP a number of advantages. Theoretically, it provides maximization of the fund investment’s upside by reducing cost and increasing exposure to portfolio companies selected by the LP for their potential upside.”

**Page 201, last paragraph of Section 7.7.3**

“For their risk-reward profile, co-investments are between a direct investment and a normal partnership. They are more risky than investing in a PE partnership, with a downside comparable to that of direct investments (while in a fund’s portfolio, a failed investment can go under; also, co-investments result in more losers), and they require significant staff time and legal expenses.”

Should read:

“For their risk-reward profile, co-investments are between a direct investment and a normal partnership. They are more risky than investing in a PE partnership, with a downside comparable to that of direct investments (while in a fund’s portfolio, a failed investment can happen, co-investments result in more losers), and they require significant staff time and legal expenses. “

## Chapter 8 Private Equity Benchmarking

### Keywords

absolute return	NAV J-curve
appraised asset class	peer-group-based benchmark
asset-based benchmark	peer-group-cohort
Bailey criteria	pooled IRR
cash flow J-curve	public market equivalent (PME ratio)
commitment-weighted IRR	relative return
distribution to paid-in ratio (DPI)	residual value to paid-in ratio (RVPI)
listed PE index	total value to paid-in (TVPI)

### Learning Objectives

#### Chapter 8: Private Equity Benchmarking

#### 8.1 Demonstrate knowledge of the role of benchmarks in private equity investing.

*For example:*

- Recognize needs served by investment benchmarks
- Identify steps of constructing a private equity benchmark

#### 8.2 Demonstrate knowledge of the valuation of private equity assets.

*For example:*

- Discuss challenges in valuing private equity assets

#### 8.3 Demonstrate knowledge of methods used to measure performance of private equity funds.

*For example:*

- Discuss why time weighted performance measures are not appropriate in the context of private equity
- Describe and calculate common performance measures for private equity funds (i.e., the internal rate of return [IRR], the modified internal rate of return [MIRR], the distribution to paid-in [DIP] ratio, the residual value to paid-in [RVPI] ratio, and the total value to paid-in [TVPI] ratio)
- Explain the J-curve concept and recognize its various types

#### 8.4 Demonstrate knowledge of types of private equity benchmarks.

*For example:*

- Define asset-based benchmarks and peer-group benchmarks
- Define absolute return and relative return in the context of benchmark categorization

**8.5 Demonstrate knowledge of asset-based benchmarks.**

*For example:*

- Recognize the characteristics of listed private equity indices
- Discuss the use of public equity indices in benchmarking private equity investments
- Calculate and interpret the public market equivalent (PME) of a given investment

**8.6 Demonstrate knowledge of private equity peer groups and their use in the private equity benchmarking process.**

*For example:*

- Describe the rationale for using peer groups when benchmarking private equity funds
- Evaluate the structural characteristics of peer-group data used for private equity benchmarking
- Discuss challenges in using peer-group-data providers
- Describe the characteristics of peer groups used for benchmarking private equity investment
- Recognize the biases the publicly available databases are subject to
- Describe methods for controlling for risk differences between benchmarks and equity funds

**8.7 Demonstrate knowledge of methods for determining what constitutes an appropriate private equity benchmark.**

*For example:*

- Describe and discuss Bailey criteria
- Discuss factors to consider when selecting private equity benchmarks

**8.8 Demonstrate knowledge of benchmarking private equity funds.**

*For example:*

- Calculate and interpret performance metrics for private equity investment based on samples of private equity fund net asset values (NAVs) and/or returns
- Apply a classic benchmark analysis to samples of private equity funds
- Apply a public market equivalent analysis to samples of private equity funds

**8.9 Demonstrate knowledge of benchmarking a portfolio of private equity funds.**

*For example:*

- Discuss basic principles for benchmarking a portfolio of private equity funds
- Describe methods for calculating performance measures for a portfolio of private equity funds, and perform such calculations for a given portfolio
- Apply commitment weighting to a set of benchmarks
- Describe how Monte Carlo simulation can be used to synthetically generate a private equity benchmark

**Correction to Reading (printed version only):****Page 208, equation (8.4):**

$$MIRR_T = \left( \frac{\sum_{t=0}^T D_t (1 + RR_T)^{T-1}}{\sum_{t=0}^T \frac{C_t}{(1 + CoC)^t}} \right)^{1/T}$$

Should read:

$$MIRR_T = \left( \frac{\sum_{t=0}^T D_t (1 + RR_T)^{T-t}}{\sum_{t=0}^T \frac{C_t}{(1 + CoC)^t}} \right)^{1/T}$$

The exponent of the numerator should be  $T - t$  rather than  $T - 1$ .**Page 208, last paragraph:**

If the residual NAV of the fund is used in the numerator to calculate the future value of cash inflows as well as the fund's NAV, then the modified internal rate of return is obtained."

Should read:

If the residual NAV of the fund is used in the numerator to calculate the future value of cash inflows as well as the fund's NAV, then the modified **interim** internal rate of return is obtained."

**Page 214, equations (8.8) and (8.9):**

$$FV(D) = FV(\text{Contributions}) = \sum_{t=0}^T \frac{D_t \times I_T}{I_T}$$

$$FV(C) = FV(\text{Contributions}) = \sum_{t=0}^T \frac{C_t \times I_T}{I_T}$$

Should read:

$$FV(D) = FV(\text{Contributions}) = \sum_{t=0}^T \frac{D_t \times I_T}{I_t}$$

$$FV(C) = FV(\text{Contributions}) = \sum_{t=0}^T \frac{C_t \times I_T}{I_t}$$

**Chapter 9** Fund Manager Selection and Monitoring

**Keywords**

blue-chip team  
defaulting investor  
exit timing  
exit value  
emerging team  
established team  
gatekeepers

joint experience  
monitoring phase  
reemerging team  
secondary transactions  
synthetic secondaries  
track record

**Learning Objectives**

Chapter 9: Fund Manager Selection and Monitoring

**9.1 Demonstrate knowledge of issues regarding performance persistence among private equity fund managers.**

*For example:*

- Summarize the link between prior returns and future returns for a private equity fund manager
- Discuss empirical evidence that supports the performance persistence hypothesis in private equity investment
- Describe six challenges to the performance persistence hypothesis
- Analyze the private equity performance persistence hypothesis based on evidence presented by transition matrices
- Describe potential implementation issues encountered by LPs who select their investments in private equity funds based on the performance persistence hypothesis

**9.2 Demonstrate knowledge of private equity fund manager selection and deal sourcing.**

*For example:*

- Recognize the elements of the private equity fund manager selection process
- Discuss the processes of determining a wish list, classifying management teams, and deal sourcing in the private equity fund manager selection process

**9.3 Demonstrate knowledge of decision making and commitment for private equity investment.**

*For example:*

- Explain the due diligence-related considerations involved when making a decision about whether to commit capital to a private equity fund manager

**9.4 Demonstrate knowledge of principles for monitoring private equity funds.**

*For example:*

- Discuss the role of monitoring in the larger control system within the investment process
- Describe the trade-offs for an LP when monitoring private equity fund managers

**9.5 Demonstrate knowledge of the objectives for monitoring private equity funds.**

*For example:*

- Explain the importance of monitoring an LP's overall portfolio composition to control risk
- Discuss how monitoring private equity investment can help an LP to avoid negative consequences of style drift
- Describe how LPs may create significant value through the proactive monitoring of their private equity fund holdings

**9.6 Demonstrate knowledge of information gathering as part of the monitoring of private equity funds.**

*For example:*

- Discuss considerations regarding transparency in the context of private equity investment
- Discuss the issues related to the information disclosed by private equity funds in their reporting to investors
- Summarize rationales supporting the desire of both GPs and LPs for lower levels of transparency in informational reporting by private equity fund managers

**9.7 Demonstrate knowledge of the actions that result from monitoring.**

*For example:*

- Identify the factors that determine the level of monitoring intensity that is necessary for a given private equity fund
- Discuss the three forms of active involvement by an LP in a private equity fund's governance process
- Describe two actions outside of a private equity fund's governance process that an LP can take when fund management is facing issues of adversity underperforming
- Describe two actions outside of private equity fund investing that an LP can take to gain investment exposure

**9.8 Demonstrate knowledge of the secondary market for private equity investment.**

*For example:*

- Discuss factors that have driven the development of the secondary market for private equity funds
- Describe the global size, transactional volume, growth, and opacity of the secondary market for private equity investment
- Identify the characteristics of typical private equity investment opportunities available in the secondary market
- Describe the motivations of buyers and sellers in private equity transactions in the secondary market
- Recognize obstacles to investment in the secondary market
- Discuss sources of private equity investment opportunities in the secondary market
- Identify factors governing pricing and valuation in the secondary market for private equity funds, and calculate secondary prices and discounts for a given fund
- Discuss the limitations of the secondary market for private equity investment

**Correction to Reading (*printed version only*):**

**Page 258, the second line below equation (9.1):**

“... cash flow at time  $i$ ,  $n$  the fund’s maturity, and  $IRR_{Buyer}$  the buyer’s required or ...”

Should read:

“... cash flow at time  $i$ ,  $T$  the fund’s maturity, and  $IRR_{Buyer}$  the buyer’s required or ...”

**Page 469, 3<sup>rd</sup> paragraph from the top:**

“... will be  $£2,550,000 \times 1.30 \times (1 - 0.01) = €3,315,000$ . This provides an expected...”

Should read:

“... will be  $£2,550,000 \times 1.30 \times (1 - 0.01) = €3,281,850$ . This provides an expected ...”

**Chapter 10** Private Equity Operational Due Diligence

**Keywords**

balance sheet	opinion letter
compromise documentation	private placement memorandum
desk review	qualified audit opinions
exculpation	risk assignment
Income statement	schedule of investments
indemnification	side letter
investment due diligence	statement of assets and liabilities
meta risks	statement of cash flows
offering memorandum	statement of changes
operational due diligence	statement of operations
operational risk profile	valuation committee
operational scalability	

**Learning Objectives**

Chapter 10: Operational Due Diligence

**10.1 Demonstrate knowledge of the scope and importance of operational due diligence (ODD).**

*For example:*

- Describe operational risk as a driver of operational due diligence, and recognize the operational risk areas typically reviewed during ODD
- Distinguish between ODD and investment due diligence
- Explain the importance of conducting ODD on private equity investments, both generally and in comparison with other types of alternative investment structures (e.g., hedge funds)
- List the five key benefits of performing ODD on private equity investments
- State and describe four explanation for the historical expansion of the scope of items covered when performing ODD

**10.2 Demonstrate knowledge of the eight core elements of the operational due diligence process.**

*For example:*

- List and discuss the eight steps investors follow when performing the ODD process on alternative investments
- Recognize considerations involved in executing the primary steps of the ODD process

**10.3 Demonstrate knowledge of the document collection process in private equity ODD.**

*For example:*

- Describe the private equity ODD document collection process, including the purposes for document collection, and the relevance of operational risk profiles
- Recognize the three primary sources of documentation for investors during an ODD review

**10.4 Demonstrate knowledge of the analysis of legal documentation in private equity ODD.**

*For example:*

- State the two primary considerations that drive the design of private equity legal structures
- Discuss common private equity legal structures, including their various partnership entities and layers
- Discuss the key functions of the offering memorandum (OM) (a.k.a. private placement memorandum [PPM]), and the function of side letters
- Recognize how the different focus and goals of legal counsel and limited partners (LPs) affect their review of legal documents in ODD
- List and describe key areas of an OM that are considered during ODD, including those associated with fees and carried interest

**10.5 Demonstrate knowledge of stages of operational due diligence other than the analysis of legal documents.**

*For example:*

- Discuss considerations in the analysis of private equity valuations in the context of legal documentation
- Describe key characteristics of private equity fund advisory committees
- Recognize common sections of private equity audited financial statements, and discuss important considerations in analyzing such statements
- Discuss common considerations of LPs when reviewing private equity documentation related to information technology (IT) and business continuity planning/disaster recovery

**10.6 Demonstrate knowledge of on-site visits with private equity fund managers.**

*For example:*

- Describe considerations in determining the best location for LPs to visit with general partners (GPs)
- Discuss the advantages and disadvantages of performing desk reviews as part of the ODD process
- Describe best practices when developing the agenda in connection with an on-site visit

**10.7 Demonstrate knowledge of evaluating meta risks.**

*For example:*

- Recognize the concept of meta risk and what it encompasses

**10.8 Demonstrate knowledge of fund service provider review and confirmation.**

*For example:*

- Recognize common fund and firm service providers
- Discuss primary investor goals when interacting with fund and firm service providers

**10.9 Demonstrate knowledge of ongoing private equity ODD monitoring considerations.**

*For example:*

- Discuss considerations related to the ongoing monitoring of a private equity investment

**Chapter 11** Private Equity Investment Process and Portfolio Management

**Keywords**

bottom-up approach	modern portfolio theory (MPT)
core portfolio	naïve diversification
core-satellite approach	recency bias
cost-averaging	satellite portfolio
market-timing approach	top-down approach
mixed approach	

**Learning Objectives**

Chapter 11: Private Equity Investment Process and Portfolio Management

**11.1 Demonstrate knowledge of the private equity investment process.**

*For example:*

- Recognize the main decisions involved in an institutional private equity investment process
- Discuss the main challenges of institutional private equity investment process
- Discuss private equity portfolio objectives
- Discuss setting private equity allocation in the context of the endowment model

**11.2 Demonstrate knowledge of private equity portfolio design.**

*For example:*

- Discuss considerations in the private equity fund selection process
- Discuss monitoring private equity investments
- Discuss private equity investment liquidity management and the role of the overcommitment strategy
- Discuss the implementation of private equity portfolio management decisions

**11.3 Demonstrate knowledge of private equity portfolio construction.**

*For example:*

- Describe the bottom-up approach in the context of private equity investment
- Describe the top-down approach in the context of private equity investment
- Discuss the mixed approach in the context of private equity investment

**11.4 Demonstrate knowledge of risk-return management of a private equity portfolio.**

*For example:*

- Describe the core-satellite approach to private equity portfolio construction
- Recognize the key factors to be considered in determining the balance between core and satellite portfolios
- Discuss diversification in the context of private equity portfolios
- Discuss naïve diversification in the context of private equity portfolios
- Describe the cost-averaging approach and the market-timing approach to management of private equity portfolios

**Chapter 12** Measuring Private Equity Risk

**Keywords**

cash-flow-at-risk (CFaR)  
commitment risk  
market risk  
private equity financial risk

**Learning Objectives**

Chapter 12: Measuring Private Equity Risk

**12.1 Demonstrate knowledge of four significant risks of private equity.**

*For example:*

- Describe market risk, liquidity risk, commitment risk, and capital or realization risk
- Distinguish between operational risk and private equity financial risk

**12.2 Demonstrate knowledge of the modeling of private equity.**

*For example:*

- Contrast buy-to-sell and buy-to-keep private equity investment philosophies
- Discuss three types of arbitrage opportunities that private equity investors can pursue
- Discuss private equity liquidity risk and capital risk from the perspective of a limited partner [LP]

**12.3 Demonstrate knowledge of methods for determining the value of a private equity asset.**

*For example:*

- Describe two principal methods for valuing private equity assets
- Discuss risk considerations of institutional private equity investors
- Explain the impact of undrawn commitments

**12.4 Demonstrate knowledge of how to apply the value at risk (VaR) concept to private equity.**

*For example:*

- Discuss the problems and limitations associated with applying VaR for private equity investments

**12.5 Demonstrate knowledge of calculating VaR based on cash flow at risk (CFaR).**

*For example:*

- Explain CFaR, including the relevancy of CFaR for private equity fund LPs, and compare and contrast CFaR and traditional VaR as measures of risk exposures
- Discuss VaR based on cash flow volatility, including terminal wealth dispersion determination, the total value to paid-in (TVPI) ratio, the risk profile for a portfolio of funds, and the eight issues affecting the VaR calculation process
- Describe, apply, and interpret simulation based VaR for a private equity fund

**Correction to Reading (*printed version only*):**

Page 319, Equation (12.2):

$$GAIN / LOSS = \frac{Avg(PV) - PV_i}{n}$$

Should read:

$$GAIN / LOSS = \frac{PV_i - Avg(PV)}{n}$$

**Chapter 13** The Management of Liquidity

**Keywords**

cyclical illiquidity  
exit risk  
follow-on funding  
funding risk  
harvesting period

liquidity line  
sell-off of limited partnership shares  
strategic commitment steering  
structural illiquidity

**Learning Objectives**

Chapter 13: The Management of Liquidity

**13.1 Demonstrate knowledge of liquidity risk and cash flow management.**

*For example:*

- Discuss the liquidity and funding risks involved in private equity fund allocation
- List the four advantages of modeling the cash flows of private equity investments
- Define illiquid assets in the context of private equity investments
- Describe funding risk as a source of liquidity risk for private equity investors
- Describe exit risk as a source of liquidity risk for private equity investors

**13.2 Demonstrate knowledge of private equity cash flow schedules.**

*For example:*

- Describe investment periods and harvesting periods with regard to private equity fund cash flows

**13.3 Demonstrate knowledge of five sources of liquidity.**

*For example:*

- Recognize approaches to achieving a competitive total return on committed capital and ensuring that capital calls can be met
- Describe five well-diversified and stable sources of liquidity

**13.4 Demonstrate knowledge of investment strategies for managing undrawn capital.**

*For example:*

- Describe investment strategies for managing undrawn capital

**13.5 Demonstrate knowledge of approaches to modeling cash flow projections.**

*For example:*

- Discuss considerations involved in the long-term management of investment commitments
- List and describe four inputs to projection models used by alternative investment and private equity fund-of-funds managers

**13.6 Demonstrate knowledge of three approaches to forming model projections.**

*For example:*

- Discuss the approach of using estimates as the basis for projecting liquidity when building a model for private equity investment
- Discuss the approach of using forecasts as the basis for projecting liquidity when building a model for private equity investment
- Discuss the approach of using scenarios as the basis for projecting liquidity when building a model for private equity investment

**13.7 Demonstrate knowledge of the use of an overcommitment strategy in private equity funds.**

*For example:*

- Discuss overcommitment and opportunity costs in the context of private equity funds
- Describe strategies that an investor may employ to address the return challenges and interdependencies presented by commitments made to private equity funds
- Calculate the overcommitment ratio of a given investment

## Topic 5: Real Assets

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 14 Real Estate as an Investment

### Keywords

anticipated inflation rate  
bottom-up asset allocation  
commercial real estate  
escalator clause  
Fisher effect  
four-quadrant model  
housing real estate  
private real estate equity

public real estate investment  
primary real estate market  
real estate system  
residential real estate  
secondary real estate markets  
tertiary real estate markets  
top-down asset allocation  
unanticipated inflation

### Learning Objectives

#### Chapter 14: Real Estate as an Investment

#### **14.1 Demonstrate knowledge of the attributes of real estate.**

*For example:*

- Identify and discuss five potential advantages of real estate that encourage its inclusion in an investment portfolio
- Identify and discuss three potential disadvantages of real estate that discourage its inclusion in an investment portfolio

#### **14.2 Demonstrate knowledge of real estate asset allocation.**

*For example:*

- Discuss heterogeneity within real estate subcategories

- Define, describe, and compare the top-down and bottom-up asset allocation approaches

**14.3 Demonstrate knowledge of methods of categorizing real estate.**

*For example:*

- Discuss four especially common categories used to differentiate real estate investments given by equity versus debt, domestic versus international, residential versus commercial, and private versus public
- Discuss additional categories used to classify real estate investments (i.e., categorization by market, and classification based on risk and return characteristics)

**14.4 Demonstrate knowledge of the return drivers for real estate.**

*For example:*

- Discuss the factors that affect the inflation protection potential of real estate investment

**14.5 Demonstrate knowledge of the four-quadrant model.**

*For example:*

- Describe the components of the four-quadrant model, and its potential uses for analyzing real estate investment

**Chapter 15** Real Estate Indices and Unsmoothing Techniques

**Keywords**

appraisal error	sales comparison approach
appraisal-based indices	smoothed series
cost approach	transaction noise
hedonic pricing method (HPM)	transaction price error
income approach	transaction price noise
purely random error or noise	temporal lag bias
repeat-sales method (RSM)	unsmoothing
reservation price	

**Learning Objectives**

Chapter 15: Real Estate Indices and Unsmoothing Techniques

**15.1 Demonstrate knowledge of real estate indices and unsmoothing.**

*For example:*

- Identify the uses of real estate price indices
- Define unsmoothing and explain the rationale for the process

**15.2 Demonstrate knowledge of the concept of smoothed pricing.**

*For example:*

- Discuss the effect of price smoothing on arbitrage in a perfect market
- Identify factors that contribute to persistence in price smoothing
- Recognize problems that can result from price smoothing

**15.3 Demonstrate knowledge of models of price and return smoothing.**

*For example:*

- Explain how and why current reported prices are modeled as a function of past true prices
- Explain how and why current reported returns are modeled as a function of past true but unobservable returns
- Explain how estimated values of true prices can be determined from reported prices using an estimation of the parameter for first order autocorrelation
- List and discuss four explanations for smoothed prices and delayed price changes in a price index

**15.4 Demonstrate knowledge of the process of unsmoothing a price or return series.**

*For example:*

- Explain the process of unsmoothing a return series using first-order autocorrelation
- Describe the three steps of the unsmoothing process
- Describe the process of unsmoothing a return index based on a model of smoothed price changes rather than returns
- Explain the process for unsmoothing returns with higher-order autocorrelation

**15.5 Demonstrate knowledge of the application of the unsmoothing process.**

- Explain the process the process of unsmoothing a historical return series
- Describe how the first order autocorrelation coefficient can be estimated
- Explain how the estimated autocorrelation coefficient can be used to calculate the volatility and the beta of an unsmoothed return series
- Describe the relationship between the variances of true and reported returns
- Describe the relationship between the betas of true and reported returns
- Interpret the results of unsmoothing a return series

**15.6 Demonstrate knowledge of noisy pricing.**

*For example:*

- Discuss the types of noise in transaction prices and appraised values of real estate properties, explanations for the noise, and problems created by noisy pricing

**15.7 Demonstrate knowledge of appraisal-based real estate indices.**

*For example:*

- Discuss three primary approaches to appraising real estate, and identify the two primary advantages and three primary disadvantages of appraisal-based models
- Describe NCREIF and key characteristics of the NCREIF Property Index (NPI)
- Describe the comparable sales method of appraisals
- Describe and apply the discounted cash flow analysis method (a.k.a. income approach) of appraisals

**15.8 Demonstrate knowledge of transaction-based real estate indices.**

*For example:*

- Identify the key characteristics of transaction-based real estate indices
- Discuss the repeat-sales method (RSM) for estimating transaction-based price indices, including two key advantages and three key disadvantages, and apply the process for using the RSM to construct an index
- Discuss the hedonic pricing method (HPM) for estimating transaction-based price indices, including its five key advantages and six key disadvantages, and apply the three-step process for calculating a hedonic price index
- Compare and contrast RSM and HPM indices
- Describe sample selection biases associated with transaction-based indices

**15.9 Demonstrate knowledge of major real estate indices.***For example:*

- Recognize popular global real estate indices and their key characteristics
- Discuss residential real estate property indices
- Describe the NCREIF Farmland Index and the NCREIF Timberland Index
- Describe market-traded real estate vehicles (typically classified as real estate investment trusts [REITs])
- Describe real estate mortgage (or debt) indices

**15.10 Demonstrate knowledge of the historical performance of real estate indices.***For example:*

- Evaluate the historical performance of real estate indices
- Evaluate the historical performance of mortgage REITs
- Evaluate the historical performance of equity REITs

**Correction to Reading (*printed version only*):**

Equation (15.13), Page 375:

$$\sigma^2(\text{Reported}) = \rho^2 \times \sigma^2(\text{True}) + (1 - \rho)^2 \times \sigma^2(\text{Reported}) \quad (15.13)$$

Should read:

$$\sigma^2(\text{Reported}) = \rho^2 \times \sigma^2(\text{Reported}) + (1 - \rho)^2 \times \sigma^2(\text{True}) \quad (15.13)$$

Section 15.9.1, Page 393:

It can also be observed that toward the end of 2008, at the beginning of the global financial and real estate crisis, the NPI peaked and then declined before the NCREIF TBI did.

Should read:

It can also be observed that toward the end of 2008, at the beginning of the global financial and real estate crisis, NAREIT and NCREIF TBI peaked and then declined before the NCREIF NPI did.

**Chapter 16** Investment Styles, Portfolio Allocation, and Real Estate Derivatives

**Keywords**

cap rate spread  
property total return swap  
real estate style boxes  
rollover

**Learning Objectives**

Chapter 16: Investments Styles, Portfolio Allocation, and Real Estate Derivatives

**16.1 Demonstrate knowledge of the three NCREIF real estate investment styles.**

*For example:*

- List, define, and discuss the investment characteristics of the three NCREIF real estate investment styles

**16.2 Demonstrate knowledge of eight attributes used to differentiate the NCREIF real estate investment styles.**

*For example:*

- Describe individual properties according to the three NCREIF real estate investment styles and the eight attributes developed by NCREIF
- Describe real estate portfolios according to the three NCREIF real estate investment styles

**16.3 Demonstrate knowledge of three purposes of real estate style analysis.**

*For example:*

- List and describe three main reasons for introducing styles into real estate portfolio analysis

**16.4 Demonstrate knowledge of real estate style boxes.**

*For example:*

- Describe the basic characteristics of style boxes, and how they can be used in analyzing real estate investments

**16.5 Demonstrate knowledge of capitalization (cap) rates and the expected returns of real estate.**

*For example:*

- Describe and apply cap rates with respect to real estate investments

**16.6 Demonstrate knowledge of using real estate styles to develop investment risk and return expectations.**

*For example:*

- Discuss considerations in the development of risk and return estimates for real estate styles
- Describe return estimates for core real estate
- Demonstrate how the true volatility of core real estate risk can be estimated from both the smoothed volatility and from the first order correlation coefficient
- Show how the beta of a true series can be estimated from the beta of a smoothed series and an autocorrelation coefficient
- Discuss how risk-premium methodologies can be applied in estimating expected returns for noncore (i.e., value-added and opportunistic) real estate investments
- Describe methods used by PSERS and CalSTRS to develop absolute target rates of return for noncore real estate assets

**16.7 Demonstrate knowledge of the characteristics of real estate derivatives.**

*For example:*

- Identify the uses of real estate derivatives by institutional investors
- Identify three potential benefits offered by the existence of derivatives on housing prices
- Identify two critical factors for the effective management of risk using real estate derivatives
- Recognize seven advantages and six disadvantages of property derivatives

**16.8 Demonstrate knowledge of the types of tradable real estate derivatives and specialized real estate indices.**

*For example:*

- Describe and calculate property total return swaps
- Describe real estate forward, futures, and options contracts
- Describe structured real estate index notes
- Describe traded derivatives of mortgage-backed securities
- Describe stock market-based property return indices (SMPRI)

**Chapter 17** Listed Versus Unlisted Real Estate Investments

**Keywords**

authorized PUTs	property authorized investment funds (PAIFs)
closed-ended real estate funds	property unit trusts (PUTs)
market clientele	real estate operating company (REOC)
non-traded REITs	real estate funds of funds
open-ended real estate funds	unauthorized PUTs
pooling of securities	

**Learning Objectives**

Chapter 17: Listed versus Unlisted Real Estate Investment

**17.1 Demonstrate knowledge of unlisted real estate funds.**

*For example:*

- Describe unlisted open-end real estate funds
- Describe unlisted closed-end real estate funds
- Describe unlisted real estate funds of funds
- State four key advantages and three key disadvantages of unlisted real estate funds

**17.2 Demonstrate knowledge of listed real estate funds.**

*For example:*

- Describe real estate investment trusts (REITs) and real estate operating companies (REOCs)
- Describe real estate index-based exchange-traded funds (ETFs)
- Compare and contrast the investment characteristics of REITs, ETFs, and listed funds and mutual funds
- Recognize six key advantages and two key disadvantages of listed real estate funds
- Discuss the global real estate securities market, focusing on global REITs
- Describe non-traded REITs
- Compare and contrast traded REITs with non-traded REITs across five major distinguishing characteristics

**17.3 Demonstrate knowledge of market-based versus appraisal-based returns.**

*For example:*

- Compare and contrast the historical investment performance characteristics from the returns of an appraisal-based real estate index (NPI) with those from the returns of a market-based real estate index (REIT Index) over a given period
- Summarize four explanations of the observed relationship between the volatilities of appraisal-based real estate indices and market-based real estate indices
- Discuss the importance of accurate pricing and risk estimation

**17.4 Demonstrate knowledge of arbitrage, liquidity, and segmentation with regard to real estate funds.**

*For example:*

- Distinguish between securitization and the pooling of securities
- Discuss the mechanics and trading of ETFs, and how these characteristics facilitate arbitrage
- Explain how listed real estate positions can be used to hedge unlisted real estate positions
- Discuss two views of the effectiveness of relying on REITs as indicators of private real estate positions
- Describe financial market segmentation
- Explain how turnover, dealer sales, and agency costs affect REIT market values
- Discuss how real estate price volatility and liquidity affect the effectiveness of short-term REITs as risk management tools
- Interpret historical evidence regarding whether REITs are effective as short- to intermediate-term hedging vehicles for appraised real estate values
- Discuss whether real estate can serve as an effective diversifier

**Chapter 18** International Real Estate Investments

**Keywords**

corporate debt of REITs	listed real estate securities
commercial mortgage-backed securities	pooled investments in direct real estate investments
direct real estate investments	risk measurement risk
economic risk	roundtrip costs
first mortgage claims	real estate mezzanine debt

**Learning Objectives**

Chapter 18: International Real Estate Investment

**18.1 Demonstrate knowledge of the basic concepts of international real estate investing.**

*For example:*

- Discuss the primary obstacles, benefits, and risks of investing in real estate internationally

**18.2 Demonstrate knowledge of the opportunities associated with international real estate investing.**

*For example:*

- Explain why investment in international real estate is generally associated with higher expected returns
- Analyze the potential diversification benefits associated with allocations to international real estate from both theoretical and empirical perspectives
- Evaluate the effect of income taxation on the performance of, and optimal allocations to, real estate investments from a global perspective
- Analyze and calculate the effect of depreciation tax shields on international real estate investments
- Explain and calculate the effect of deferral of taxation of gains on international real estate investments
- Discuss the combined effects of depreciation, deferral, and leverage on international real estate investments
- Explain and calculate the effect of leverage on international real estate investments

**18.3 Demonstrate knowledge of the challenges associated with international real estate investing.**

*For example:*

- Discuss three reasons why agency relationships are important in international real estate investing
- Identify the sources and explain the implications of asymmetric information in international real estate investing
- Describe the sources and effects of illiquidity and transactions costs in international real estate investing
- Describe the political and economic risks associated with international real estate investing
- Discuss and calculate exchange rate risk in the context of international real estate investing
- Recognize legal risks encountered in international real estate investing

**18.4 Demonstrate knowledge of strategies for establishing a global real estate investment program.**

*For example:*

- Discuss the advantages and disadvantages of international equity real estate investment trusts (REITs)
- Describe the advantages and disadvantages of various forms of real estate equity investments and debt investments

**Chapter 19** Infrastructure

**Keywords**

economic infrastructure assets  
project finance  
social infrastructure assets

**Learning Objectives**

Chapter 19: Infrastructure as an Investment

**19.1 Demonstrate knowledge of infrastructure assets.**

*For example:*

- Identify the distinguishing characteristics of infrastructure as an asset class
- Describe three approaches used to classify infrastructure assets by their economic nature
- Discuss factors affecting the demand for infrastructure assets
- Discuss the supply of infrastructure assets

**19.2 Demonstrate knowledge of the key characteristics of infrastructure that dictate its risk-return profile.**

*For example:*

- Describe the effect of the stage of maturity on infrastructure's risk-return profile
- Describe the effect of the geographic location on infrastructure's risk-return profile
- Describe the effect of the sector scope on infrastructure's risk-return profile

**19.3 Demonstrate knowledge of attributes of infrastructure assets that make infrastructure attractive as a defensive investment.**

*For example:*

- List and describe the twelve defensive attributes of infrastructure assets

**19.4 Demonstrate knowledge of methods used to access infrastructure investment opportunities.**

*For example:*

- Describe infrastructure financing and investment options
- Discuss private infrastructure funds
- Discuss publicly traded infrastructure funds
- Discuss direct infrastructure deals
- Discuss publicly traded infrastructure companies
- Discuss debt type infrastructure investments

**19.5 Demonstrate knowledge of infrastructure fund strategy classification.**

*For example:*

- Compare and contrast active management and passive management investment styles
- Describe stages of infrastructure asset maturity and the effect of asset maturity on the risk-return profile of the asset
- Describe the role geographic scope plays in shaping the risk-return profile of an infrastructure fund
- Describe the role sector scope plays in shaping the risk-return profile of an infrastructure fund
- Recognize the characteristics of core infrastructure and peripheral infrastructure

**19.6 Demonstrate knowledge of how infrastructure compares with other asset classes.**

*For example:*

- Compare and contrast investment in infrastructure assets with investments in bonds, real estate, buyouts, and equities

**19.7 Demonstrate knowledge of public-private partnerships (PPPs).**

*For example:*

- Describe the characteristics, advantages, and disadvantages of PPPs

**19.8 Demonstrate knowledge of how regulation and public policy affect infrastructure assets.**

*For example:*

- Discuss the rationales behind governmental regulation and public policy that affect infrastructure assets

**19.9 Demonstrate knowledge of the historical performance of infrastructure funds.**

*For example:*

- Compare and contrast the historical performance of infrastructure funds with that of other asset classes

**Chapter 20** Farmland and Timber Investments

**Keywords**

agricultural infrastructure  
crop yield  
expropriation  
Granger-causality analysis

permanent cropland  
rotation age  
row cropland

**Learning Objectives**

Chapter 20: Farmland and Timber Investments

**20.1 Demonstrate knowledge of the motivations for, and characteristics of, farmland investment.**

*For example:*

- List and describe three motivations that drive investments in farmland
- Identify three key characteristics of U.S. farmland investment
- Discuss investment opportunities in non-U.S. farmland
- Contrast returns to farmland investment with those of U.S. timberland investment

**20.2 Demonstrate knowledge of the global demand for agricultural products.**

*For example:*

- List the primary macro factors driving global agricultural demand and supply
- Discuss how changes in worldwide populations, incomes, and food affect the performance of farmland investments
- Discuss how the increasing production of biofuels affects demand for agricultural products

**20.3 Demonstrate knowledge of investor approaches to accessing the returns of agricultural assets.**

*For example:*

- List and discuss the three primary approaches to accessing returns from agricultural assets
- Discuss approaches investors can employ to capture improvements in agricultural yield, and calculate the change in a given crop yield
- Describe the main factors that have driven historical growth in agricultural yields
- Discuss the determinants of agricultural profitability
- Describe the effect of government agricultural subsidies on agricultural returns

**20.4 Demonstrate knowledge of the factors that contribute to the returns to farmland.**

*For example:*

- Evaluate the historical returns to U.S. farmland
- Discuss macroeconomic factors that explain U.S. farmland returns
- Evaluate the heterogeneity of U.S. farmland returns
- Explain characteristics of indices produced by The National Council of Real Estate Investment Fiduciaries (NCREIF), and describe the NCREIF Farmland Index
- Describe the causes and consequences of the significant price appreciation observed in U.S. farmland over the period 2009-2014

**20.5 Demonstrate knowledge of investing in agriculture infrastructure.**

*For example:*

- Describe the four economic functions of agricultural infrastructure
- Discuss three drivers of productivity of agricultural infrastructure

**20.6 Demonstrate knowledge of global investing in timberland.**

*For example:*

- Describe four key attractions to timber investment
- Discuss the history and drivers of returns to timberland investing
- Describe the risks associated with international timber investing
- Evaluate the investment implications of timberland rotation

**20.7 Demonstrate knowledge of farmland and timber investments, as compared with other real assets investments.**

*For example:*

- Identify the investment characteristics of real assets
- Discuss the risk and return expectations for agriculture investments
- Discuss how the ease of investment, high liquidity, effective inflation hedging, positive portfolio diversification, and low interest rate sensitivity of agriculture investments affect their appropriateness for an institutional portfolio
- characteristics of real assets

**Chapter 21** Investing in Intellectual Property

**Keywords**

acquisition and licensing strategies  
coproduction  
debt financing structures  
equity financing structures  
film production stages  
foreign presale  
gap financing  
hammer prices  
masterpiece effect

mature intellectual property  
negative pickup deal  
patent sale license-back (SLB) strategy  
patent pooling  
quality effect  
slate equity financing  
spillover effects  
super gap financing  
unbundled intellectual property

**Learning Objectives**

Chapter 21: Investing in Intellectual Property

**21.1 Demonstrate knowledge of the characteristics of intellectual property.**

*For example:*

- Describe the characteristics of intellectual property (IP) assets

**21.2 Demonstrate knowledge of the investment properties of film production and distribution.**

*For example:*

- Discuss historical revenues for film production and distribution
- Recognize the four stages in the film production and distribution life cycle
- Describe the costs and financing structures associated with film production and distribution
- Recognize the four key evidence-based conclusions regarding film production profitability
- Describe the factors and variables involved in estimating the relationship of returns to film production

**21.3 Demonstrate knowledge of the investment properties of visual works of art.**

*For example:*

- Discuss reasons for considering art as an investment
- Describe the empirical evidence on the investment performance of art as an asset class
- Discuss characteristics of art that are hypothesized to drive returns to art investments
- Evaluate the historical risk-return profile and correlations of the art market

**21.4 Demonstrate knowledge of the investment properties of research and development (R&D) and patents.**

*For example:*

- Discuss theoretical and empirical evidence regarding the returns to R&D and patent expenditures
- Identify strategies for accessing R&D through the acquisition and monetization of patent-related IP
- Discuss patent enforcement and litigation strategies and how these processes affect returns on patent investments
- Describe the patent sale license-back (SLB) strategy
- Recognize patent lending strategies
- Discuss potential buyers for patents and the concept of patent pooling
- Describe the risks involved with patent investment

**21.5 Demonstrate knowledge of six characteristics common to both IP and real assets.**

*For example:*

- List and describe six characteristics of IP that overlap with the characteristics of real assets

## Topic 6 Commodities

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 22 Key Concepts in Commodity Markets

#### Keywords

agents of transformation	preferred habitat hypothesis
cash-and-carry arbitrage	price speculation
commodity currencies	real options embedded in commodity markets
consumer surplus	rebalancing yield
financialization of commodities	relative value arbitrage
flat price risk	reverse cash-and-carry arbitrage
forward curve	spread risk
funding liquidity risk	stock-out
Hotelling theory	supercycles
humped curve	transforming commodities
income return	unbiased expectation hypothesis
liquidity preference hypothesis	volatility asymmetry
margin and volume risk	working curve
marginal convenience yield	

#### Learning Objectives

Chapter 22: Key Concepts in Commodity Markets

**22.1 Demonstrate knowledge of the economics of commodity spot markets.**

*For example:*

- Analyze factors affecting the relationship between commodity prices and the business cycle

- Describe the properties of spot commodity prices, including evidence regarding long-run returns, and the causes and effects of supercycles and short-term fluctuations
- 22.2 Demonstrate knowledge of commodity trading firms, risks, and speculation.**  
*For example:*
- Describe the process of commodity transformation
  - List and discuss the seven risks to which commodity trading exposes trading firms
  - Discuss speculation in commodity markets
  - Discuss the effects of commodity speculation on pricing and risk
- 22.3 Demonstrate knowledge of the economics of commodity futures markets.**  
*For example:*
- Discuss the theory of storage and the concept of convenience yield
  - List and explain the three determinants of convenience yield
  - List and describe the major components of the cost of carry, and calculate convenience yield for a given commodity
  - Describe commodity arbitrage and the cost of carry without convenience yield
  - Describe commodity arbitrage and the cost of carry with convenience yield
- 22.4 Demonstrate knowledge of commodity forward curve theories.**  
*For example:*
- Discuss the relationship between the slope of the forward curve and the cost of carry
  - Discuss the relationship between market expectations and forward curves
  - Describe the concept of normal backwardation, and discuss its relationship to the liquidity preference hypothesis
  - Discuss commodity storage models, and the relationship between storage models and the futures curve for a commodity
  - Discuss the preferred habitat hypothesis, segmented markets, and option-based models of the term structure, and their effects on forward curves
- 22.5 Demonstrate knowledge of the decomposition of returns to futures-based commodity investment.**  
*For example:*
- List and discuss the three sources into which returns on commodity contracts may be decomposed
  - Describe how the forward curve can indicate scarcity in commodity markets
- 22.6 Demonstrate knowledge of the use of commodities as an inflation hedge.**  
*For example:*
- Describe the rationale for using commodities as an inflation hedge
  - Discuss evidence regarding the efficacy of commodities as an inflation hedge
  - Describe the rationale for the inverse relationship between financial assets and both commodities and inflation
- 22.7 Demonstrate knowledge of the relationship between commodity prices and exchange rates.**  
*For example:*
- Discuss the effects of exchange rate changes and risks on commodity market prices and participants
  - Discuss the effects commodity prices have on currencies and national economies

**22.8 Demonstrate knowledge of the effects of rebalancing and the historical performance of commodity futures.**

*For example:*

- Discuss empirical evidence on the effects of rebalancing on return
- Describe the effects of rebalancing when commodity prices are not mean-reverting
- Recognize and approximate the effect of rebalancing on geometric and arithmetic mean returns
- Analyze historical performance of commodity investments
- Discuss research findings regarding the financialization of commodity returns

**See next page for correction to reading**

**Correction to Reading (*printed version only*)**

Section 22.4.3, page 577, second paragraph from the bottom:

Producers offer attractive yields, which would mean low bond prices, to entice **borrowers** to extend their maturity or to induce speculators to borrow at short maturities and lend at long maturities.

Should read:

Producers offer attractive yields, which would mean low bond prices, to entice **lenders** to extend their maturity or to induce speculators to borrow at short maturities and lend at long maturities.

---

Section 22.8.2, Page 587, last paragraph:

“However, we can see that there is only a one in three chance that Portfolio A would make money after two years, while there is a two in three chance that portfolio B would make money after two years.”

Should read:

“However, we can see that there is only a **two in four** chance that Portfolio A would make money after two years, while there is a **three in four** chance that portfolio B would make money after two years.”

---

**Note:** Middle values of Exhibit 22.5 are realized through two different paths while each of the other values are realized through one unique path.

---

Section 22.5, Page 581, 4th paragraph:

“As previously discussed, the hotelling model predicts that spot prices should rise at a rate that is lower than the prevailing interest rates.”

Should read:

“As previously discussed, then adjusted for the production cost, the hotelling model predicts that spot prices should rise at a rate that is lower than the prevailing interest rates.”

## Chapter 23 Accessing Commodity Investment Products

### Keywords

commodity rights	operational diversification
commodity spreads	operational hedging
correlation trade	processing spreads
crack spreads	quality spreads
crush spreads	quantitative directional strategies
directional strategies	selective hedging
diversification return	storage strategies
downstream producers	substitution spreads
enterprise value	synthetic weather derivative
fundamental directional strategies	transportation strategies
location spreads	upstream commodity producers

### Learning Objectives

#### Chapter 23: Allocation to Commodities

#### 23.1 Demonstrate knowledge of the five beneficial characteristics of allocations to commodity futures.

*For example:*

- List the five beneficial characteristics for investors when allocating to commodity futures
- Describe the effects of full collateralization on commodity risk, diversifying a traditional portfolio with commodity futures, and adding commodities exposure in an asset-liability management investment setting
- Describe the hedging benefits of commodity futures over time and in various economic cycles
- Discuss the performance of commodities in each of the four major business cycle phases
- Explain how mean reversion can be a great benefit of commodity investment
- Understand why commodity investment may be well suited to capture diversification return
- Explain why volatility reduction enhances geometric mean returns, but does not enhance expected values in commodity investing
- Discuss the source of positive risk premium of commodity investments and the effect of this positive risk premium on investment decisions
- Discuss the source of positive skewness of commodity investments and the effect of this positive skewness on investment decisions

**23.2 Demonstrate knowledge of commodity investment strategies.**

*For example:*

- Discuss the unique risk and return characteristics of commodities, as compared to traditional investments

**23.3 Demonstrate knowledge of directional strategies.**

*For example:*

- Describe directional strategies in commodities markets

**23.4 Demonstrate knowledge of relative value strategies.**

*For example:*

- Describe relative strategies in commodities markets

**23.5 Demonstrate knowledge of commodity futures and options spreads.**

*For example:*

- Describe various types of calendar spreads, and calculate the position profit and loss for a commodity spread trade
- Describe processing spreads, including typical users and common types
- Describe substitution commodity spreads, two major types of substitutions in commodities, and how to determine entry and exit points with a substitution test statistic
- Describe quality and location spreads, and how they differ from substitution spreads
- Describe intermarket relative value strategies

**23.6 Demonstrate knowledge of capital structure and commodity-based corporations.**

*For example:*

- Describe how equity and debt of commodity-based firms tend to act as hybrid investments
- Discuss the commodity risk management strategies of commodity producers
- Describe the effect of commodity prices on the risk associated with investing in securities issued by commodity-based firms
- Discuss commodity-based equity and debt investment strategies

**Chapter 24** Accessing Commodity Investment Products

**Keywords**

cash-and-call-strategy	preroll strategies
commodity exchange-traded note	principal-guaranteed notes
commodity index swap	quantity-based index
dynamic asset allocation model	realized roll return
excess return index	return to commodity beta
first-generation commodity indices	second-generation commodity indices
indirect commodity investments	third-generation commodity indices
leveraged note	total return
participation note	total return index
prepaid forward contracts	value-based index

**Learning Objectives**

Chapter 24: Accessing Commodity Investment Products

**24.1 Demonstrate knowledge of the benefits and drawbacks of direct ownership of physical commodities.**

*For example:*

- Discuss the benefits and drawbacks of direct ownership of various types of physical commodities

**24.2 Demonstrate knowledge of the benefits and drawbacks of indirect ownership of commodities.**

*For example:*

- Recognize the types of instruments, indices, and vehicles institutional investors may use to obtain commodity exposure through indirect investments
- Describe the characteristics of commodity index swaps
- Describe the characteristics of public commodity-based equities
- Describe the characteristics of bonds issued by commodity firms
- Describe the characteristics of commodity-based mutual funds and exchange traded funds (ETFs)
- Describe the characteristics of public and private commodity partnerships
- Describe the characteristics of commodity-linked investments
- Describe the characteristics of commodity-based hedge funds
- Discuss strategies related to financing the production and trade of physical commodities

**24.3 Demonstrate knowledge of leveraged and option-based commodity investment structures.**

*For example:*

- Describe leveraged and short commodity index-based products, and apply the mathematics inherent in understanding daily performance calculations
- Describe how leveraged notes may offer leveraged exposure to commodity indices
- Discuss the characteristics of principal-guaranteed notes

**24.4 Demonstrate knowledge of the basic concepts associated with commodity indices.**

*For example:*

- Describe the characteristics of commodity indices
- Recognize the effect of a commodity index's methodology on volatility and return levels

**24.5 Demonstrate knowledge of eight sources of commodity index returns.**

*For example:*

- Describe the effect on performance of the eight sources of commodity index returns

**24.6 Demonstrate knowledge of the factors to be considered in designing commodity indices.**

*For example:*

- Describe the characteristics of value-based commodity indices and quantity-based commodity indices
- Describe the characteristics of total return indices and excess return indices
- Describe the characteristics of the two types of roll methodology a commodity index may employ
- Discuss considerations involved in the choice of weighting methodology
- Describe the characteristics of first generation commodity indices

**24.7 Demonstrate knowledge of performance enhancements provided by second-generation and third-generation commodity indices.**

*For example:*

- Describe the difficulties encountered with validating the performance improvements resulting from second-generation and third-generation commodity index enhancements
- Describe the roll techniques associated with second-generation enhanced commodity indices
- Describe the roll techniques associated with third-generation enhanced commodity indices

**24.8 Demonstrate knowledge of commodity index return calculations.**

*For example:*

- Discuss four factors that influence returns on commodity indices, and their effects on return attribution
- Describe the four measures of return attribution (i.e., spot return, excess return, total return, and realized roll return) that are typically published by commodity index providers
- Calculate returns for a given commodity index

## Topic 7 Hedge Funds and Managed Futures

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 25 Managed Futures

#### Keywords

Adaptive Markets Hypothesis (AMH)	moving average crossover strategy
alpha decay	multi-strategy CTAs
capital at risk	National Futures Association (NFA)
Commodity Futures Trading Commission (CFTC)	point value
commodity pool operator (CPO)	resistance levels
divergence	signal observation period
equal dollar risk allocation	signal to noise ratio
equal risk contribution	support level
futures contract dollar risk	time series momentum
futurization	trading signal
market capacity weighting	trailing stop
market divergence index (MDI)	volatility targeting

#### Learning Objectives

##### Chapter 25: Managed Futures

##### **25.1 Demonstrate knowledge of the structure of the managed futures industry.**

*For example:*

- Discuss the structure and key features of the managed futures industry

**25.2 Demonstrate knowledge of four core dimensions of managed futures investment strategies.***For example:*

- Discuss and compare managed futures strategies defined by the core dimension of data sources
- Discuss and compare managed futures strategies defined by the core dimension of implementation styles
- Discuss and compare managed futures strategies defined by the core dimension of strategy focus
- Discuss and compare managed futures strategies defined by the core dimension of time horizons

**25.3 Demonstrate knowledge of the foundations of managed futures.***For example:*

- Describe the adaptive markets hypothesis (AMH)
- List and describe four practical implications of the AMH
- Discuss the topics of divergence, dislocation, and momentum with regard to markets and the AMH
- Discuss how market divergence may be measured, and calculate signal-to-noise ratio ( $SNR_t$ ) for a given price series and the market divergence index (MDI) for a given signal observation period
- Define crisis alpha opportunities, and describe characteristics of systematic trend following strategies and their implications during periods of equity market crisis

**25.4 Demonstrate knowledge of the benefits of commodity trading advisors (CTAs).***For example:*

- Discuss the conclusions of academic research regarding the benefits of CTAs
- Describe the sources of return for CTAs
- List and describe eight positive risk-return trade-offs that CTAs provide for their investors

**25.5 Demonstrate knowledge of systematic futures portfolio construction.***For example:*

- Recognize the four core decisions of a futures trading system
- Describe the use of data processing in futures portfolio construction
- Describe approaches to position sizing in futures portfolio construction, and calculate the number of futures contracts in a given allocation
- Describe process of market allocation in managed futures portfolio construction
- Summarize the role of trading execution in a managed futures portfolio construction

**Correction to Reading (*printed version only*):**

Section 25.3.4, Equation (25.1)

$$SNR_t(n) = \frac{|P_t - P_{t-n}|}{\sum_{i=0}^{n-1} |P_{t-i} - P_{t-i+1}|} \quad \text{Should be:} \quad SNR_t(n) = \frac{|P_t - P_{t-n}|}{\sum_{i=0}^{n-1} |P_{t-i} - P_{t-i-1}|}$$

**Chapter 26** Investing in CTAs

**Keywords**

access bias	maximum drawdown duration
convex payout	notional funding
crisis alpha	notional level
drawdown duration	omega ratio
dynamic-trading-based long gamma strategy	scenario analysis
funding level	stress test
implicit leverage	trading level
margin-to-equity	winning ratio of trades
market stress	

**Learning Objectives**

Chapter 26: Investing in CTAs

**26.1 Demonstrate knowledge of the historical performance of commodity trading advisors (CTAs).**

*For example:*

- Identify factors that contribute to the operational and informational efficiency of futures markets
- Analyze the statistical properties of CTA returns, and compare and contrast these properties with those of returns with other asset classes
- Discuss the effects of trend-following strategies on the skewness of a portfolio's return profile
- Describe the risk factors to which CTAs are exposed
- Discuss theory and evidence regarding the relationship between market divergence and the performance of CTAs
- Discuss the exposure of CTAs to market volatility
- Describe the effects of gamma exposure on CTAs

**26.2 Demonstrate knowledge of the diversification benefits provided by CTAs.**

*For example:*

- Describe the relationship between crisis alpha and CTA performance
- Recognize the portfolio diversification benefits of CTA investment for a 60/40 investor
- Recognize the portfolio diversification benefits of CTA investment for a fund of hedge funds investor

**26.3 Demonstrate knowledge of CTA risk measurement and risk management.**

*For example:*

- Discuss considerations involved in the allocation of capital and risk by CTA managers
- Compare and contrast the leverage of traditional investments with the implicit leverage of futures positions
- Discuss the functions of margin accounts and collateral management in managed futures positions and portfolios, and calculate trading level, funding level, and notional level for a given account
- Describe capital at risk and its relevance for managed futures trading programs and portfolios
- Discuss value at risk (VaR) with regard to managed futures, and calculate VaR for a given portfolio
- Discuss maximum drawdown and drawdown duration, and calculate maximum drawdown for a given CTA
- Describe the use of simulation analysis in managed futures investing
- Discuss the use of the omega ratio in the context of a CTA fund or a diversified portfolio of CTAs, and calculate the omega ratio for a given investment

**26.4 Demonstrate knowledge of three approaches to the benchmarking of CTAs.**

*For example:*

- Discuss the benchmarking of CTAs with an index of long-only futures contracts
- Discuss the benchmarking of CTAs with peer groups
- Discuss the benchmarking of CTAs with algorithmic indices
- Discuss the relationship between a CTA's investment strategy and benchmark selection
- Recognize five conclusions from empirical studies regarding CTA benchmarking

**26.5 Demonstrate knowledge of CTA managed accounts and platforms.**

*For example:*

- Identify factors that affect an investor's choice of a suitable managed futures investment product
- Discuss four factors that drive CTA portfolio construction
- Describe the various structures of CTA products and funds
- Describe the structuring of CTA products using managed accounts
- Describe the structuring of CTA investment using platforms
- Compare and contrast the structural characteristics of common CTA structures

**Correction to Reading (*printed version only*):**

See next page

**Correction to Reading (*printed version only*):**

Equations (26.4) and (26.5), page 695:

$$\mu_{T-1} = (1 - \lambda)\mu_{T-2} + \lambda(\mu_{T-2} - R_{T-1}) \quad (26.4)$$

$$\sigma_T^2 = (1 - \lambda) \times \sigma_{T-1}^2 + \lambda \times (\mu_{T-1} - R_T)^2 \quad (26.5)$$

Should read:

$$\mu_{T-1} = (1 - \lambda)\mu_{T-2} + \lambda R_{T-1} \quad (26.4)$$

$$\sigma_T^2 = (1 - \lambda) \times \sigma_{T-1}^2 + \lambda \times (R_T - \mu_{T-1})^2 \quad (26.5)$$

**Chapter 27** Relative Value Strategies

**Keywords**

beta neutral	market frictions
call protections	monetary neutral
cash-flow strategy	noise traders
cointegration approach	noise traders' risk
conversion premium	parity
efficiently inefficient	risk arbitrage
fundamental risk	sector neutral
fundamental value	short-sale risk
hard call	soft call
in-the-money	synchronization risk
junk or distressed convertibles	synthetic put
leverage risk	volatility trading

**Learning Objectives**

Chapter 27: Hedge Funds: Arbitrage & Relative Value Strategies

**27.1 Demonstrate knowledge of the limits to arbitrage of relative valuation.**

*For example:*

- Describe the characteristics of a relative value investment strategy
- Explain the absence of arbitrage in the pricing of derivative contracts
- Analyze examples of arbitrage opportunities
- Describe the factors that limit pure and/or risk arbitrage opportunities
- Discuss the concept of efficiently inefficient markets

**27.2 Demonstrate knowledge of convertible arbitrage.**

*For example:*

- Define and describe convertible arbitrage
- List three broad steps for the implementation of a convertible arbitrage strategy
- Discuss reasons why convertible bonds may be underpriced
- Describe the strategy of arbitrage with convertible bonds, and analyze a given example of the strategy
- Describe the valuation of convertible securities using the component approach, and use this approach to calculate the price of a given convertible bond
- Describe the valuation of convertible securities using the binomial model, and use this approach to calculate the price of a given convertible bond
- Describe convertible bond behavior at various stock price levels
- Describe the application of the Greeks to the analysis of convertible bond pricing
- Discuss the implementation of a convertible bond arbitrage strategy
- Describe four non-equity risks of convertible bond arbitrage strategies
- Describe the five sources of convertible arbitrage returns
- Summarize the market size and historical performance of convertible arbitrage investment strategies

**27.3 Demonstrate knowledge of equity market-neutral investment strategies, particularly pairs trading**

*For example:*

- Compare and contrast pairs trading and convertible arbitrage
- Discuss the general framework for equity market-neutral strategies, and perform calculations to determine whether given variables are independent
- Discuss the conceptual framework for a pairs trading strategy, including four steps for implementation
- Describe the details of implementing a pairs trading strategy, summarize the conclusions of related research studies, and perform calculations to determine whether stock prices are co-integrated
- Describe the sources of risk and return in a pairs trading investment strategy
- Summarize the market size and historical performance of pairs trading investment strategies

**Correction to Reading (*printed version only*):**

Exhibit 27.3, page 721

Parity                    80 (i.e., 80% of face value) = (Conversion ratio × Stock price)/Convertible bond price

Should read:

Parity                    80 (i.e., 80% of face value) = (Conversion ratio × Stock price)/**Face value**

**Chapter 28** Hedge Funds: Directional Strategies

**Keywords**

absolute purchasing power parity (PPP)	growth approach
balance of payments	high quality assets
betting against beta (BAB)	information-based global macro managers
bottom-up fundamental analysis	law of one
capital account	leverage aversion theory
cognitive psychology	loss aversion/disposition effect
covered interest rate parity	model-based global macro managers
current account	perpetual growth model
dividend premium	relative purchasing power parity (PPP)
DuPont model	sector specialists
efficient Market Hypothesis	sentiment
free cash flow to the firm (FCFF)	SWOT analysis
feedback-based global macro managers	top-down fundamental analysis
Fisher effect	uncovered interest rate parity
generalists	value long/short managers
Gordon's Growth Model	value-trap

**Learning Objectives**

Chapter 28: Hedge Funds: Directional Strategies

**28.1 Demonstrate knowledge of the financial economics of directional strategies.**

*For example:*

- Compare and contrast equity long/short strategies, global macro strategies, and quantitative hedge fund strategies
- Discuss the effect of informational market efficiency on directional hedge fund strategies
- Describe behavioral finance, and discuss how behavioral biases affect investor behavior

**28.2 Demonstrate knowledge of equity long/short hedge fund strategies.**

*For example:*

- Describe the equity long/short investment strategy
- Recognize the potential equity long/short investment opportunity set
- Discuss the value, growth, and blend approaches to equity long/short investing
- Describe and compare the bottom-up approach and the top-down approach to fundamental analysis
- Describe Gordon's growth model and the enterprise valuation model for fundamental equity valuation, and use these models to calculate valuations for a given investment
- Describe the sector-specific approach and the activist approach to equity long/short investment
- Discuss the steps involved in the process of executing a long/short hedge fund strategy (i.e., idea generation, optimal idea expression, position sizing, and trade execution)
- Recognize the risks associated with equity long/short investing, and describe how they may be managed
- Describe the issues of managerial expertise, sources of returns, and return attribution as they apply to the analysis of equity long/short strategies, and calculate the return on a given long/short investment
- Discuss the procedures involved in the investment process for a fundamental equity long/short manager

**28.3 Demonstrate knowledge of global macro hedge funds and strategies.**

*For example:*

- Summarize the history of the global macro hedge fund industry
- Describe the key characteristics of global macro strategies
- Compare and contrast the discretionary trading approach and the systematic trading approach
- Compare global macro managers to commodity trading advisors (CTAs)
- Discuss various schools of thought regarding sources of returns of which global macro funds are trying to take advantage
- Describe multistrategy global macro funds
- Describe directional currency trades, and apply the Fisher equation
- Discuss the possible effect of global macro funds on financial market volatility in emerging markets
- Describe four models used for currency trading
- Describe carry models for currency trading, and determine whether interest rate parity is satisfied in a given scenario
- Describe trend-following and momentum models for currency trading
- Describe value and volatility models for currency trading, and calculate the end-of-period exchange rate in a given scenario
- Discuss risk management techniques used for global macro funds, and how they affect the portfolio construction process

**28.4 Demonstrate knowledge of the historical performance of directional strategies.**

*For example:*

- Analyze historical performance of equity long/short and global macro hedge fund strategies

**Correction to Reading (*printed version only*):**

Application 28.3.10, Page 784:

Assume that the domestic inflation rate of 5% per period exceeds the foreign inflation rate of 3%, and that the current exchange rate is that 2 foreign currency units equals 1 foreign currency unit.

Should read:

Assume that the domestic inflation rate of 5% per period exceeds the foreign inflation rate of 3%, and that the current exchange rate is that 2 domestic currency units equals 1 foreign currency unit.

**Chapter 29** Hedge Funds: Credit Strategies

**Keywords**

accordion feature	KMV model
actual default	loan-to-own
administration of restructuring	lockbox
advance rate	net leverage covenant
asset-based loan (ABL)	operational restructuring
attachment of security interest	out-of-court restructuring
borrowing base	perfect the security interest
classic distressed investing strategy	prepackaged filing
credit	revolver
credit events	revolving line of credit
credit score	scheme of arrangement
creditors committee	seasonal overadvance
debtor-in-possession (DIP)	steering committee
default intensity	technical default
default trigger	term loan
distance to default (DD)	termining out debt
distressed exchange	trade claims
empirical approach to credit risk modeling	trading-oriented distressed strategy
exchange offer	traditional overadvance
expected default frequency (EDF)	Z-score model
fixed charge coverage	

**Learning Objectives**

Chapter 29: Hedge Funds: Credit Strategies

**29.1 Demonstrate knowledge of the economics of credit risk.**

*For example:*

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

**29.2 Demonstrate knowledge of credit risk modeling.**

*For example:*

- 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

**29.3 Demonstrate knowledge of the Merton model.**

*For example:*

- 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

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

*For example:*

- 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

**29.5 Demonstrate knowledge of reduced-form models.**

*For example:*

- 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

**29.6 Demonstrate knowledge of the pros and cons of structural and reduced-form models.**

*For example:*

- Compare and contrast the advantages and disadvantages of structural models and reduced-form models

**29.7 Demonstrate knowledge of empirical credit models.**

*For example:*

- 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

**29.8 Demonstrate knowledge of distressed debt investment strategies.**

*For example:*

- Define distressed debt
- Describe trade claims
- Describe the characteristics of distressed debt, and how the size of the distressed debt universe is measured
- Discuss common factors that cause financial distress for borrowers
- Describe the countercyclical nature of distressed debt opportunities
- Discuss the types of investors and investment vehicles in distressed debt
- Describe the roles of fundamental valuation and informational inefficiency as return drivers in distressed debt investment
- Describe the roles of catalytic events and activism as return drivers in distressed debt investment

**29.9 Demonstrate knowledge of bankruptcy laws across the globe.**

*For example:*

- Discuss the processes and characteristics of bankruptcy laws across the globe

**29.10 Demonstrate knowledge of the implementation of distressed debt investment strategies.**

*For example:*

- Describe the loan-to-own control-oriented approach to implementing distressed debt investment strategies
- Describe the classic approach to implementing distressed debt investment strategies
- Describe trading-oriented approach to implementing distressed debt investment strategies
- Describe debtor-in-possession (DIP) loan approach to implementing distressed debt investment strategies

**29.11 Demonstrate knowledge of the valuation risks involved in distressed debt investing.**

*For example:*

- Identify factors to consider in valuing a potential distressed debt investment
- Discuss the effect of liquidity risk on the value of a distressed debt investment
- Discuss the effect of mark-to-market risk on the value of a distressed debt investment
- Discuss the effect of legal and jurisdiction risk on the value of a distressed debt investment

**29.12 Demonstrate knowledge of asset-based lending.***For example:*

- Describe a typical asset-based loan (ABL) borrower, and the unique characteristics of the ABL market
- Explain why borrowers select asset-based lending
- Describe the features of asset-based lending
- Describe common uses of asset-based lending proceeds
- Describe the structures of ABLs and their collateral requirements
- Describe ABL lender protection and covenants
- Discuss five specialized risks inherent to ABLs (i.e., valuation, process and people, hedging, legal, and timing/exit)

**Correction to Reading (*printed version only*)**

Section 29.3.3, Equation 29.11, page 796:

The equation for credit spread written as follows

$$s = -\frac{1}{4} \times \ln \left[ 0.883 + \frac{100}{70} \times e^{-0.05 \times 4} \times (1 - 0.944) \right] = 0.49\%$$

Should read

$$s = -\frac{1}{4} \times \ln \left[ 0.883 + \frac{100}{70} \times e^{0.05 \times 4} \times (1 - 0.944) \right] = 0.49\%$$

There is no negative sign in the exponent of  $e$ .

Section 29.7.1, Equation 29.23, page 808:

$$Z = 1.2 \times X_1 + 1.4 \times X_2 + 3.3 \times X_3 + 0.5 \times X_4 + 1.0 \times X_5 \quad (29.23)$$

Should read:

$$Z = 1.2 \times X_1 + 1.4 \times X_2 + 3.3 \times X_3 + 0.6 \times X_4 + 1.0 \times X_5 \quad (29.23)$$

**Corrections continue to next page**

Section 29.7.3, 3rd paragraph, page 808:

Finally, the Z-score can be calculated as 3.49 using these five values and the coefficients in Equation 29.23.

Should read:

Finally, the Z-score can be calculated as 3.61 using these five values and the coefficients in Equation 29.23.

---

Section 29.7.4 6th paragraph, page 808:

The 3.49 Z-score for the sample firm (PQR Corporation) indicates that this firm belongs to the nondefault group.

Should read:

The 3.61 Z-score for the sample firm (PQR Corporation) indicates that this firm belongs to the nondefault group.

---

Level II book, pages 796 and 887

This is a clarification of the numerical examples appearing on these two pages.

Both examples deal with the construction of equity neutral portfolios consisting of long positions in convertible bonds and short positions in the underlying stocks.

Page 796: The example on this page calculates the number shares that should be shorted for each convertible bond as:

$$\# \text{ of Shares to be Shorted} = \text{Delta} \times \text{Conversion Ratio}$$

Page 887: The example on this page calculates the number of shares that should be shorted for convertible bond as:

$$\# \text{ of Shares to be Shorted} = \text{Delta} \times \text{Bond Price} \times (1/\text{Stock Price})$$

Both approaches are correct and depend on the form of delta that is used to perform the calculation. In the first example, delta is the sensitivity of bond price to changes in its parity value, while in the second example delta is measured as the percentage change in the bond price resulting from a percentage change in the stock price.

---

**Corrections continue on next page.**

## Corrections Continued

CAIA Level II book, Page 796, Lines 13-14 from the bottom of the page

... the risk-neutral probability of default can be expressed as  $\Pr[A_T \leq K] = 1 - N(d)$

Should read:

... the risk-neutral probability of default can be expressed as  $\Pr[A_T \leq K] = 1 - N(d - \sigma_A \sqrt{\tau})$

**Chapter 30** 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	short volatility
implied volatility structure	smile
iron butterfly	smirk
iron condor	tail risk funds
jump process	tenor
mixture model	vertical spread
negative volatility risk premium	VIX term structure
options volatility surface	volatility clustering
performance drag	volatility derivatives
ratio spread	volatility diffusion
regime change	volatility jump
regime switching model	volatility skew

**Learning Objectives**

Chapter 30: Volatility, Correlation, and Dispersion Products and Strategies

**30.1 Demonstrate knowledge of volatility, risk factors, and risk premiums.**

*For example:*

- Discuss volatility as a return factor exposure
- Describe how the returns of volatility correlate with the returns of the market index, and the effect of volatility factors on risk premium
- Discuss evidence supporting the idea that volatility is a unique, if unobservable, risk factor
- Describe how volatility derivatives can be used by investors to hedge market risk exposure

**30.2 Demonstrate knowledge of how options can be used to manage the volatility exposure and risk premiums of a portfolio.**

*For example:*

- Explain how writing options can be used as a short volatility strategy
- Explain how writing option straddles and strangles can be used as a short volatility strategy
- Explain how writing option butterflies and condors can be used as a short volatility strategy
- Discuss how the Greeks can be used to manage the risk of option portfolios
- Analyze a given position to determine the position's volatility exposure
- List and describe six key properties of realized volatility
- Describe the implied volatility structures of derivatives
- Evaluate the evidence that short volatility positions are associated with a positive risk premium
- Describe the dynamics of the volatility risk premium
- List and describe two reasons that explain the relatively short recovery period from drawdowns that exists for investment in volatility strategies
- List and describe two reasons that explain why the mean reversion that occurs with realized volatility is not an arbitragable property

**30.3 Demonstrate knowledge of modeling of volatility processes.**

*For example:*

- Discuss volatility processes with jump risk, and apply equations that represent returns and changes in volatility
- Describe volatility processes and regime changes

**30.4 Demonstrate knowledge of volatility products.**

*For example:*

- Describe the economic rationale for the existence of volatility products
- List and describe four features common to both volatility products and bonds
- Describe the characteristics of variance swaps, including their link to realized volatility
- Describe the Chicago Board Options Exchange (CBOE) Volatility Index (VIX), and recognize the steps for calculating the VIX
- Describe futures contracts and options based on the VIX, recognize how the VIX term structure can serve as a proxy for portfolio insurance, and describe VIX-related options and ETFs
- Calculate the price of a given 30-day hypothetical contract
- Describe the mechanics of, price modeling of, and motivations for correlation swaps; calculate the net payment on a given correlation swap; and describe dispersion trades
- Identify the common theme found in the pricing and trading of volatility and volatility products

**30.5 Demonstrate knowledge of option-based volatility strategies.**

*For example:*

- Describe the characteristics and mechanics of vertical intra-asset (skew) option spreads, describe how vertical spreads take advantage of volatility skew, and discuss how to use vertical spreads in equities while hedging delta risk
- Describe the characteristics of horizontal intra-asset (skew) spreads
- Describe the characteristics of inter-asset option spreads

**30.6 Demonstrate knowledge of volatility hedge funds and their strategies.**

*For example:*

- Describe the four subcategories of volatility hedge funds
- Define vega risk, and describe one common approach used to normalize it
- Interpret the return characteristics of volatility funds
- Describe the characteristics of relative value volatility funds, short volatility funds, long volatility funds, and tail risk funds
- Evaluate the results of tests designed to access the level of tail risk protection provided by the four volatility strategies

**Correction to Reading (*printed version only*):**

Exhibit 30.2, Page 837:

Payoff Diagrams for Long Iron Condor and Iron Butterfly Strategies

Should be:

Payoff Diagrams for Short Iron Condor and Iron Butterfly Strategies

**Chapter 31** Hedge Fund Replication

**Keywords**

algorithmic approach  
alternative betas  
capacity constraint hypothesis  
exposure inertia  
factor-based approach

fund bubble hypothesis  
hedge fund replication products  
increased allocation to active funds hypothesis  
payoff-distribution approach  
view commonality

**Learning Objectives**

Chapter 31: Hedge Fund Replication

**31.1 Demonstrate knowledge of the basics of hedge fund replication products.**

*For example:*

- Describe the basic characteristics of hedge fund replication products

**31.2 Demonstrate knowledge of the potential benefits of replication products.**

*For example:*

- Discuss the potential benefits to investors of using replication products

**31.3 Demonstrate knowledge of the case for using hedge fund replication.**

*For example:*

- 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

**31.4 Demonstrate knowledge of the unique benefits provided by replication products.**

*For example:*

- Describe the two key issues regarding the benefits provided by replication products
- Discuss the eight potential benefits unique to hedge fund replication products (i.e., liquidity, transparency, flexibility, lower fees, hedging, lower due diligence and monitoring risks, diversification, and benchmarking)

**31.5 Demonstrate knowledge of the factor-based approach to replication.**

*For example:*

- Describe the factor-based approach
- Discuss the four issues that must be addressed in constructing a replication product using the factor-based approach
- Discuss the three steps involved in setting up a factor-based replication program, and describe the calculations that are necessary to estimate asset weights for a given portfolio
- Discuss two key concepts in factor-based replication
- Summarize and evaluate empirical research related to the factor-based approach used to benchmark and replicate hedge funds

**31.6 Demonstrate knowledge of the payoff-distribution approach to replication.**

*For example:*

- Describe the payoff-distribution approach to hedge fund replication
- Compare and contrast the factor-based replication approach and the payoff-distribution replication approach, and describe the calculations that are necessary to replicate the probability distribution of a given hedge fund benchmark
- Summarize the empirical research evidence regarding the payoff-distribution approach

**31.7 Demonstrate knowledge of the algorithmic (or bottom-up) approach to replication.**

*For example:*

- Describe the algorithmic approach to hedge fund replication
- Discuss how the algorithmic approach can be applied to merger arbitrage, convertible arbitrage, and momentum strategies

**31.8 Demonstrate knowledge of alternative mutual funds (AMFs).**

*For example:*

- Describe AMFs, also known as liquid alternative funds
- Identify and describe three potential benefits to hedge managers of offering AMFs
- Discuss the potential benefits to an investor of allocating capital to AMFs instead of to hedge funds
- Describe and evaluate the risks associated with investing in an AMF

**31.9 Demonstrate knowledge of exchange-traded funds (ETFs).**

*For example:*

- Describe ETFs and how they can be used as hedge fund replication products
- Recognize three distinct advantages of ETFs over mutual funds
- Compare the costs of alternative ETFs to those of traditional investment ETFs

**Correction to Reading (printed version only)**

Section 31.5.4, Equation 31.6, Page 881

$$R_{t,HF} - r = \beta_1 \times (F_{1t} - r) + \beta_2 \times (F_{2t} - r) + \dots + \beta_1 \times (F_{1t} - r) + \varepsilon_t$$

Should read:

$$R_{t,HF} - r = \beta_1 \times (F_{1t} - r) + \beta_2 \times (F_{2t} - r) + \dots + \beta_K \times \max(F_{Kt} - r, 0) + \varepsilon_t$$

Pages 796 and 887:

This is a clarification of the numerical examples appearing on these two pages. Both examples deal with the construction of equity neutral portfolios consisting of long positions in convertible bonds and short positions in the underlying stocks.

Page 796: The example on this page calculates the number shares that should be shorted for each convertible bond as:

$$\# \text{ of Shares to be Shorted} = \text{Delta} \times \text{Conversion Ratio}$$

Page 887: The example on this page calculates the number of shares that should be shorted for convertible bond as

$$\# \text{ of Shares to be Shorted} = \text{Delta} \times \text{Bond Price} \times \frac{1}{\text{Stock Price}}$$

Both approaches are correct and depend on the form of delta that is used to perform the calculation. In the first example, delta is the sensitivity of bond price to changes in its parity value, while in the second example delta is measured as the percentage change in the bond price resulting from a percentage change in the stock price.

**Chapter 32** Funds of Hedge Funds and Multistrategy Funds

**Keywords**

administrative delay risk  
co-investor risk  
concentrated FoFs  
constituency effect  
double layer of fees

funding bias  
funds-of-one  
netting risk  
single-strategy FoFs  
tactical FoFs

**Learning Objectives**

Chapter 32: Fund of Hedge Funds & Multistrategy Funds

**32.1 Demonstrate knowledge of the approaches used by investors to gain hedge fund exposure.**

*For example:*

- 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

**32.2 Demonstrate knowledge of the characteristics of funds of hedge funds.**

*For example:*

- Define and describe funds of hedge funds
- Summarize the historical background of funds of hedge funds
- Describe the diversification goals of various types of funds of hedge funds
- Discuss characteristics of funds of hedge funds that reduce potential biases in reporting

**32.3 Demonstrate knowledge of the performance of funds of hedge funds.**

*For example:*

- Discuss the historical performance of funds of hedge funds

**32.4 Demonstrate knowledge of approaches to fund of hedge funds portfolio construction.**

*For example:*

- 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

**32.5 Demonstrate knowledge of factors affecting manager selection for a fund of hedge funds.**

*For example:*

- Discuss considerations in the selection of hedge funds for inclusion in a fund of hedge funds portfolio

**32.6 Demonstrate knowledge of benefits of allocating to funds of hedge funds.**

*For example:*

- Discuss potential benefits of investing in funds of hedge funds

**32.7 Demonstrate knowledge of disadvantages of allocating to funds of hedge funds.**

*For example:*

- Discuss potential disadvantages of investing in funds of hedge funds

**32.8 Demonstrate knowledge of the differences between funds of hedge funds and multistrategy funds.**

*For example:*

- Compare and contrast the key features of funds of hedge funds and multistrategy funds

**32.9 Demonstrate knowledge of how funds of hedge funds add value for investors.**

*For example:*

- 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 by the use of these approaches by fund of hedge fund managers

**32.10 Demonstrate knowledge of hedge fund indices.**

*For example:*

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

**Correction to Reading (*printed version only*):**

Page 899, Exhibit 32.2

The legend of the Exhibit is incorrect: The **darker bars** must refer to “Hedge Funds”  
While the **lighter bars** must refer to “Funds of Funds”.

**Chapter 33** Hedge Fund Operational Due Diligence

**Keywords**

asset verification	operational threshold issue
associate directors	position verification
audit holdback	post-clearance
board of directors	posting
dedicated operational due diligence approach	pro-rata allocation
director capacity	pre-clearance
equity ownership model	reconciliation
execution	redemption gates
formal directors	reserve
front running	restricted list
fund governance	risk control model
hardship exemption	settlement (internal)
hedge fund prime brokers	shared operational due diligence approach
hybrid operational due diligence approach	T+1 basis
insider trading	three-way reconciliation
investment decision making authority model	trade blotter
modular operational due diligence approach	trade break
operational benchmarking	two-way reconciliation
operational signaling effect	unencumbered cash

**Learning Objectives**

Chapter 33: Hedge Fund Operational Due Diligence

**33.1 Demonstrate knowledge of the differences in the operational due diligence (ODD) processes for hedge fund investment and private equity investment.**

*For example:*

- Describe the major differences between hedge funds and private equity that affect the ODD processes for those types of investments

**33.2 Demonstrate knowledge of the four operational steps in the analysis of hedge fund operational trading procedures.**

*For example:*

- Identify and describe the four operational steps in the hedge fund trading process
- Identify and describe additional factors investors analyze to identify operational risks

**33.3 Demonstrate knowledge of the analysis of hedge fund cash management and movement.**

*For example:*

- Identify and describe the four primary reasons for a hedge fund to hold a cash position
- Explain why internal hedge fund review processes and administrator checks are crucial as they relate to the processing of subscriptions and redemptions

**33.4 Demonstrate knowledge of the analysis of hedge fund external parties.**

*For example:*

- Discuss the analysis of hedge fund prime brokers as part of the ODD process
- Discuss the analysis of hedge fund administrators as part of the ODD process
- Identify the reasons for having an independent service provider verify the operational data of a hedge fund

**33.5 Demonstrate knowledge of the analysis of hedge fund compliance considerations.**

*For example:*

- Identify areas commonly overseen by a hedge fund compliance department
- Explain why ODD analysis of a hedge fund's compliance function should include review of fund employees' personal trading, common compliance risks regarding personal trading, compliance risks regarding insider trading, electronic communication monitoring, and the work of third-party compliance consultants

**33.6 Demonstrate knowledge of documenting the ODD process.**

*For example:*

- Discuss structure and content of the documentation of results and conclusions of an ODD investigation

**33.7 Demonstrate knowledge of operational decision making and allocation considerations.**

*For example:*

- Discuss common operational decisions and allocation conclusions that result from the ODD process

**33.8 Demonstrate knowledge of investigative due diligence.**

*For example:*

- Describe three models investors use to determine which key fund personnel to investigate as part of the ODD process
- Recognize and define five areas that are typically covered during the background investigation process
- Discuss factors involved in organizing and interpreting the results of hedge fund investigative due diligence

**33.9 Demonstrate knowledge of four approaches to resource allocation for ODD.**

*For example:*

- Discuss four popular approaches used by investors in designing an approach to allocating resources for ODD reviews

**33.10 Demonstrate knowledge of the governance of hedge funds.**

*For example:*

- Recognize the structures of hedge fund governance, and discuss the duties of committees, boards, and directors

**33.11 Demonstrate knowledge of hedge fund insurance.**

*For example:*

- Discuss the reasons for including analysis of insurance coverage in an ODD review, and recognize common types of hedge fund insurance

**33.12 Demonstrate knowledge of the process for performing ODD on funds of hedge funds.**

*For example:*

- Compare the operational procedures of funds of hedge funds with those of hedge funds
- Discuss the unique factors included in the ODD process for funds of hedge funds

## Chapter 34 Regulation and Compliance

### Keywords

accredited investor  
Alternative Investment Fund Managers Directive (AIFMD)  
asset stripping rules  
blue sky law  
cause inspections  
code of ethics  
Dodd-Frank Act  
European Securities and Markets Authority  
European Systemic Risk Board (ESRB)  
Financial Stability Oversight Council  
Financial Supervisory Service (FSS)  
Form ADV  
Form PF  
The Investment Advisers Act of 1940  
large hedge fund advisers  
large liquidity fund advisers  
large private equity fund advisers  
Monetary Authority of Singapore (MAS)  
Orderly Liquidation Authority  
Orderly Liquidation Fund  
qualified purchaser  
regulatory assets under management (RAUM)  
rule 206(4)-7  
Section 13(d)  
Section 13(f)  
Section 13(g)  
Section 13(h)  
Section 16  
Securities Act of 1933  
Securities Exchange Act of 1934  
Securities and Exchange Surveillance Commission (SESC)  
Securities and Futures Commission (SFC)  
Securities and Exchange Commission (SEC)  
sweep inspections  
Undertakings for Collective Investment in Transferrable Securities (UCITS)  
Volcker Rule

### Learning Objectives

#### Chapter 34: Regulation and Compliance

#### **34.1 Demonstrate knowledge of three foundational principles of financial market regulation.**

*For example:*

- Discuss the three principles on which financial regulations are based

**34.2 Demonstrate knowledge of the regulation of alternative investments in the United States.**

*For example:*

- Summarize the role of the U.S. Securities and Exchange Commission (SEC) in the regulation of financial markets within the United States
- Describe the legal foundation of regulation of hedge funds in the United States
- Discuss the core operating principles that govern the hedge fund regulatory scheme in the United States
- Describe hedge fund registration requirements in the United States
- Describe requirements for registered advisors to establish and maintain an adequate compliance program, including duties of the chief compliance officer, code of ethics, three types of SEC inspections, and responses to the outcomes of SEC inspections
- List and describe the various reporting requirements for hedge funds in the United States
- Summarize the regulation of private equity funds in the United States

**34.3 Demonstrate knowledge of the regulation of alternative investments in Europe.**

*For example:*

- Describe the historical development of the structure and governance of the European Union (EU)
- Identify and describe regulations for alternative asset managers in Europe
- Discuss European regulations regarding registration, exemptions to compliance, obtaining registration, AIFMD fund directives and fund requirements, marketing materials, formal risk management and accountability, and required reporting
- Describe the role of the European Securities and Markets Authority (ESMA), violation penalties, and the role of ESMA in the enforcement of European regulation
- Discuss the regulation of non-EU managers in Europe

**34.4 Demonstrate knowledge of the regulation of hedge funds in Asia.**

*For example:*

- Discuss the regulation of hedge funds in the continent of Asia, and specifically in Hong Kong, Singapore, South Korea, and Japan

## Topic 8 Structured Products

### Reading:

*Alternative Investments: CAIA Level II, Third Edition, Wiley, 2016.*

### Chapter 35 Structured Products I: Fixed-income Derivatives and Asset-backed Securities

#### Keywords

arbitrage-free models of the term structure	floorlet
auto loan-backed securities (ALBS)	Ho and Lee model
absolute prepayment speed (ABS)	interest rate cap
cap	interest rate floor
caplet	interest rate swap
callable bonds	non-recourse loan
credit card receivable (CCR)	recourse loan
Cox, Ingersoll, and Ross model	swap rate
equilibrium models of the term structure	swap rate curve
floor	Vasicek's model

#### Learning Objectives

##### Chapter 35: Structured Products I - Fixed-Income Derivatives and Asset-Backed Securities

##### **35.1 Demonstrate knowledge of the main approaches to term structure modeling.**

*For example:*

- Recognize the main approaches used to model the term structure of interest rates

##### **35.2 Demonstrate knowledge of equilibrium models of the term structure.**

*For example:*

- Describe, discuss and apply Vasicek's model
- Describe, discuss and apply the Cox, Ingersoll, and Ross (CIR) model

**35.3 Demonstrate knowledge of arbitrage-free models of the term structure.***For example:*

- Describe arbitrage-free models of the term structure
- Describe, discuss and apply the Ho and Lee model

**35.4 Demonstrate knowledge of interest rate derivatives.***For example:*

- Describe interest rate caps and floors, and calculate cap payments and floor payments
- Describe callable bonds, and calculate the value of a callable bond
- Describe the mechanics and uses of interest rate swaps (IRSs)
- Describe and apply the process for valuing an IRS
- Discuss the risks associated with open positions in IRSs

**35.5 Demonstrate knowledge of asset-backed securities (ABSs).***For example:*

- Discuss the structure and characteristics of ABSs

**35.6 Demonstrate knowledge of auto loan-backed securities (ALBSs).***For example:*

- Discuss the features and distinguishing characteristics of ALBSs, and calculate prepayment rates

**35.7 Demonstrate knowledge of credit card receivables (CCRs).***For example:*

- Discuss the features and distinguishing characteristics of CCRs

**Correction to Reading (*printed version only*)**

Page 1016, Section 35.6, Equation 35.12

$$ABS = \frac{SMM}{1 - [SMM \times (M - 1)]} \quad (35.12)$$

Should read:

$$ABS = \frac{SMM}{1 + [SMM \times (M - 1)]} \quad (35.12)$$

Continued to next page

**Correction to Reading (*printed version only*)**

Application 35.4.4A, Page: 1008:

The heading of the last column:

$$(8) = 4.3464\% \times (3) / 360 \times 10M$$

Should read

$$(8) = 4.3464\% \times (90) / 360 \times 10M$$

**Chapter 36** Structured Products II: Insurance-Linked Products and Hybrid Securities

**Keywords**

attachment probability	longevity risk
bonus payment	longevity swap contracts
cat bond attachment point of the trigger	modeled trigger
catastrophe bonds (Cat bonds)	mortality risk
complexity arbitrage	parametric trigger
exhaustion point	payment in kind (PIK) interest
extreme mortality risk	subordinated debt with profit participation
indemnity trigger	surrender value
industry loss trigger	viatical settlement
insurance-linked securities (ILS)	warrants
life insurance settlements	

**Learning Objectives**

Chapter 36: Structured Products II – Insurance-Linked Products and Hybrid Securities

**36.1 Demonstrate knowledge of insurance-linked securities.**

*For example:*

- Describe the characteristics of insurance-linked securities (ILS)

**36.2 Demonstrate knowledge of catastrophe (cat) bonds.**

*For example:*

- Describe the characteristics and mechanics of catastrophe bonds
- Describe the characteristics of four trigger types of catastrophe bonds
- Discuss the historical performance of catastrophe bonds
- Describe the process used to establish coupon rates that catastrophe bond investors expect to receive on their investment, and calculate the total coupon rate to investors
- Describe the characteristics of catastrophe derivatives
- Discuss the credit risk of catastrophe bonds, and list alternatives devised to mitigate and manage this risk

**36.3 Demonstrate knowledge of longevity and mortality risk-related products.**

*For example:*

- Describe the characteristics of longevity risk
- Describe the process for hedging longevity risk using longevity swap contracts
- Describe the characteristics of mortality risk
- Discuss life insurance settlements, including its components, processes, and participants
- Model a life insurance settlement, and calculate the net present value for a given policy
- Describe viatical settlements, and identify the characteristics that distinguish them from life settlements
- Discuss the benefits and risks of investing in viatical settlements

**36.4 Demonstrate knowledge of mezzanine debt.**

- Describe the characteristics of mezzanine debt ( MD)
- Compare the characteristics of MD with the characteristics of senior debt and equity
- Discuss the benefits and disadvantages of mezzanine debt to issuers and investors
- Describe the structural terms and internal rates of return (IRR) typically associated with investment in MD
- Describe the characteristics of various mezzanine products (i.e., subordinated debt with step-up rates, subordinated debt with PIK interest, subordinated debt with profit participation, subordinated debt with warrants, and convertible loans), and calculate payments to investors for a given bond
- Discuss the uses of mezzanine debt and financing in project finance

**See next page for correction to reading.**

**Correction to Reading (*printed version only*):**

Exhibit 36.11 should appear as it does below:

**EXHIBIT 36.11** Summary of Mezzanine Debt Products and Attributes

<b>Debt with warrants</b>	<b>Convertible loan</b>	<b>Participating loans</b>	<b>Debt w/ step-up or deferred interest</b>	<b>Convertible preferred equity</b>
Typically subordinated debt with detached equity warrants Principal is repaid after senior debt is largely or fully repaid Cash coupon Equity warrants can have zero or very low exercise price, and represent least dilutive minority stake in issuer	Typically subordinated Principal repaid at maturity unless conversion occurs, in which case debt swaps into equity at pre-agreed formula Inherently more dilutive than debt w/ warrants Most applicable on eve of IPO or when seed capital PE investor seeks max downside protection	Alternative form of mezzanine Base interest rate plus a performance-linked spread Interest rate linked to net profit, EBITDA, or sometimes sales; easy to game No equity Cumbersome to structure in practice	Subordinated debt with large amount of interest deferred (PIK often at final maturity) No equity participation, but potential for high IRR nonetheless Principal repayment is typically back ended Does not work well for longer-term finance (cumulative effect of deferred interest becomes punitive)	Similar to convertible debt, except that default on payment does not accelerate other debt and cannot force issues into bankruptcy Essentially a form of senior equity Widely used in start-up financings; basically equity
<b>Direct</b>	<b>Direct</b>	<b>Indirect</b>	<b>Subordinated debt</b>	<b>Equity</b>
<b>Senior debt with equity participation</b>				

**Correction to Reading (*printed version only*):**

Page 1021, 5<sup>th</sup> line from the top:

“This section discusses two examples of ICS:”

Should read

“This section discusses two examples of ILS:”

## Action Words

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

NOTE: The question examples in this table are NOT sample questions for the current exam.

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

Term	Definition	Question Example	Example of Term Use
Compare	Describe similarities and differences	Which of the following least accurately compares the Sharpe and Treynor ratios?  A. Both ratios contain excess return in the numerator. B. Both ratios express a measure of return per unit of some measure of risk. C. The Sharpe ratio is based on total risk, while the Treynor ratio is based on systematic risk. D. The Sharpe ratio is the inverse of the Treynor ratio.	You have to <b>compare</b> 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 <b>compare</b> 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 <b>construct</b> 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 <b>contrast</b> 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 <b>define</b> , 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 <b>describes</b> 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 <b>differentiate</b> 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 <b>discussion</b> 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 <b>explanation</b> of a term or issue.  2. You need to identify the term that best <b>explains</b> 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 <b>identify</b> the term that best meets the criterion of the question.  Correct Answer: C
Illustrate	Clarify through examples or comparisons	For two types of convergence hedges, what situations present profitable opportunities, how are the hedges set up, and what are the associated risks?	You have to provide an example for each hedge or compare the two to <b>illustrate</b> how they work.
Interpret	Explain the meaning	Your certificate of deposit will mature in one week, and you are considering how to invest the proceeds. If you invest in a 30-day CD, the bank will pay you 4% interest. If you invest in a 2-year CD, the bank will pay you 6% interest. You should choose the:  A. 30-day CD, no matter what you expect interest rates to do in the future. B. 2-year CD, no matter what you expect interest rates to do in the future. C. 30-day CD if you expect that interest rates will fall in the future. D. 2-year CD if you expect that interest rates will fall in the future.	You have to <b>interpret</b> 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 <b>list</b> those items that are consistent with the question.

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

**CAIA Editorial Staff**

Hossein Kazemi, Ph.D., CFA, Senior Advisor, CAIA Program

Keith Black, Ph.D., CAIA, CFA, Managing Director, Curriculum and Exams

Donald R. Chambers, Ph.D., CAIA, Associate Director of Curriculum

Nelson J. Lacey, Ph.D., CFA, Director of Examinations

Kristaps Licis, Associate Director of Examinations

Kate Lucey, Project Manager of Exams Administration

Nancy E. Perry, Curriculum & Exams Associate

No part of this publication may be reproduced or used in any form (graphic, electronic or mechanical, including photocopying, recording, taping or information storage and retrieval systems) without permission by Chartered Alternative Investment Analyst Association, Inc. (“CAIA”). The views and opinions expressed in the book are solely those of the authors. This book is intended to serve as a study guide only; it is not a substitute for seeking professional advice.

CAIA disclaims all warranties with respect to any information presented herein, including all implied warranties of merchantability and fitness. All content contained herein is provided “AS IS” for general informational purposes only. In no event shall CAIA be liable for any special, indirect or consequential changes or any damages whatsoever, whether in an action of contract, negligence or other action, arising out of or in connection with the content contained herein. The information presented herein is not financial advice and should not be taken as financial advice. The opinions and statements made in all articles and introductions herein do not necessarily represent the views or opinions of CAIA.