CAIA ASSOCIATION®

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CAIA® Level II Study Guide

Chartered Alternative Investment Analyst Association®

Contents

Introduction to the Level II Program

Congratulations on your successful completion of Level I and welcome to Level II of the Chartered Alternative Investment Analyst℠ (CAIA) program. The CAIA® program, organized by the CAIA Association® and co-founded by the Alternative Investment Management Association (AIMA) and the Isenberg School Center for International Securities and Derivatives Markets (CISDM), 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 our 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.

Each study guide is 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 reading materials for the Level II curriculum are as follows:

- *Standards of Practice Handbook,* 10th edition, CFA Institute, 2010. ISBN: 978-0-938-36722-2.

- *CAIA Level II: Advanced Core Topics in Alternative Investments,* Wiley, 2012. ISBN: 978-1-118-36975-3.

- *CAIA Level II: Core and Integrated Topics,* Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9.

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 complete list of the 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. The equation exception list at the end of this study guide contains equations that serve as exceptions and will be provided if needed to answer a specific question. For example, a question asking candidates to describe the implication of large excess kurtosis can be answered without having access to the kurtosis formula. On the other hand, a question asking candidates to calculate the excess kurtosis of a return series would require the excess kurtosis equation.

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. Nevertheless, 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.

Except for "Professional Standards and Ethics," 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 and 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%
Private Equity	10%–20%	0%–10%
Commodities	5%–15%	0%–10%
Real Assets	10%–20%	0%–10%
Hedge Funds and Managed Futures	10%–20%	0%–10%
Structured Products, and Asset Allocation and Portfolio Management	5%–15%	0%–10%
Risk and Risk Management, and Manager Selection, Due Diligence, and Regulation	5%–15%	0%–10%
Total	**70%**	**30%**

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

Errata Sheet

Correction notes appear in this study guide to address known errors existing in the assigned readings. Additional errors in the readings and learning objectives are occasionally brought to our attention; in these cases, we will post the errata on the Curriculum and Study Materials page of the CAIA website: www.caia.org. It is the

responsibility of the candidate to review these errata prior to taking the examination. Please report suspected errata to curriculum@caia.org.

Calculator Policy

You will need to bring a calculator for the Level II examination. The calculations that candidates are asked to perform range from simple mathematical operations to more complex methods of valuation. 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.** The examination proctor will require that you clear all calculator memory prior to the start of the examination.

Completion of the Program

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

CAIA Level II Outline

Topic 1: Professional Standards and Ethics

Standards of Practice Handbook, 10th edition, CFA Institute, 2010.

- 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

Introduces the practices and standards for dealing with ethical considerations experienced in the investment profession on a daily basis; the handbook addresses the professional intersection where theory meets practice and where the concept of ethical behavior crosses from the abstract to the concrete.

Topic 2: Private Equity

CAIA Level II: Advanced Core Topics in Alternative Investments, Wiley, 2012. Part Two: Private Equity, Chapters 5 – 14.

- Private Equity Market Landscape
- Private Equity Fund Structure
- The Investment Process
- Private Equity Portfolio Design
- Fund Manager Selection Process
- Measuring Performance and Benchmarking in the Private Equity World
- Monitoring Private Equity Fund Investments
- Private Equity Fund Valuation
- Private Equity Fund Discount Rates
- The Management of Liquidity

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part I: Investment Products: Private Equity.

- Kojima, J. C. and D. J. Murphy. "Hitting the Curve Ball: Risk Management in Private Equity." *The Journal of Private Equity*, Spring 2011, Vol. 14, No. 2, pp. 18-42.
- Bengtsson, O. "Covenants in Venture Capital Contracts." *Management Science*, November 2011, Vol. 57, No. 11, pp. 1926-1943.

- Teten, D., A. AbdelFattah, K. Bremer, and G.Buslig. "The Lower-Risk Startup: How Venture Capitalists Increase the Odds of Startup Success." *The Journal of Private Equity*, Spring 2013, Vol. 16, No. 2, pp. 7-19.

Core readings cover advanced topics in private equity investments and describe various routes into private equity investments. The structure of private equity funds is discussed, and manager selection and monitoring processes are explained. Benchmarking in the private equity world, valuation methods, and management of liquidity are reviewed. The additional readings examine the unique risks that arise in selecting and monitoring private equity managers. The importance of covenants in venture capital is discussed, as proper covenants can reduce agency costs and improve the relationship between entrepreneurs and venture capitalists. The final paper examines the areas and actions by which venture capitalists can add value to startup firms beyond the provision of capital.

Topic 3: Real Assets

CAIA Level II: Advanced Core Topics in Alternative Investment, Wiley, 2012. Part Three: Real Assets, Chapters 15-22.

- Real Estate as an Investment
- Unsmoothing of Appraisal-Based Returns
- Core, Value-Added, and Opportunistic Real Estate
- Real Estate Indices
- Public versus Private Real Estate Risks
- Portfolio Allocation within Real Estate
- Farmland and Timber Investments
- Investing in Intellectual Property

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part II: Investment Products: Real Assets.

- Derwall, J., J. Huij, D. Brounen, and W. Marquering. "REIT Momentum and the Performance of Real Estate Mutual Funds." *Financial Analysts Journal*, September/October 2009, Vol. 65, No. 5, p. 24-34.
- Inderst, G. "Infrastructure as an asset class." EIB Papers, 2010, Vol. 15, No. 1, pp. 70-105.
- Fu, C-H. "Timberland Investments: A Primer." Timberland Investment Resources, LLC. May 2011.

Core readings cover various forms of real estate investment and valuation methodologies. Due diligence of real estate investments and the risk-return characteristics of major real estate indices are discussed. Mortgage securities, asset allocation using real estate, and risk-return profiles of numerous real estate investments are explained. Implications of momentum in REITs are presented. Risk measurement and management tools applicable to institutional real estate investments are analyzed. The structure and risk-return profile of investments in infrastructure are examined. Inderst's article provides evidence on the

global performance of infrastructure funds and addresses the issue of heterogeneity of this investment product. Real assets are considered desirable assets because of their potential to provide a hedge against inflation risk. The diversification potential and special risks of timberland investments are presented.

Topic 4: Commodities

CAIA Level II: Advanced Core Topics in Alternative Investments, Wiley, 2012. Part Four: Commodities, Chapters 23-28.

- Key Concepts in Commodity Market Analysis
- Role of Commodities in Asset Allocation
- Methods of Delivering Commodity Alpha
- Methods of Delivering Commodity Beta: Indices, Swaps, Notes, and Hedge Funds
- Macroeconomic Determinants of Commodity Futures Returns
- Effective Risk Management Strategies for Commodity Portfolios

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part III: Investment Products: Commodities.

- Gorton, G. and K.G. Rouwenhorst. "Facts and Fantasies about Commodity Futures." *Financial Analysts Journal*, March/April 2006, Vol. 62, No. 2, p. 47-68.
- Erb, C.B. and C.R. Harvey. "The Strategic and Tactical Value of Commodity Futures." *Financial Analysts Journal*, March/April 2006, Vol. 62, No. 2, p. 69-97.
- Irwin, S.H. and D.R. Sanders. "Financialization and Structural Change in Commodity Futures Markets." *Journal of Agricultural and Applied Economics*, August 2012, Vol. 44, No. 3, pp. 371–396.

Core readings provide advanced analysis of commodity markets and explain the role of commodities in asset allocation. Various methods for generating commodity alpha and beta through spot and futures transactions are described, and major commodity indices and their risk-return profiles are discussed. Economics of commodity markets and the term structure of commodity futures contracts are explained. The final article examines the impact of increased demand for index linked commodity products on the behavior of commodity prices and the pricing of commodity futures prices.

Topic 5: Hedge Funds and Managed Futures

CAIA Level II: Advanced Core Topics in Alternative Investments, Wiley, 2012. Part Five: Hedge Funds and Managed Futures, Chapters 29–40.

- Structure of the Managed Futures Industry
- Managed Futures: Strategies and Sources of Return
- Risk and Performance Analysis in Managed Futures Strategies
- Structuring Investments in CTAs

- Hedge Fund Replication
- Convertible Arbitrage
- Global Macro and Currency Strategies
- Fundamental Equity Hedge Fund Strategies
- Quantitative Equity Hedge Fund Strategies
- Funds of Hedge Funds
- Regulation and Compliance
- Operational Due Diligence

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part IV: Investment Products: Hedge Funds, Fund of Funds and Managed Futures.

- Reddy, G., P. Brady, and K. Patel. "Are Funds of Funds Simply Multi-Strategy Managers with Extra Fees?" *The Journal of Alternative Investments,* Winter 2007, Vol. 10, No. 3, p. 49-61.
- Jain, S. "Investing in Credit Series Distressed Debt." UBS Alternative Investments, June 15, 2011, Published in AIAR, Q2 2012, Vol. 1, Issue 2.

Core readings provide detailed discussions of convertible arbitrage, global macro, and equity long/short strategies. Risk-return characteristics of funds of funds and investable hedge fund indices are explained and compared. Due diligence processes for various hedge fund strategies and the role of operational risk are explained. Hedge fund replication products and the role of hedge fund beta are presented, and various methodologies used in the creation of these products are evaluated. Recent industry and academic research on multi-strategy funds and their relationship to funds of funds are studied. Distressed debt investments by hedge funds and private equity firms are contrasted.

The structure of the managed futures industry and its regulatory framework are presented, and each managed futures strategy and its risk-return profile is explained. The role of managed futures in diversified portfolios is examined, and performance evaluation and manager selection processes are explained.

Topic 6: Structured Products

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Section V: Investment Products: Structured Products.

- Coval, J., J. Jurek, and E. Stafford. "The Economics of Structured Finance." *Journal of Economic Perspectives*, Winter 2009, Vol. 23, No. 1, p. 3–25.
- Weistroffer, C. "Insurance Linked Securities: A niche market expanding." Deutsche Bank Research, October 2010.

Modeling credit risk is described, and then a detailed discussion of the structure, pricing, and applications of credit default swaps is presented. The risk and return of insurance-

linked products are derived from natural disasters and mortality risk, which are different risk and return drivers from traditional investments and other alternative investments.

Topic 7: Asset Allocation and Portfolio Management

CAIA Level II: Advanced Core Topics in Alternative Investments, Wiley, 2012. Part One: Asset Allocation and Portfolio Management, Chapters 2–4.

- The Endowment Model
- Risk Management for Endowment and Foundation Portfolios
- Pension Fund Portfolio Management

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part VI: Asset Allocation and Portfolio Management.

- Perold, A. F. and W.F. Sharpe. "Dynamic Strategies for Asset Allocation." *Financial Analysts Journal*, January/February 1995, Vol. 51, No. 1, p.149-160.
- Ilmanen, A. "Understanding Expected Returns." CFA Institute, cfapubs.org, June 2012, CFA Institute Conference Proceedings Quarterly.

The endowment model as represented by the investment strategy of Yale University's endowment is examined. The issue of illiquidity risk was especially important during the 2007–2008 financial crisis. These chapters provide practical rules for managing and reducing this risk. The important role of pension funds in the fund management industry is presented.

Risk profiles of dynamic strategies such as constant proportion portfolio insurance and momentum are discussed. The importance of the derivation of expected return assumptions is discussed, along with a historical and theoretical framework for estimating expected returns to a number of asset classes.

Topic 8: Risk and Risk Management

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part VII: Risk and Risk Management.

- Hill, J.M. "A Perspective on Liquidity Risk & Horizon Uncertainty." *The Journal of Portfolio Management*, Summer 2009, Vol. 35, No. 4, p. 60-68.
- Berger, A. "Chasing Your Own Tail (Risk)." AQR Capital Management, LLC, Summer 2011.

Methods for dealing with unique challenges of managing illiquid investments are presented. Implications of illiquidity and uncertain investment horizons during periods of financial distress are studied, and methods for reducing the adverse effects of liquidity risk are presented. Finally, non-option methods of protecting portfolios against tail risk are listed.

Topic 9: Manager Selection, Due Diligence, and Regulation

CAIA Level II: Core and Integrated Topics, Institutional Investor, Inc., 2013. Part VIII: Manager Selection, Due Diligence, and Regulation.

- De Souza, C. and S. Gokcan. "Hedge Fund Investing: A Quantitative Approach to Hedge Fund Selection and De-Selection." *The Journal of Wealth Management*, Spring 2004, Vol. 6, No. 4, p. 52-73.
- Clare, A. and N. Motson. "Locking in the Profits or Putting It All on Black? An Empirical Investigation into the Risk-Taking Behavior of Hedge Fund Managers." *The Journal of Alternative Investments,* Fall 2009, Vol. 12, No. 2, p. 7-25.
- Smith, D. and A. Deutschmann. "Hedge Funds, Leverage and Counterparty Negotiations." JPMorgan Alternative Asset Management, 2008.

The first reading presents a quantitative approach to manager selection, in which each manager's risk-return profile and persistence in performance are taken into account in developing such a framework. Clare and Motson explore how hedge fund fee structures can influence the risk-taking behavior of hedge fund managers. The last article emphasizes the importance of liquidity and flexibility in the operations of a hedge fund, where managers are cautioned to closely monitor the terms and availability of leverage.

Topic 1: Professional Standards and Ethics

Readings

1. *Standards of Practice Handbook*, 10th edition, CFA Institute, 2010. ISBN: 978-0-938-36722-2.

Keywords

Additional compensation
Best execution
Blackout/restricted periods
Block allocation
Block trades
Brokerage
Buy-side
Commissions
Composites
Custody
Directed brokerage
Disclosure
Due diligence
Execution of orders
Fact versus opinion
Fair dealing
Firewalls
"Flash" report
Fraud
Front-running
"Hot issue" securities
Global Investment Performance Standards (GIPS)
Incentive fees
Independent contractors
Insider trading
Market manipulation
Material changes
Material nonpublic information
Misappropriation
Mosaic theory
Oversubscribed issue
Performance fees
Plagiarism
"Pump and dump"
Reasonable basis
Referral fees
Restricted list
Round-lot
Secondary offerings
Secondary research
Self-dealing
Sell-side
Soft commissions
Soft dollars
Thinly traded security
Watch list
Whisper number
Whistle-blowing

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: Private Equity

Readings

1. *CAIA Level II: Advanced Core Topics in Alternative Investments*, Wiley, 2012. ISBN: 978-1-118-36975-3. Part Two: Private Equity, Chapters 5 – 14.
2. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9. Part I: Investment Products: Private Equity.
   A. Kojima, J. C. and D. J. Murphy. "Hitting the Curve Ball: Risk Management in Private Equity." *The Journal of Private Equity*, Spring 2011, Vol. 14, No. 2, pp. 18-42.
   B. Bengtsson, O. "Covenants in Venture Capital Contracts." *Management Science*, November 2011, Vol. 57, No. 11, pp. 1926-1943.
   C. Teten, D., A. AbdelFattah, K. Bremer, and G.Buslig. "The Lower-Risk Startup: How Venture Capitalists Increase the Odds of Startup Success." *The Journal of Private Equity*, Spring 2013, Vol. 16, No. 2, pp. 7-19.

Reading 1, Chapter 5
Private Equity Market Landscape

Keywords

Blind-pool investment
Buyout funds
Capital calls or drawdowns
Carried interest
Cash flow J-curve
Co-investment
Commitments
Contractually limited life
Distributions
Early stage
Expansion stage or development capital stage
Fund-raising cycle
General partner (GP)
Going direct
Hurdle rate or preferred return
Investment period
J-curve
Limited partner (LP)
Limited partnership structure
Limiting liability
Management fees
Mezzanine funds
Net asset value (NAV) J-curve
Realizations or exits
Replacement capital or secondary purchase
Rescue or turnaround
Secondary transactions
Venture capital (VC) funds
Vintage year

Learning Objectives

5.1 Demonstrate knowledge of the main strategies for investing in private equity.
For example:
- Describe venture capital and the stages of development of funded companies
- Identify and describe buyout capital

- Identify and describe mezzanine capital
- Identify and describe rescue capital and replacement capital

5.2 Demonstrate knowledge of the main differences between venture capital and buyout investments.

For example:

- Contrast the business model for venture capital investments with the business model for buyout investments
- Contrast the deal structuring for venture capital investments with the deal structuring for buyout investments
- Contrast the role of the PE manager for venture capital investments with the role of the PE manager for buyout investments
- Contrast the valuation challenges of venture capital investments with the valuation challenges of buyout investments

5.3 Demonstrate knowledge of private equity funds serving as intermediaries for investing in private equity.

For example:

- Identify and describe different routes for investing in private equity
- Identify and describe the limited partnership structure
- Identify and describe the functions, relationships, terms, and standards involved in private equity limited partnership structures

5.4 Demonstrate knowledge of private equity funds-of-funds serving as intermediaries for investing in private equity.

For example:

- Discuss the typical activities that funds-of-funds manage
- Explain the costs associated with investing in funds-of-funds

5.5 Demonstrate knowledge of the factors that should be considered before making an allocation to private equity funds-of-funds.

For example:

- Explain how private equity funds-of-funds can add value through diversification and intermediation
- Explain how private equity funds-of-funds can provide resources and information for inexperienced investors
- Explain how private equity funds-of-funds can provide skills and expertise in manager selection
- Explain how private equity funds-of-funds can add value in the context of incentives, oversight, and agreements

5.6 Demonstrate knowledge of the relationship life cycle between limited partners and general partners.

For example:

- Discuss potential advantages to limited partners of long-term relationships with general partners

- Identify the phases of the fund manager–investor relationship, and describe their characteristics

5.7 Demonstrate knowledge of the J-curve concept in private equity investments.
For example:
- Identify the J-curve, and explain the reasons for its shape
- Describe evidence regarding the effect of new valuation guidelines on the J-curve
- Discuss variations of the J-curve

Correction to reading:

Page 54, section 5.3, first bullet

In a fund-of-funds structure, the PE fund investment program buys units of a PE **fund** general partner, which in turn **purchases** units of a PE fund, which further invests in a portfolio company

Should be:

In a fund-of-funds structure, the PE fund investment program buys units of a PE **fund of funds** general partner, which in turn **buys** units of a PE fund **general partner**, which further invests in a portfolio company

Reading 1, Chapter 6
Private Equity Fund Structure

Keywords

Bad-leaver clause
Carried-interest split
Catch-up period
Clawback
Deal-by-deal
Distribution waterfall
Fund-as-a-whole
Good-leaver clause
Key-person provision
Limited partnership agreement (LPA)
Preferred return
Qualified majority

Learning Objectives

6.0 Demonstrate knowledge of the legal and regulatory issues underlying private equity fund structures.
For example:
- Discuss the role of the limited partnership structure in fostering widespread adoption of private equity in institutional portfolios
- Discuss the main categories of private equity limited partnership clauses

- Identify the main documents of the limited partnership agreement and explain their purposes
- Identify the relationships in a limited partnership structure

6.1 Demonstrate knowledge of the key features of a private equity fund's structure.

For example:

- Discuss corporate governance in private equity funds
- Identify typical investment objectives, fund sizes, and fund terms
- Discuss the management fees and expenses of private equity investments
- Recognize and apply the determination of carried interest
- Identify and describe the hurdle rate
- Discuss the typical contribution of the general partner
- Identify and describe the key-person provision
- Discuss termination and divorce clauses in a private equity fund
- Recognize and apply the distribution waterfall in a private equity fund, including clawback, preferred return, and catch-up provisions

6.2 Demonstrate knowledge of conflicts of interest in private equity fund structures.

For example:

- Identify the types of conflicts of interest, and explain procedures to reduce conflicts

6.3 Demonstrate knowledge of the balancing involved in structuring a private equity fund.

For example:

- Discuss the balancing of interests between participants with regard to performance incentives and penalties

Clarification to reading:

The concept of "catch-up" is discussed on pages 75-76 of the *Core* book and on page 6 of the *Workbook.* The following example is intended to further clarify the calculation of the catch-up.

Consider a private equity investment that stipulates an 8% hurdle rate, a 20% carried interest and a 100% catch-up rate. The capital committed by the limited partner (LP) is $100 million and the entire amount is contributed at the beginning.

After one year, the fund receives $108 million from various exits. In the second year, the fund receives $3 million and then $40 million in the third year.

Continued on next page:

In year one, the entire $108 million will go to the LP. This will return the capital to the LP and satisfy the hurdle rate of 8%. In the second year, the first $2 million of the $3 million will go to the general partner (GP) so that the GP can catch-up with the LP. The remaining $1 million in the second year and the full $40 million received in the third year will be split 80/20 between the LP and the GP.

	Exit	Hurdle Rate Amount	Captial Return	LP's Share of Profits	GP Catch up	GP's Share of Profits	Cumulative Exit	Cumulative Payments to LP	Cumulative Payments to GP
Year 1	108	8	100	8	0	0	108	108	0
Year 2	3	0	0	0.8	2	0.2	111	108.8	2.2
Year 3	40	0	0	32	0	8	151	140.8	10.2

Notice that $40.8 million and $10.2 million are respectively is 80% and 20% of the $51 million in profits.

Reading 1, Chapter 7
The Investment Process

Keywords

Naïve allocation

Over-commitment strategy

Learning Objectives

7.1 Demonstrate knowledge of the private equity investment process.

For example:

- Discuss the step of defining portfolio objectives
- Identify and describe portfolio design as a step in the private equity investment process
- Discuss the importance of liquidity management in the private equity investment process
- Explain the importance of fund selection
- Discuss the monitoring that needs to take place as part of a private equity investment process
- Discuss the implementation of portfolio management decisions

7.2 Demonstrate knowledge of risk management for a portfolio of private equity funds.

For example:

- Describe the framework for risk-measurement
- Discuss risk control, and explain the difficulties in measuring risk for a portfolio of private equity funds
- Describe methods for mitigating risk in a portfolio of private equity funds

Reading 1, Chapter 8
Private Equity Portfolio Design

Keywords

Bottom-up approach
Core-satellite approach
Cost-averaging approach
Market-timing approach
Mixed approach
Naïve diversification
Top-down approach
Vintage-year diversification

Learning Objectives

8.1 Demonstrate knowledge of approaches to private equity portfolio design.
For example:

- Identify and describe the bottom-up approach to designing a private equity portfolio, and explain the advantages and disadvantages this approach offers
- Identify and describe the top-down approach to designing a private equity portfolio, and explain the advantages and disadvantages this approach offers
- Identify and describe the mixed approach to designing a private equity portfolio, and explain the advantages and disadvantages this approach offers

8.2 Demonstrate knowledge of risk-return management for private equity portfolios.
For example:

- Identify and describe the core-satellite approach to portfolio management
- Explain how diversification is used to manage the risk-return relationship in private equity funds
- Identify and describe naïve diversification
- Identify and describe the market-timing and cost-averaging approaches to diversification

8.3 Demonstrate knowledge of the risk profile of private equity assets.
For example:

- Infer general observations about the risks and returns of venture capital and buyouts from historical performance data

Reading 1, Chapter 9
Fund Manager Selection Process

Keywords

Defaulting investor
Expected economic value
Grading private equity funds
Reactive deal sourcing
Real option value

Learning Objectives

9.1 Demonstrate knowledge of the process for determining a wish list of fund characteristics.

For example:

- Outline the process for establishing a wish list of fund characteristics

9.2 Demonstrate knowledge of deal sourcing for private equity investments.

For example:

- Discuss the process of deal sourcing
- Identify and describe evidence regarding private equity performance and its implications regarding access to top-performing funds

9.3 Demonstrate knowledge of due diligence in private equity investments.

For example:

- Discuss due diligence as a requirement for originators
- Discuss due diligence as a basis for sound investment decisions
- Explain limitations to conducting due diligence on in private equity investments
- Outline and describe the stages in the due diligence process (i.e., screening, meeting the team, evaluation of the proposal, and final and legal due diligence)

9.4 Demonstrate knowledge of the commitment process in private equity investments.

For example:

- Discuss the due diligence process as a method of gathering information and evaluating investments rather than being a decision-making tool
- Explain how the commitment process is not a one-sided decision

Reading 1, Chapter 10
Measuring Performance and Benchmarking in the Private Equity World

Keywords

Bailey criteria
Benchmarking
Commitment weighted
Distribution to paid-in ratio (DPI) or realized return
Extended peer group
Interim internal rate of return (IIRR)
Internal rate of return (IRR)
Modified IRR (MIRR)
Public market equivalent (PME)
Residual value to paid-in ratio (RVPI) or unrealized return
Survivorship bias
Top-quartile fund
Total value to paid-in ratio (TVPI) or total return

Learning Objectives

10.1 Demonstrate knowledge of methods for measuring performance of and benchmarking for individual private equity funds.

For example:

- Recognize and apply methods for measuring individual private equity fund performance (i.e., IRR, interim IRR, modified IRR, TVPI, DPI, and RVPI)
- Identify and describe the characteristics for gauging the appropriateness of benchmarks, including the Bailey criteria
- Discuss classical relative benchmarks for private equity
- Identify and describe extended peer groups and public market equivalents (PMEs)
- Describe common absolute benchmarks for private equity
- Recognize and apply a classical benchmark analysis of private equity fund returns and a benchmark approach using PMEs

10.2 Demonstrate knowledge of methods for measuring performance of and benchmarking for portfolios of private equity funds.

For example:

- Recognize and apply methods for measuring the performance of a portfolio of private equity funds
- Identify major problems with benchmarking private equity fund portfolios
- Recognize and apply a commitment-weighted benchmark
- Outline the steps for a Monte Carlo simulation, and discuss the process of analyzing the results

Correction to reading:

Page 119, Equation at the bottom of the page and following paragraph:

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

where RR_T is the expected reinvestment rate for the period until time T; CoC is the investors' cost of capital for the period until time T; and $MIIRR_T$ is the interim modified IRR for the period until time T.

Should be:

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

where RR_T is the expected reinvestment rate for the period until time T; CoC is the investors' cost of capital for the period until time T; and $MIRR_T$ is the modified IRR for the period until time T.

Reading 1, Chapter 11
Monitoring Private Equity Fund Investments

Keywords

Securitization
Secondary transactions
Special purpose vehicle (SPV)
Style drift
Transparency

Learning Objectives

11.1 Demonstrate knowledge of methods for the development of an approach to monitoring a private equity fund investment.
For example:
- Describe monitoring as part of a control system
- Describe the trade-offs involved with monitoring a private equity investment

11.2 Demonstrate knowledge of the objectives for monitoring a private equity fund investment.
For example:
- Discuss monitoring in the context of managing portfolio allocations within private equity
- Explain the role of monitoring in reducing downside risk
- Outline the costs of style drift and methods for alleviating it
- Discuss examples of creating value through monitoring

11.3 Demonstrate knowledge of information gathering in the private equity monitoring process.
For example:
- Discuss the transparency of private equity investments
- Identify and describe issues facing the standard monitoring of private equity investments
- Describe the provision of specific information to limited partners

11.4 Demonstrate knowledge of actions that can result from monitoring a private equity investment.
For example:
- Discuss factors that determine the intensity of monitoring and the relationship of monitoring intensity to performance expectations, operational status, and total exposure of a fund
- Outline methods that limited partners may use to influence management
- Identify and describe the exit routes an investor can take to attempt to exit a private equity investment
- Describe active involvement by limited partners

Reading 1, Chapter 12
Private Equity Fund Valuation

Keywords

Bottom-up cash flow projection
Economic value approach
Modified bottom-up approach
Modified comparable approach
Top-down cash flow projection

Learning Objectives

12.1 Demonstrate knowledge of the net asset value (NAV) approach to valuing a private equity investment.
For example:
- Explain how limited partnership shares are traditionally valued
- Provide reasons why the aggregation of the fair value of companies would not provide the economic value of a private equity fund

12.2 Demonstrate knowledge of the internal rate of return (IRR) approach for valuing a private equity investment.
For example:
- Recognize and apply IRR and interim IRR (IIRR) to private equity investments

12.3 Demonstrate knowledge of the economic value approach for valuing a private equity investment.
For example:
- Outline the use of bottom-up cash flow projection for determining the economic value of a private equity fund
- Outline the use of top-down cash flow projection for determining the economic value of a private equity fund

Reading 1, Chapter 13
Private Equity Fund Discount Rates

Keywords

Bottom-up beta
Publicly traded private equity (PTPE)
Relative volatility

Learning Objectives

13.1 Demonstrate knowledge of using the Capital Asset Pricing Model (CAPM) to estimate a private equity discount rate.
For example:
- Discuss the appropriateness of applying the CAPM to private equity funds

- Identify how the risk-free rate and equity risk premium are normally estimated, and discuss the limitations to those methods of estimation

13.2 Demonstrate knowledge of approaches to estimating private equity fund betas.

For example:

- Recognize and apply estimation of beta by comparing volatility levels of PTPEs (publicly traded private equities)
- Recognize and apply alternatives to estimating standard regression betas (i.e., using relative risk measures, bottom-up beta, and beta based on modified and corrected data)

Reading 1, Chapter 14
The Management of Liquidity

Keywords

Cash flow projection models
Distribution in kind
Drawdown capital
Harvesting period
Over-commitment ratio
Projection models
Sources of funding

Learning Objectives

14.1 Demonstrate knowledge of private equity cash flow schedules.

For example:

- Explain the challenges of maintaining a target allocation to a private equity investment
- Identify important determinants of cash flows (drawdown capital and harvesting period), and develop an example of a cash flow schedule

14.2 Demonstrate knowledge of sources of liquidity for a private equity investor.

For example:

- Identify and describe sources of funding available to private equity managers (e.g., follow-on funding, liquidity lines, maturing treasury investments, realizations of other investments, sell-off of limited partnership shares, distributions from private equity funds, and limited partner default)

14.3 Demonstrate knowledge of investment strategies for undrawn capital.

For example:

- Discuss the main strategies for managing undrawn capital

14.4 Demonstrate knowledge of cash flow projections for a private equity portfolio.

For example:

- Discuss projection models, and identify three approaches to projecting cash flows (estimates, forecasts, and scenarios)

- Describe estimates as an approach to projecting cash flows
- Outline an example of estimation techniques
- Identify issues that may arise in the implementation of estimation techniques
- Describe forecasts as an approach to projecting cash flows
- Describe scenarios as an approach to projecting cash flows

14.5 Demonstrate knowledge of over-commitment in private equity portfolios.
For example:

- Discuss the concept of an over-commitment strategy
- Recognize and apply the concept of an over-commitment ratio
- Discuss factors that affect successful implementation of an over-commitment strategy

Reading 2, Article A
Hitting the Curve Ball: Risk Management in Private Equity

Keywords

Active management
Equity-market risk
Fund-raising risk
Manager selection risks
Performance persistence
Portfolio level risks
Program execution risks
Public market proxies
Unfunded commitments

Learning Objectives

Demonstrate knowledge of the current private equity market landscape.
For example:

- Describe the current private equity landscape

Demonstrate knowledge of risks present in private equity investments.
For example:

- Contrast traditional private equity risks with new private equity risks
- Describe private equity risks at the company level
- Describe private equity risks at the portfolio level
- Describe private equity risks caused by unfunded commitments
- Describe private equity risks associated with manager selection
- Describe private equity risks associated with program execution (i.e., equity market risk and liquidity risk)
- Outline the five steps for private equity program risk management (i.e., fund structure penetration, mapping to broader risk factors, scenario analysis, triangulating with proxies in the public markets, and beginning active management)

Reading 2, Article B
Covenants in Venture Capital Contracts

Keywords

Automatic conversion
Board majority
Control rights
Covenants
Monitoring

Learning Objectives

Demonstrate knowledge of the covenant structure within venture capital (VC) contracts.
For example:

- Recognize why covenants are included in contracts between venture capitalists and entrepreneurs
- Describe the characteristics of the two types of equity securities that are issued in a VC investment
- Describe the typical varieties of covenants that are included in VC contracts
- Discuss how covenants are used to exercise control rights
- Distinguish between covenants that are always included in VC contracts and those that are selectively included

Reading 2, Article C
The Lower-Risk Startup: How Venture Capitalists Increase the Odds of Startup Success

Keywords

Portfolio operators
Value-creation function
Financiers
Mentors

Learning Objectives

Demonstrate knowledge of how venture capitalists (VCs) can contribute to start-up success.
For example:

- Describe how and why VCs should be actively involved in portfolio companies
- Distinguish between three common categories of VCs (i.e., financiers, mentors, and portfolio operators)
- Explain why the portfolio operator strategy can achieve the highest start-up efficiency
- Describe the resources that must be evaluated in order to determine what role a VC investor should choose

Topic 3: Real Assets

Readings

1. *CAIA Level II: Advanced Core Topics in Alternative Investments*, Wiley, 2012. ISBN: 978-1-118-36975-3. Part Three: Real Assets, Chapters 15–22.
2. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9. Part II: Investment Products: Real Assets.
   A. Derwall, J., J. Huij, D. Brounen, and W. Marquering. "REIT Momentum and the Performance of Real Estate Mutual Funds." *Financial Analysts Journal*, March/October 2009, Vol. 65, No. 5, pp. 24-34.
   B. Inderst, G. "Infrastructure as an Asset Class." *EIB Papers*, 2010, Vol. 15, No. 1, pp. 70-105.
   C. Fu, C-H. "Timberland Investments: A Primer." Timberland Investment Resources, LLC, May 2011.

Reading 1, Chapter 15
Real Estate as an Investment

Keywords

Anticipated inflation
Bottom-up asset allocation
Commercial real estate
Fisher effect
Lumpiness
Mortgage
Primary real estate market
Private real estate equity
Public real estate investment
Real estate investment trusts (REITs)
Residential real estate
Secondary real estate market
Tertiary real estate market
Top-down asset allocation
Unanticipated inflation

Learning Objectives

15.1 Demonstrate knowledge of attributes of real estate as an investment.
For example:
- Identify five potential advantages of real estate investment
- Identify and describe three potential disadvantages of real estate investment

15.2 Demonstrate knowledge of asset allocation to real estate.
For example:
- Explain how real estate exhibits heterogeneity among and within its subcategories
- Identify and describe top-down asset allocation within the context of real estate investment
- Identify and describe bottom-up asset allocation within the context of real estate investment

15.3 Demonstrate knowledge of the categorization of real estate investment.

For example:

- Identify and describe the four common categories of real estate (i.e., equity vs. debt, domestic vs. international, residential vs. commercial, and private vs. public)
- Compare and contrast the category of equity claims and debt claims within real estate
- Compare and contrast domestic real estate with international real estate
- Compare and contrast residential real estate with commercial real estate
- Compare and contrast private real estate with public real estate
- Identify and describe the specific categories of real estate based on the market in which they are located
- Identify the categories of real estate based on their risk and return classifications (i.e., core, value-added, and opportunistic)
- Explain why private commercial real estate is of particular interest to institutional investors

15.4 Demonstrate knowledge of the return drivers of real estate investment.

For example:

- Identify and describe anticipated inflation, the Fisher effect, and unanticipated inflation
- Discuss the challenges of estimating unanticipated inflation
- Describe the complexities of identifying the effects of inflation on different types of properties

Reading 1, Chapter 16
Unsmoothing of Appraisal-Based Returns

Keywords

Anchoring
First-order autocorrelation
Smoothed
Unsmoothing

Learning Objectives

16.1 Demonstrate knowledge of smoothed pricing.

For example:

- Identify and describe price smoothing
- Explain how smoothed prices permit arbitrage opportunities in perfect markets and how the activities of arbitrageurs can unsmooth prices
- Describe impediments that prevent smoothed returns from being unsmoothed by arbitrageurs
- Identify problems that may result from price smoothing

16.2 Demonstrate knowledge of models of price and return smoothing.

For example:

- Recognize and apply models for reported prices being determined by lags of the true prices, and for true prices being revealed by reported prices
- Recognize and apply models for reported returns being determined by lags of the true returns
- Recognize and apply models for reported prices and returns based on first-order autocorrelation
- Explain the four primary reasons for the existence of smoothed prices and delayed price changes

16.3 Demonstrate knowledge of approaches to unsmoothing a price or return series.

For example:

- Recognize and apply unsmoothing to a return series, assuming first-order autocorrelation, and given an estimated autocorrelation parameter
- Explain and apply the general steps for unsmoothing a return series containing first-order autocorrelation
- Explain and apply the general steps for unsmoothing a price series containing first-order autocorrelation
- Describe the general steps for unsmoothing returns with more complex autocorrelation than first-order autocorrelation

16.4 Demonstrate knowledge of unsmoothing a set of real estate return data.

For example:

- Compare unsmoothed return data with smoothed return data
- Explain the effect of estimated first-order autocorrelation on correlation coefficients
- Compare autocorrelations of unsmoothed market data with smoothed market data
- Recognize and apply the unsmoothing of returns using an estimated autocorrelation coefficient
- Interpret results obtained from unsmoothing return data

Correction to reading:

Page 199, Equation 16.10

$$\hat{\rho} = \text{corr}\left(R_{t,\text{reported}} - R_{t-1,\text{reported}} \right)$$

Should be:

$$\hat{\rho} = \text{corr}\left(R_{t,\text{reported}}, R_{t-1,\text{reported}} \right)$$

Reading 1, Chapter 17
Core, Value-Added, and Opportunistic Real Estate

Keywords

Cap rate
Cap rate spread
Core real estate
Opportunistic real estate
Private equity real estate funds (PERE funds)
Real estate style boxes
Risk premium approach
Rollover
Styles of real estate investing
Value-added real estate

Learning Objectives

17.1 Demonstrate knowledge of the NCREIF real estate styles.
For example:
- Identify, describe, and compare the three real estate styles (i.e., core, value-added, and opportunistic), as categorized by NCREIF

17.2 Demonstrate knowledge of differentiating real estate styles using attributes.
For example:
- Identify and describe eight major real estate attributes that can be used to differentiate real estate styles (i.e., property type, life-cycle phase, occupancy, rollover concentration, near-term rollover, leverage, market recognition, and investment structure/control)
- Classify the style of a real estate portfolio using these attributes

17.3 Demonstrate knowledge of the purposes of real estate style analysis.
For example:
- Explain the three main reasons why styles are introduced into real estate portfolio analysis

17.4 Demonstrate knowledge of using real estate style boxes to characterize properties or portfolios.
For example:
- Apply and interpret variations on style boxes to characterize real estate properties or portfolios

17.5 Demonstrate knowledge of the cap rate as applied to real estate valuation and its relationship to expected returns.
For example:
- Identify and apply the cap rate
- Recognize and apply how cap rates can be used to estimate expected returns
- Explain and apply how cap rates can be used to value real estate

17.6 Demonstrate knowledge of methods for developing risk and return expectations by real estate style category.

For example:

- Explain how expected return estimates can be obtained for core real estate properties
- Recognize and apply volatility and beta estimates in the context of core real estate properties
- Describe the concept of the cap rate spread, identify the risk-premium approach, and apply the risk-premium approach to estimate the expected returns for core and noncore assets
- Discuss challenges that arise in estimating expected returns for noncore style assets
- Interpret examples of target return estimates for noncore style assets

Reading 1, Chapter 18
Real Estate Indices

Keywords

Hedonic price index
Price discovery
Transactions-Based Index (TBI)
Transaction-to-transaction index or repeat-sales index

Learning Objectives

18.1 Demonstrate knowledge of the mechanics of appraisal-based indices.

For example:

- Describe the method for calculating returns based on appraisals
- Describe appraisal methods for valuing real estate and the frequency with which appraisals typically occur
- Identify and describe price discovery in the context of real estate market values

18.2 Demonstrate knowledge of non-appraisal-based indices.

For example:

- Identify and describe transaction-to-transaction indices
- Identify and describe hedonic price indices
- Describe market-traded real estate vehicles
- Explain how transaction-based indices can suffer from sample selection bias

18.3 Demonstrate knowledge of major real estate indices.

For example:

- List examples of housing and residential real estate property indices, and describe their characteristics
- List examples of private commercial real estate property indices, and describe their characteristics

- List examples of farmland and timberland indices, and describe their characteristics
- List examples of public real estate equity indices, and describe their characteristics
- List examples of real estate debt or mortgage indices, and describe their characteristics

Reading 1, Chapter 19
Public versus Private Real Estate Risks

Keywords

Dealer sales
Market clientele
Market segmentation
Pooling of securities

Learning Objectives

19.1 Demonstrate knowledge of market-based versus appraisal-based returns.
For example:

- Compare market-based returns with appraisal-based returns using historical data
- Explain why market-based returns may be more volatile than appraisal-based returns
- Explain the importance of accurate pricing and risk estimation

19.2 Demonstrate knowledge of how arbitrage, liquidity, and segmentation affect the relationship between appraisal-based and market-based returns.
For example:

- Compare the pooling of securities with securitization
- Explain the role of arbitrage in determining the prices of exchange-traded funds
- Discuss the hedging of private real estate risks using public real estate
- Explain two views of REIT prices as indicators of private real estate value
- Identify market segmentation (e.g., private vs. public), and describe it in the context of valuing real estate investment
- Explain the potential role of real estate turnover, dealer sales, and agency costs in causing public real estate values to diverge from private real estate values
- Evaluate whether REIT returns reflect true changes in the economic value of the underlying private real estate during periods of illiquidity
- Interpret evidence regarding the correlation of REIT index returns with private real estate index returns
- Interpret historical return evidence regarding real estate investments as a diversifier

19.3 Demonstrate knowledge of public real estate products.
For example:
- Discuss the emergence of options and futures on real estate indices, and identify their potential benefits
- Discuss exchange-traded funds based on real estate indices, and identify their potential benefits
- Describe the characteristics of closed-end real estate mutual funds

Reading 1, Chapter 20
Portfolio Allocation within Real Estate

Keywords

Depreciation tax shield
Liquidity premium
Present value (PV) of the depreciation tax shield
Risk measurement risk

Learning Objectives

20.0 Demonstrate knowledge of diversification using real estate.
For example:
- Identify and describe naïve diversification
- Discuss optimal diversification and the diversification prescribed by the capital asset pricing model (CAPM)

20.1 Demonstrate knowledge of the effect of income taxation on real estate portfolio allocation.
For example:
- Identify and describe the tax shield generated by depreciation
- Recognize and apply the present value of the depreciation tax shield
- Explain the advantage of deferred taxation of investment gains
- Synthesize the income tax advantages of depreciation, deferral, and leverage in real estate investments

20.2 Demonstrate knowledge of leverage in the context of real estate investments.
For example:
- Recognize and apply return and volatility metrics related to real estate investment leverage

20.3 Demonstrate knowledge of the importance of agency relationships in real estate investment allocation.
For example:
- Identify and describe three reasons why agency relationships are particularly important in managing real estate investments

20.4 Demonstrate knowledge of the influence information asymmetries have on real estate investment allocation.

For example:

- Discuss how information asymmetry may generally play a larger role in private real estate markets than in more efficient markets

20.5 Demonstrate knowledge of liquidity and transaction costs of real estate investments.

For example:

- Discuss the liquidity of a typical real estate investment, and identify causes of illiquidity
- Explain why real estate returns may be expected to include a liquidity premium

20.6 Demonstrate knowledge of cross-border real estate investments.

For example:

- Explain the opportunities for enhanced diversification that cross-border real estate investing offers
- Recognize and apply the determinants of the variance of an international real estate return

20.7 Demonstrate knowledge of the synthesis of elements that contribute to the real estate investment allocation process.

For example:

- Identify risk measurement risk, and describe challenges regarding its accurate estimation

Reading 1, Chapter 21
Farmland and Timber Investments

Keywords

Biofuels
Causal relationship
Crop yield
Direct ownership of land
Expropriation
Permanent cropland
Rotation age
Row cropland

Learning Objectives

21.0 Demonstrate knowledge of the potential role of farmland assets in an institutional portfolio.

For example:

- Identify and describe the three primary motivations for adding farmland investments to an investment portfolio
- Discuss issues in international farmland investing and the potential integration of agricultural markets and energy markets

21.1 Demonstrate knowledge of the global demand for agricultural products.
For example:
- Discuss general trends in population growth, income growth, and changing food demands, and how they may affect demand for farmland
- Describe issues regarding the demand for agricultural products to produce biofuels and the potential effects on the demand for cropland

21.2 Demonstrate knowledge of ways to access agricultural returns.
For example:
- Identify and discuss the three primary approaches to gaining access to agricultural assets
- Describe the potential advantages of direct ownership of land
- Recognize and apply methods for predicting crop yield, and discuss crop yield as a determinant of returns to farmland
- Discuss factors influencing the risks and profitability of farmland

21.3 Demonstrate knowledge of factors that drive farmland returns.
For example:
- Identify and describe macroeconomic factors that affect U.S. farmland returns
- Compare and contrast characteristics of U.S. Midwest farmland and U.S. coastal farmland

21.4 Demonstrate knowledge of commodity price volatility and its implications for farmland-based investment strategies.
For example:
- Describe historical trends in the volatilities and correlations of commodity prices
- Describe approaches to determining causal relationships between commodity returns

21.5 Demonstrate knowledge of global timberland investment.
For example:
- Discuss historical patterns in timberland returns in the context of industry changes
- Identify and describe incremental risks to timberland investment

Reading 1, Chapter 22
Investing in Intellectual Property

Keywords

Acquisition and licensing
Artwork
Debt financing structures
Enforcement and litigation
Equity financing structures
Film production stages
Hammer prices
Hedonic price estimators

Intellectual property (IP)
Investment properties of art
Investments in patents
Lending strategies
Masterpiece effect
Mature intellectual property
Orphan patent pooling
Patent sales
Quality effect
Repeat-sales estimators
Sale license-back
Spillover effects
Unbundled intellectual property

Learning Objectives

22.1 Demonstrate knowledge of the characteristics of intellectual property.

For example:

- Identify the two major types of intellectual property (i.e., unbundled intellectual property and mature intellectual property), and describe their characteristics

22.2 Demonstrate knowledge of film production and distribution as an alternative investment asset.

For example:

- Outline the film production and revenue distribution processes
- Identify and describe the stages of the film production and distribution life cycle
- Identify and describe the costs, equity financing structures, and debt financing structures of film production and distribution
- Discuss empirical evidence on revenues and profits to film production
- Recognize and apply methods for estimating the relationship of returns to investments in film production

22.3 Demonstrate knowledge of art as an alternative investment asset.

For example:

- Identify reasons why art may be considered an investable asset class
- Identify methods for constructing an art index
- Discuss unique characteristics of the art market that can affect observed prices and investment strategies

22.4 Demonstrate knowledge of research and development (R&D) and patents as alternative investment assets.

For example:

- Identify difficulties in estimating returns from investments in R&D and patents
- List six key strategies for acquiring or monetizing patent-related intellectual property
- Describe patent acquisition and licensing strategies
- Describe patent enforcement and litigation strategies
- Describe patent sale license-back and financing strategies

- Describe patent sales and pooling
- Identify and discuss the major risks involved with investing in patents

Reading 2, Article A
REIT Momentum and the Performance of Real Estate Mutual Funds

Keywords

Book-to-market factor
Company-specific variables
Liquidity risk factor
REIT momentum factor
Size factor

Learning Objectives

Demonstrate knowledge of REIT momentum and the performance of real estate mutual funds.
For example:

- Identify factors that explain REIT returns
- Recognize and apply the five models that are used to measure the performance of REIT portfolios
- Discuss the role of REIT momentum in explaining REIT mutual fund performance and performance persistence
- Discuss the three main practical implications of this study (e.g., the choice of a factor model)

Reading 2, Article B
Infrastructure as an Asset Class

Keywords

Economic characteristics of infrastructure
Economic infrastructure
Environmental risks
Political risks
Private infrastructure
Public infrastructure
Public-private partnership
Regulatory risks
Social infrastructure
Social risks

Learning Objectives

Demonstrate knowledge of the characteristics of infrastructure as an asset class.
For example:

- Define the asset class of infrastructure
- Describe the economic characteristics of infrastructure investments

Demonstrate knowledge of infrastructure investment vehicles and volumes.
For example:

- Describe investment vehicles available for infrastructure assets
- Discuss market development and growth for infrastructure investments

Demonstrate knowledge of asset allocation to infrastructure investments.
For example:

- Describe how infrastructure assets are classified and their typical allocations

Demonstrate knowledge of the risk-return profile of infrastructure investments.
For example:

- Describe the early risk-return profile of infrastructure investments
- Discuss the benchmarking of infrastructure investments
- Describe the risks of infrastructure investments

Demonstrate knowledge of the historical performance of infrastructure investments.
For example:

- Discuss the methods for analyzing the historical performance of infrastructure investments (i.e., infrastructure indices, listed infrastructure funds, investor reports, and Australian unlisted funds)

Demonstrate knowledge of global infrastructure investment performance.
For example:

- Recognize and apply key statistics in analyzing infrastructure investment returns (e.g., remaining value and IRR)
- Compare and contrast infrastructure investments with private equity investments

Demonstrate knowledge of diversification and portfolio optimization using infrastructure investments.
For example:

- Describe the diversification potential of infrastructure investments
- Discuss the limitations of quantitative methods for optimal allocation levels to infrastructure investments
- Describe the potential inflation protection infrastructure investments can provide, and their cash flow properties

Reading 2, Article C
Timberland Investments: A Primer

Keywords

Carbon offset credit markets
Conservation banking
Established markets
Frontier markets
Harvest schedules
Natural investing

Near-established markets
Pioneer markets
Plantation investing
Property rights
Rotation
Sustainability
Timberland investment management organizations (TIMOs)
Wetland and stream mitigation banking

Learning Objectives

Demonstrate knowledge of timberland as an asset class.
For example:

- Explain the evolution of timberland investment structures, from operating companies to REITs to timberland investment management organizations (TIMOs)
- List and discuss key features of timberland that attract investors, including returns, inflation hedging, and low correlations to traditional investments
- Discuss the risk and return characteristics of timberland investments and their correlation to traditional and alternative investment asset classes
- List the limitations of timber as an asset class, including valuation difficulties, long-term investment horizon, and limited availability of investment opportunities

Demonstrate knowledge of the timberland investment universe.
For example:

- Discuss the investment opportunities in timberland, including publicly traded securities, direct investments, TIMO accounts, TIMO managed funds, and funds of funds
- Identify the various types of investors who have allocated to timberland, such as foundations, endowments, and pension plans

Demonstrate knowledge of timberland as a biological asset.
For example:

- Discuss the importance of productivity and marketability in timberland management
- Contrast natural versus plantation investing
- Explain how rotation and growth rates vary across species of timber

Demonstrate knowledge of timber markets.
For example:

- Explain the business of selling timber, including limitations on geography and the types of sales methods
- Discuss the consumers of timber and how the desired physical characteristics of timber vary across uses
- List non-timber revenue sources for forest owners, including mineral rights, conservation banking, and carbon credit markets

Demonstrate knowledge of the evaluation of timberland investments.
For example:

- Discuss how the age, growth rate, and type of tree affect rotation age and the target timber consumer
- Recognize and apply timberland valuation methodologies, including comparable sales, cost approach, and net present value/discounted cash flow (NPV/DCF) methods
- Identify the inputs needed for NPV/DCF valuations, such as harvest schedules, discount rates, and forecasts of land and timber prices

Demonstrate knowledge of timberland investment strategies.
For example:

- Discuss the goals of timberland investors, which can include sustainability, return enhancement, and diversification
- Discuss how the discount rates, property rights, financial risks, and business risks of timberland investments vary across markets, including established, near-established, pioneer, and frontier markets

Topic 4: Commodities

Readings

1. *CAIA Level II: Advanced Core Topics in Alternative Investments*, Wiley, 2012. ISBN: 978-1-118-36975-3. Part Four: Commodities, Chapters 23–28.
2. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2012. ISBN: 978-1-939942-02-9. Part III: Investment Products: Commodities
   A. Gorton, G. and K.G. Rouwenhorst. "Facts and Fantasies about Commodity Futures." *Financial Analysts Journal*, March/April 2006, Vol. 62, No. 2, pp. 47-68.
   B. Erb, C.B and C.R. Harvey. "The Strategic and Tactical Value of Commodity Futures." *Financial Analysts Journal*, March/April 2006, Vol. 62, No. 2, pp. 69-97.
   C. Irwin, S.H. and D.R. Sanders. "Financialization and Structural Change in Commodity Futures Markets." *Journal of Agricultural and Applied Economics*, August 2012, Vol. 44, No. 3, pp. 371–396.

Reading 1, Chapter 23
Key Concepts in Commodity Market Analysis

Keywords

Backwardation
Cash-and-carry arbitrage
Consumer surplus
Contango
Convenience yield
Cost of carry
Financial assets
Forward curve
Hedging
Liquidity preference hypothesis
Normal backwardation
Normal contango
Preferred habitat hypothesis
Rational expectations hypothesis
Real assets
Segmented market
Speculation
Speculators
Stock-out

Learning Objectives

23.1 Demonstrate knowledge of commodities as alternative investments.
For example:
- Describe characteristics of commodity investments that make them fundamentally different from other traditional and alternative asset classes

23.2 Demonstrate knowledge of commodities as real assets.
For example:
- Identify and describe real assets and financial assets, and identify the asset class commodity investments belong to.

23.3 Demonstrate knowledge of the role investors play in commodity markets.
For example:
- Identify and describe the role of speculators in commodity markets
- Compare and contrast speculation and hedging in the context of commodity markets

23.4 Demonstrate knowledge of convenience yield for commodity futures investments.
For example:
- Identify and describe convenience yield
- Describe methods of measuring convenience yield

23.5 Demonstrate knowledge of the cost of carry model for commodity investments.
For example:
- Describe the major components of the cost of carry model for commodity investments
- Recognize and apply cash-and-carry arbitrage in commodity markets

23.6 Demonstrate knowledge of theories related to commodity forward curves.
For example:
- Identify commodity forward curves, and describe terms related to the curve's slope (i.e., contango and backwardation)
- Identify and describe the rational expectations hypothesis
- Identify and describe normal backwardation, and examine its assumptions
- Compare and contrast backwardation with normal backwardation
- Discuss the components of commodity storage models and the effect of storability
- Identify and describe the liquidity preference hypothesis and segmented market models as special cases of commodity market models
- Compare and contrast contango with normal contango
- Examine the effects speculators are perceived to have on commodity markets

Reading 1, Chapter 24
Role of Commodities in Asset Allocation

Keywords

Business cycle hedging
Diversification return
Event risk hedging
Income return or collateral yield
Scarcity
Spot return

Learning Objectives

24.2 Demonstrate knowledge of major findings of commodity investment studies.
For example:

- Discuss research that has indicated that commodity investment can provide profitable returns in addition to being a hedge against inflation
- Discuss the effect of full collateralization on the risk-return characteristics of commodity futures investments
- Describe the diversification benefits of commodities
- Recognize and apply the term *diversification return*, and explain why it is important for commodity investments
- Describe the effect of storability on the risk-return characteristics of commodity futures investments

24.3 Demonstrate knowledge of the sources of return to futures-based commodity investment.
For example:

- Identify and describe spot return, collateral income return, and roll return
- Identify and describe the effect of scarcity on commodity markets

24.4 Demonstrate knowledge of the statistical properties of commodity prices.
For example:

- Discuss the evolution of the co-movement between commodities and equities
- Explain why measuring long-run return to commodities is difficult
- Describe the relationship between volatility and the risk premium for commodities
- Describe the profitability of momentum-based trading strategies for commodities

24.5 Demonstrate knowledge of commodity investments in asset allocation.
For example:

- Describe how commodity investments have the ability to hedge event risk in a portfolio
- Describe how commodity investments provide diversification benefits in a stock-bond portfolio
- Describe how commodity investments provide a natural hedge against inflation
- Describe how commodity investments provide a natural hedge against business cycles

Correction to reading:

Page 319, Exhibit 24.1, Price Asset 2, Time 1, says ID. It should be 10.

Reading 1, Chapter 25
Methods of Delivering Commodity Alpha

Keywords

Bear spread
Bull spread
Calendar spread
Commodity derivatives
Commodity rights
Commodity spreads
Crack spreads
Crush spreads
Enterprise value
Fundamental directional strategies
Location spreads
Processing spreads
Quality spreads
Quantitative directional strategies
Relative value strategies
Storage strategies
Substitution spreads
Transportation strategies

Learning Objectives

25.2 Demonstrate knowledge of directional strategies in commodity investing.
For example:

- Identify and describe the two major types of directional strategies of commodity investing

25.3 Demonstrate knowledge of relative value strategies in commodity investing.
For example:

- Identify, describe and apply the various types of time spread strategies (i.e., calendar spread, bull spread, and bear spread)
- Identify, describe and apply the various types of correlation spread strategies (i.e., processing spreads, crack spreads, crush spreads, substitution spreads, and quality spreads)
- Identify and describe location spread strategies
- Identify and describe the various types of intramarket relative value strategies (i.e., storage strategies and transportation strategies)

25.4 Demonstrate knowledge of commodity-based equity and debt strategies.
For example:

- Describe the structure of commodity-based equity and debt strategies
- Identify and describe commodity rights and enterprise value in the valuation of commodity-based corporations

25.5 Demonstrate knowledge of fundamental analysis for directional and relative value strategies.
For example:

- Describe the primary focus of fundamental analysis in commodity investment

Reading 1, Chapter 26
Methods of Delivering Commodity Beta: Indices, Swaps, Notes, and Hedge Funds

Keywords

Cash and call strategy
Collateral
Commodity beta
Commodity index
Commodity index-linked note
Commodity index swap
Commodity weights
Dynamic asset allocation
Dynamic strategy
Excess return
First-generation commodity indices
Indirect commodity investments
Master limited partnership (MLP)
Maturity
Preroll strategies
Principal-guaranteed notes
Second-generation enhanced commodity indices
Third-generation enhanced commodity indices
Total return

Learning Objectives

26.2 Demonstrate knowledge of direct physical ownership of commodities.
For example:
- Describe the difficulties associated with direct physical ownership of commodities as an investment strategy

26.3 Demonstrate knowledge of methods for obtaining indirect ownership of commodities.
For example:
- Identify and describe commodity index swaps
- Describe publicly traded commodity-based equities and their typical return characteristics
- Describe the characteristics of the commodity exposure provided by an investment in bonds issued by commodity firms
- Compare and contrast the commodity exposures offered by commodity-based mutual funds with those offered by exchange-traded products
- Identify and describe master limited partnerships
- Compare and contrast commodity-based exchange-traded notes with commodity exchange-traded funds
- Discuss methods hedge funds use to gain exposure to commodities
- Describe strategies for commodity trade financing and production financing

26.4 Demonstrate knowledge of complex structures of commodity investment.
For example:
- Describe methods an investor can use to gain leveraged exposure to commodities

- Identify and describe principal-guaranteed notes and their two common structures (i.e., cash and call strategy and dynamic strategy)

26.5 Demonstrate knowledge of similarities and differences between commodity indices and securities indices.

For example:

- Compare and contrast characteristics of commodity indices with equity and bond indices

26.6 Demonstrate knowledge of the sources of commodity index returns.

For example:

- Identify and describe the major sources of commodity index returns (i.e., commodity beta, roll return, spot return, dynamic asset allocation, diversification, commodity weights, maturity, and collateral)

26.7 Demonstrate knowledge of factors involved in designing a commodity index.

For example:

- Compare and contrast a value-based commodity index with a quantity-based commodity index
- Compare and contrast a total return index with an excess return index
- Describe roll methodology and its effect on returns in a commodity index
- Describe weighting methodology and its effect on returns in a commodity index
- Describe and recognize the characteristics of first-generation commodity indices

26.8 Demonstrate knowledge of performance characteristics of enhanced commodity indices.

For example:

- Describe the return enhancements of the second-generation commodity indices
- Describe and recognize the characteristics of second-generation commodity indices (e.g., MLCX)
- Describe the return enhancements of the third-generation commodity indices
- Describe and recognize the characteristics of third-generation commodity indices (e.g., UBS Bloomberg CMCI Active Index)

26.9 Demonstrate knowledge of measures of return of commodity indices.

For example:

- Recognize and apply spot return, roll return, excess return, and total return of commodity indices

Reading 1, Chapter 27
Macroeconomic Determinants of Commodity Futures Returns

Keywords

Business cycle
Expansion
Inflation hedge
Real interest rate
Recession
Unexpected inflation

Learning Objectives

27.1 Demonstrate knowledge of the use of commodities as an inflation hedge.
For example:

- Describe how commodity futures can act as a hedge against inflation
- Analyze commodity index returns and their correlation structures to determine their effectiveness in hedging against inflation
- Explain why short-term investments in commodities do not offer efficient inflation protection
- Describe characteristics of commodities as hedges against unexpected and expected inflation

27.2 Demonstrate knowledge of the effect that changes in exchange rates have on commodity returns.
For example:

- Describe how investors in commodities face exchange rate risk
- Explain why an increase in the value of a currency typically decreases the prices of commodities denominated in that currency, and vice versa

27.3 Demonstrate knowledge of the relationship between the business cycle and commodities.
For example:

- Describe the relationship of the real interest rate to commodity prices
- Identify and describe the phases of the business cycle (i.e., strong expansion, weak expansion, strong recession, and weak recession) and the effect on commodity demand
- Describe how commodity indices perform in various phases of the business cycle
- Recognize and apply a model for the quarterly return of an individual commodity index that incorporates demand effects from the business cycle and exchange rate changes

Corrections to reading:

Page 364, section 27.1, second paragraph, first and second sentences

In contrast, commodity futures represent the expected spot price in the future. Therefore, commodities are an inflation hedge, as commodity futures prices increase when expected inflation increases.

Should be:

In contrast, commodity futures prices typically increase when there are unexpected increases in commodity prices. Therefore, to the degree that the unexpected increases in commodity prices are positively correlated with unexpected increases in the general price level (i.e., unexpected higher inflation), then commodities and commodity futures represent a hedge again inflation.

Page 369, Equation 27.1

$$R_t = \beta_0 + \beta_1 E(\pi_t) + B_2(\pi - E(\pi_t)) + e_t$$

Should be:

$$R_t = \beta_0 + \beta_1 E(\pi_t) + \beta_2(\pi - E(\pi_t)) + e_t$$

Page 369, paragraph after Equation 27.1, first 4 sentences:

Where R_t is the return of the respective S&P GSCI commodity excess return index, β_0 is a constant, the term $\beta_1 E(\pi_t)$ is expected inflation whereas $B_2(\pi - E(\pi_t))$ is the remaining unexpected inflation, and e_t is an error term. The coefficients β_1 and B_2 measure the effectiveness of the hedge in the case of expected and unexpected inflation, respectively. A common approximation for the market's expectation of inflation is the short-term interest rate. Unexpected inflation is defined as inflation minus the short-term interest rate.

Should be:

Where R_t is the return of the S&P GSCI commodity excess return index, β_0 is a constant, the term $E(\pi_t)$ is expected inflation whereas $(\pi - E(\pi_t))$ is the remaining unexpected inflation, and e_t is an error term. The coefficients β_1 and β_2 measure the effectiveness of the hedge in the case of expected and unexpected inflation, respectively. A common approximation for the market's expectation of inflation is the short-term interest rate. In this case, a proxy for unexpected inflation is inflation minus the short-term interest rate.

Reading 1, Chapter 28
Effective Risk Management Strategies for Commodity Portfolios

Keywords

Front-month equivalent
Market impact cost
Spark spread

Learning Objectives

28.1 Demonstrate knowledge of considerations involved in determining the net asset value of a commodity investment.
For example:
- Explain why marking the correct net asset value of a commodity asset is important, and describe the complications that can arise in doing so in certain markets

28.2 Demonstrate knowledge of event risks in commodity investments.
For example:
- Identify and describe event risks
- Give examples of types of event risks that can occur, and how they can effect commodity investments.

28.3 Demonstrate knowledge of methods for using value at risk to stress-test a portfolio with commodities.
For example:
- Identify three ways to stress-test a portfolio
- Recognize and apply the front-month equivalent to stress-test a portfolio

28.4 Demonstrate knowledge of methods for measuring liquidity risks in a commodity portfolio.
For example:
- Recognize and apply market impact cost

28.5 Demonstrate knowledge of the factors that affect investment performance attribution.
For example:
- Describe the factors that affect profit and loss in commodities
- Analyze a set of returns to explain the profit and loss of a portfolio

28.6 Demonstrate knowledge of the need for firms to mitigate operational risks.
For example:
- Describe ways to mitigate transaction risks

Correction to reading:

Page 384-5, section 28.4, second and third paragraph, Exhibit 28.7 and equation, should be:

Market impact cost is the percentage loss of notional value incurred by a portfolio during the unwinding of a large position. The analysis in Exhibit 28.7 uses five-minute interval data to calculate the coefficient of price changes for unusually large volumes on a NYMEX Henry Hub Natural Gas Prompt contract. This scenario assumes a regression on five-minute interval price and volume data, and shows that unwinding a large order (defined as an order size equal to two times the standard deviation of the usual volume for each five-minute interval) could incur a 1.25% impact cost. In other words, assuming the fund has a position of 5,000 open contracts, a cost of $5 million would be incurred to unwind this position.

EXHIBIT 28.7 Impact Cost Calculation

Number of contracts	5,000
Total MMBtu	50,000,000
Price per MMBtu	$8.00
Total position size	$400,000,000
Impact cost per MMBtu	1.25%
Possible impact cost	-5,000,000

Source: Data from Globex.

Risk managers should calculate impact costs for each contract. Next, they should set maximum open position limits, based on the impact cost and the firm's tolerance. A firm should be able to survive a liquidation event if the manager enforces an appropriate maximum open position limit.

$$\text{Total MMBtu} = \text{Number of contracts} \times 10{,}000(\text{NYM HH})$$

$$\text{Possible impact cost} = \text{Impact cost per MMBtu} \times \text{Price per MMBtu} \times \text{Total MMBtu}$$

Reading 2, Article A
Facts and Fantasies about Commodity Futures

Keywords

Basis

Risk premium

Learning Objectives

Demonstrate knowledge of the mechanics of commodity futures investments.
For example:

- Compare commodity spot returns with commodity futures returns

- Describe the effect of risk premium on returns to commodity futures
- Describe the behavior of commodity returns through the business cycle
- Describe the information content of futures prices and the relationship between futures prices and expected future spot prices.
- Compare the properties of commodity futures returns with those of stock returns and bond returns
- Illustrate how an investment in commodity futures can earn a positive return when spot commodity prices are falling
- Describe the difference between a market that is in normal backwardation and one that is in backwardation or in contango.
- Recognize and apply the cost of carry model, and describe the potential arbitrage strategies that can be implemented if there are violations of the cost of carry model.

Demonstrate knowledge of the benefits of investing in commodity futures.
For example:

- Discuss the use of commodity futures as a hedge against inflation
- Explain the diversification benefits of commodity futures
- Describe a trading strategy that uses basis in futures markets as an indication of risk premium in futures markets
- Describe the performance of commodity futures from a non–U.S. investor's perspective

Reading 2, Article B
The Strategic and Tactical Value of Commodity Futures

Keywords

Arithmetic return
Geometric return
Roll return

Learning Objectives

Demonstrate knowledge of the uses of historical returns as a jumping-off point for considering prospective commodity future returns.
For example:

- Explain why the performance of a rebalanced equally weighted commodity futures portfolio should not be used to represent the return of the commodity futures asset class
- Explain why the three most commonly used commodity futures indices (i.e., GSCI, DJ-AIGCI, and CRB) show different levels of return and volatility over a common time period

Demonstrate knowledge of commodity futures return decomposition and expectations.

For example:

- Describe how the returns of a single cash-collateralized commodity futures contract and a portfolio of cash-collateralized commodity futures can be decomposed into various sources of return
- Describe the four theoretical frameworks used to explain the sources of commodity futures excess returns (i.e., the CAPM, the insurance perspective, the hedging pressure hypothesis, and the theory of storage)
- Explain the concepts of contango, normal backwardation, and market backwardation
- Recognize and apply roll yield of a commodity futures contract in backwardation or contango
- Discuss the importance of roll return in explaining the long-run cross-sectional variation of commodity futures returns, and its implications for investors
- Describe the relative importance of the volatility of spot returns and roll returns in determining the volatility of futures returns
- Describe the effect of inflation and unexpected changes in the rate of inflation on individual commodity contracts, commodity sectors, and diversified commodity portfolios and indices
- Explain how rebalancing and diversification can affect the geometric rate of return of a portfolio in comparison to its arithmetic rate of return

Demonstrate knowledge of the long-term performance expectations of commodity futures.

For example:

- Discuss arguments against the use of naïve extrapolation of past commodity returns to forecast future performance, and recognize the importance of formulating forward-looking expectations.

Demonstrate knowledge of tactical asset allocation.

For example:

- Discuss the effectiveness of tactical asset allocation in commodity portfolios using strategies based on momentum and the term structure of futures prices.

Correction to reading:

Page 201, the 13th line from the bottom of the left column should read, "If inventories are high, the convenience yield may be low."

Reading 2, Article C
Financialization and Structural Change in Commodity Futures Markets

Keywords

Bubble
Exchange-traded products
Financialization
Masters hypothesis
Non-reporting traders
Open interest

Learning Objectives

Demonstrate knowledge of the structural changes in commodity futures markets.
For example:

- Identify the trends in the volume of commodity futures trading and in open interest
- Discuss changes in commodity futures that have resulted from electronic trading
- Describe the role of new exchange traded products (ETPs) in futures market access
- Explain how passive trading has changed the commodity markets
- Discuss the Masters hypothesis and the arguments around the potential harmful effects of financialization and structural change in commodity futures markets
- Discuss the potential effect of financialization of commodity markets on risk premiums and the volatility of futures prices

Topic 5: Hedge Funds and Managed Futures

Readings

1. *CAIA Level II: Advanced Core Topics in Alternative Investments,* Wiley, 2012. ISBN: 978-1-118-36975-3. Part Five: Hedge Funds and Managed Futures, Chapters 29–40.
2. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2012. ISBN: 978-1-939942-02-9. Part IV: Investment Products: Hedge Funds, Fund of Funds and Managed Futures.
   A. Reddy, G., P. Brady, and K. Patel. "Are Funds of Funds Simply Multi-Strategy Managers with Extra Fees?" *The Journal of Alternative Investments,* Winter 2007, Vol. 10, No. 3, pp. 49-61.
   B. Jain, S. "Investing in Credit Series Distressed Debt." *UBS Alternative Investments*, June 15, 2011, Published in *AIAR*, Q2 2012, Vol. 1, Issue 2.

Reading 1, Chapter 29
Structure of the Managed Futures Industry

Keywords

Commodity Futures Trading Commission (CFTC)
Commodity pool
Commodity pool operator (CPO)
Commodity trading adviser (CTA)
Funding level
Futures commission merchant (FCM)
Introducing broker (IB)
Managed futures
Margin-to-equity ratio
National Futures Association (NFA)
Notional level
Segregated account structure
Single currency margining
Standard Portfolio Analysis of Risk (SPAN)
Trading level
Variation margin

Learning Objectives

29.1 Demonstrate knowledge of ways investors can gain access to managed futures investments.
For example:
- Describe the process of investing in CTAs
- Describe the process of investing in a commodity pool

29.2 Demonstrate knowledge of regulation in managed futures.
For example:
- Identify and describe regulated participants in the managed futures industry (i.e., CTAs, CPOs, FCMs, and IBs)
- Compare and contrast the roles and responsibilities of CTAs and CPOs

29.3 Demonstrate knowledge of the risk-return benefits that CTAs provide.

For example:

- Describe various sources of benefits obtained when allocating to CTAs

29.4 Demonstrate knowledge of systems for managing margin requirements.

For example:

- Identify the Standard Portfolio Analysis of Risk (SPAN) and its expansions and extensions
- Identify single currency margining, and explain how it solves issues regarding multicurrency margining
- Identify and describe variation margin

29.5 Demonstrate knowledge of the returns of managed futures.

For example:

- Describe three key differences seen in futures contacts as compared to forwards contracts
- Identify and describe trading level, funding level, and notional level, and how the choice of investment size affects return calculations

29.6 Demonstrate knowledge of the foreign currency exposure of managed futures.

For example:

- Describe the currency hedges inherent in futures positions
- Describe the foreign currency risk associated with the futures positions of CTAs

29.7 Demonstrate knowledge of collateral income and segregation issues in managed futures investments.

For example:

- Identify and explain details that separate superior CTAs from other CTAs
- Identify and describe the segregated account structure

29.8 Demonstrate knowledge of margin-to-equity ratios in determining collateral amounts.

For example:

- Identify and describe the margin-to-equity ratio
- Describe the incentives for the clearing broker and the trading client to maintain a sufficient collateral buffer to meet margin calls

Correction to reading:

Page 393, Exhibit 29.2

Remove the third bullet under CTA Responsibilities

Reading 1, Chapter 30
Managed Futures: Strategies and Sources of Return

Keywords

Confirmation bias
Data mining
Data snooping
Discretionary strategies
Disposition effect
Efficient market hypothesis
Herding
Limits to arbitrage
Market anomalies
Momentum
Moving average-based systems
Price channel or trading range breakout
Relative strength index (RSI) or momentum oscillator system
Representativeness bias
Semistrong form efficiency
Strong form efficiency
Trend-following strategies
Weak form efficiency
Zero-sum games

Learning Objectives

30.1 Demonstrate knowledge of investment strategies used by CTAs.
For example:

- Discuss whether CTA strategies are a zero-sum game
- Identify and describe trend-following strategies, and compare them with market-timing strategies.
- Identify and describe relative value strategies
- Identify and describe discretionary strategies
- Contrast systematic trend-following strategies with discretionary trading strategies

30.2 Demonstrate knowledge of the prominent theories that relate futures prices, current spot prices, and expected future spot prices.
For example:

- Describe the theory of storage and its important implications
- Explain the role of storage as another method of hedging risks associated with commodities
- Identify convenience yield, explain how it varies between commodity futures and financial futures, and describe how it is affected by economic conditions in commodity markets
- Recognize and apply the cost of carry model for determining the relationship between futures prices and cash prices of a commodity
- Describe the relationship between changes in spot and futures prices and changes in the volatility of these prices, and compare the results to those in equity markets
- Identify and describe normal backwardation, backwardation, and contango in futures markets

- Explain the relationship between slope of futures contracts, level of inventories, spot price volatility, and risk premium in futures prices
- Recognize and apply methods to measure the risk premium in a futures price

30.3 Demonstrate knowledge of using the efficient market hypothesis to explain returns to CTAs.

For example:

- Identify and describe the three forms of efficient markets
- Explain how returns to CTAs relate to the efficient market hypothesis
- Explain the relationship between trends in futures prices and their systematic risk

30.4 Demonstrate knowledge of sources of returns to CTAs.

For example:

- Explain why it is not satisfactory to attribute CTA returns purely to the skill of the manager
- Describe the structure of a momentum-based strategy, and discuss observations that support the existence of momentum in storable commodities
- Describe the relationship between inventory levels and momentum returns for storable commodities
- Describe the highlights of the results obtained by various studies on momentum-based CTA strategies
- Identify data mining and data snooping, and describe how they may affect research studies.
- Describe the presence of momentum in financial futures markets
- Explain why momentum profits may exist in equity markets
- Compare and contrast the presence of momentum in equity markets with commodity markets
- Explain why currencies tend to display momentum
- Identify two biases in behavioral finance that explain why investors underreact to new information
- Identify two biases in behavioral finance that explain overreaction to new information
- Identify and describe limits to arbitrage and how these limits explain the continued availability of profitable trading strategies

30.5 Demonstrate knowledge of technical trading rules.

For example:

- Identify and describe three basic components to technical analysis (i.e., moving average-based systems, price channels, and relative strength index)
- Describe the highlights of the results obtained in studies that examined the profitability of following technical trading rules

Reading 1, Chapter 31
Risk and Performance Analysis in Managed Futures Strategies

Keywords

Access bias
Backfill bias or instant history bias
Capital at risk (CaR)
Exponential smoothing method
Gamma
Initial margin
Look-back bias
Maintenance margin
Margin requirement
Maximum drawdown
Omega ratio
Parametric approach
Selection bias
Straddle
Stress test or scenario analysis
Survivorship bias
Value at risk (VaR)

Learning Objectives

31.1 Demonstrate knowledge of risk measurement used in managed futures strategies.

For example:

- Describe initial and maintenance margin requirements
- Apply the margin-to-equity ratio and explain how it may be used to measure risk
- Describe capital at risk, and explain its relationship with stop-loss levels and its shortcomings as a risk measure
- Recognize and apply methods of determining value at risk and variance (i.e., parametric approach and exponential smoothing method)
- Recognize and apply maximum drawdown
- Describe the usefulness of maximum drawdown in measuring risk, and the factors that affect it
- Describe stress tests (aka scenario analysis)
- Recognize and apply the omega ratio

31.2 Demonstrate knowledge of the historical performance of CTAs.

For example:

- Explain why the volatility of CTA indices may not be representative of the volatility of individual CTA investments

31.3 Demonstrate knowledge of research findings on the performance and benefits of managed futures investments.

For example:

- Describe the potential role of managed futures in a portfolio of stocks, bonds, and hedge funds
- Explain how a lack of centralized performance data makes evaluating CTA performance and benefits difficult

- Identify and describe potential bias issues that can be found in hedge fund/CTA databases (e.g., selection bias, look-back bias, survivorship bias, and backfill bias)

31.4 Demonstrate knowledge of benchmarking of CTA investments.

For example:

- Describe and give examples of approaches to benchmarking the performance of managed futures investments

31.5 Demonstrate knowledge of separation of alpha and beta using passive indices.

For example:

- Describe how beta sources of return can be estimated by comparing CTA returns to an index of passive trend-following strategy returns
- Discuss whether different CTA strategies can be benchmarked

31.6 Demonstrate knowledge of the performance of CTAs during periods of financial market stress.

For example:

- Discuss the notion that trend-following CTAs are long volatility
- Explain the relationship between the performance of equity markets and the volatility of equity returns.
- Use option pricing terminology to explain volatility exposure of CTAs
- Describe the historical performance of CTAs during periods of financial stress
- Explain how a change in trend could lead observers to conclude that there has been a change in volatility

Corrections to reading:

Page 431, first equation

$$\sigma_T^2 = \frac{1}{T-1}\sum_{r=1}^{T}\left(\mu - R_t\right)^2$$

Should be:

$$\sigma_T^2 = \frac{1}{T-1}\sum_{t=1}^{T}\left(\mu - R_t\right)^2$$

Page 435, second equation

$$\Omega = \frac{\text{Upper partial moment}}{\text{Lower partial moment}}$$

Continued on next page:

Should be:

$$\Omega = \frac{\text{Average Upper partial moment}}{\text{Average Lower partial moment}}$$

Clarification to reading:

Page 431, the following expression for an estimate of ***current*** volatility of a return series is presented:

$$\sigma_T^2 = (1-\lambda) \times \sigma_{T-1}^2 + \lambda \left(\mu - R_T\right)^2$$

In this case, σ_T^2 is an estimate of time T volatility based on information available at time T. Further, given a value of, for example, 0.06 for λ the estimate gives a weight of 0.06 to current value of squared deviation from the mean, $\left(\mu - R_T\right)^2$, and a weight of 0.94 to the estimate of variance for time T.

The following points should be noted:

1. The role of lambda in the two expressions is not consistent and this will be corrected in future editions of these books. For the time being, candidates may use either equation. The important point to remember is that the weight given to the most recent observation is generally much lower than the weight given to the most recent estimate/forecast of variance.
2. Since the term involving deviation from the mean is squared, it does not matter whether the mean is subtracted from the observation or the observation is subtracted from the mean.
3. The subscript for the most recent observation will lag the estimate of variance when the goal is to forecast variance and will not lag the estimate of variance when the goal is to estimate the current variance

Reading 1, Chapter 32
Structuring Investments in CTAs

Keywords

Administration agreement
Audited financial statements
CTA fund
Foregone loss carryforward
Investment advisory agreement
Investment due diligence
Limited liability structure
Managed account platform
Master-feeder structure
Multi-CTA funds
Offering documents
Operational due diligence

Opportunity losses
Pro forma, or back-tested, performance records
Redemption form
Subscription agreement

Learning Objectives

32.1 Demonstrate knowledge of approaches to sourcing CTA managers.
For example:
- Describe approaches to sourcing potential CTA managers

32.2 Demonstrate knowledge of issues involved in structuring a CTA investment program.
For example:
- Outline the two steps of the decision process involved in allocating to one or more CTAs
- Outline the two issues that arise as an investor attempts to create diversified portfolios of CTAs

32.3 Demonstrate knowledge of the number of managers an investor should choose.
For example:
- Describe how risk and information ratios of portfolios of CTAs are affected as the number of managers increases

32.4 Demonstrate knowledge of CTA funds and multi-CTA funds.
For example:
- Identify CTA funds, and describe their structure
- Identify the master-feeder structure, and describe how and why it is used
- Identify multi-CTA funds, and describe their structure and benefits

32.5 Demonstrate knowledge of using managed accounts to structure CTA investments.
For example:
- Describe the structure of managed accounts, and their potential advantages and disadvantages
- Identify the limited liability of investors who choose a managed account platform
- Analyze the structures of managed accounts
- Demonstrate how special purpose vehicles (SPVs) and protected cell companies (PCCs) can be used to create a limited liability structure within a managed account

32.6 Demonstrate knowledge of using platforms to structure CTA investments.
For example:
- Describe the structure of a platform for investing in CTAs

32.7 Demonstrate knowledge of characteristics of structures for CTA investments.
For example:
- Compare and contrast the characteristics of the four categories of CTA investment structures

32.8 Demonstrate knowledge of quantitative analysis of CTA managers.
For example:
- Identify and describe the challenges in obtaining relevant research information on CTAs for due diligence or portfolio evaluation
- Interpret performance statistics of CTA managers, including correlation to other investments and performance in specific market conditions
- Describe the approaches to quantitatively analyzing the performance of individual CTA managers

32.9 Demonstrate knowledge of investment and operational due diligence processes.
For example:
- Identify and describe operational due diligence and investment due diligence
- Describe the fund documents that an operational due diligence process would likely review (e.g., offering documents)

32.10 Demonstrate knowledge of the cost of active management of managed futures.
For example:
- Identify and describe the typical central elements of the formal monitoring and review process of managed futures investments
- Identify and describe the costs associated with actively managing portfolios of CTAs

Correction of reading:

Chapter 32, page 464, Exhibit 32.5

The column labeled "Terms and Fees for Service Providers" is a duplicate of the previous column and should be ignored.

Reading 1, Chapter 33
Hedge Fund Replication

Keywords

Alternative betas
Capacity constraint hypothesis
Exposure inertia
Factor-based approach
Fund bubble hypothesis
Hedge fund replication products
Increased allocation to active funds hypothesis
Nonlinear approach to replication
Payoff-distribution approach

Return enhancers
Risk diversifiers
View commonality

Learning Objectives

33.2 Demonstrate knowledge of the approaches to hedge fund replication.
For example:
- Identify the three approaches to hedge fund replication (i.e., factor-based replication, payoff-distribution replication, and bottom-up replication)
- Identify and describe alternative betas

33.3 Demonstrate knowledge of the benefits of hedge fund replication products.
For example:
- Explain why an investor would want to replicate hedge fund returns

33.4 Demonstrate knowledge of the case for using hedge fund replication.
For example:
- Identify and describe the three hypotheses derived from studies that found historical increases in beta and declines in alpha over time (i.e., the fund bubble hypothesis, the capacity constraint hypothesis, and the increased allocation to active funds hypothesis)
- Describe how replication products can be a source of alpha
- Describe how replication products can be a source of alternative beta

33.5 Demonstrate knowledge of the unique benefits of using replication products.
For example:
- Identify and describe the unique benefits that hedge fund replication products have the potential to provide (i.e., liquidity, transparency, flexibility, lower fees, hedging, lower due diligence and monitoring risks, diversification, and benchmarking)

33.6 Demonstrate knowledge of the factor-based approach to hedge fund replication.
For example:
- Describe the assumptions and steps involved in creating a factor-based approach to hedge fund replication
- Describe the issues that must be addressed in constructing a replication product (e.g., choice of benchmark)
- Recognize and apply the model for a factor-based replication approach
- Interpret a factor-based replication, including analysis of tracking error, leverage, and in-sample fit
- Identify and describe view commonality and exposure inertia
- Discuss conclusions derived from historical research on factor-based replication distributions
- Recognize and apply the nonlinear approach to replication

33.7 Demonstrate knowledge of the payoff-distribution approach to hedge fund replication.

For example:

- Describe the payoff-distribution approach, and contrast it with the factor-based approach
- Outline the steps in developing and interpreting a payoff replication model
- Discuss conclusions derived from empirical studies testing the payoff-distribution approach

33.8 Demonstrate knowledge of using the bottom-up (aka algorithmic) approach to hedge fund replication.

For example:

- Describe the bottom-up approach and for what strategies it is best suited

Reading 1, Chapter 34
Convertible Arbitrage

Keywords

Asset swap
At-the-money convertibles
Busted convertible bond
Call protections
Conversion premium
Conversion price
Conversion ratio
Convertible price
Deep-in-the-money convertibles
Deep-out-of-the-money convertibles
Dynamic delta hedging
Equity proxy convertible bond
Hybrid convertible bond
In-the-money convertibles
Junk (distressed) convertible bond
Net delta
Out-of-the-money convertibles
Parity
Risk-neutral probability
Vega hedging

Learning Objectives

34.1 Demonstrate knowledge of the convertible arbitrage strategy.

For example:

- Explain why corporations may issue underpriced convertible bonds
- Describe the historical evolution of the convertible arbitrage strategy
- Describe the structure of a convertible arbitrage strategy

34.2 Demonstrate knowledge of the terminology used in convertible arbitrage strategies.

For example:

- Identify and describe terms of conversion for a convertible bond (i.e., conversion ratio, conversion price, and call protection)
- Identify and describe terms involved with valuation parameters of the convertible bond (i.e., convertible price, parity, and conversion premium)

- Describe the complex characteristics a convertible bond may have

34.3 Demonstrate knowledge of the valuation of convertible securities.

For example:

- Recognize and apply the component approach to the valuation of a convertible bond
- Recognize and apply the binomial model to the valuation of a convertible bond
- Identify and describe the four possible states for a convertible bond (i.e., junk/distressed, busted, hybrid, and equity proxy)

34.4 Demonstrate knowledge of how the Greeks are measured for use in convertible bonds.

For example:

- Describe what delta and modified delta measure
- Recognize and apply delta and modified delta
- Describe what gamma measures
- Recognize and apply gamma
- Describe what vega measures
- Recognize and apply vega
- Describe what theta measures
- Recognize and apply theta
- Describe what rho measures
- Recognize and apply rho
- Describe other types of Greeks used by convertible bond traders (i.e., Chi, Omicron, Upsilon, and Phi)

34.5 Demonstrate knowledge of engaging in a convertible arbitrage strategy.

For example:

- Outline the steps for building a convertible arbitrage position
- Describe the positive convexity of convertible arbitrage positions
- Identify and describe vega hedging

34.6 Demonstrate knowledge of how a convertible arbitrageur eliminates credit risk.

For example:

- Describe ways to mitigate credit risk in a convertible arbitrage position
- Identify asset swaps, and describe their usefulness in convertible arbitrage situations
- Outline the steps for structuring an asset swap
- Describe the five basic cases that can occur at expiration

34.7 Demonstrate knowledge of the use of leverage in convertible arbitrage strategies.

For example:

- Describe the typical and desirable amounts of leverage used in a convertible arbitrage strategy

Correction to reading:

Page 505

$$\text{Convert. Value} = \frac{\left[p \times \text{Convert. Value}_{\text{up}} + (1-p) \times \text{Convert. Value}_{\text{down}}\right] + \text{Coupon}}{1 + \text{Discount Rate}}$$

Should be:

$$\text{Convert. Value} = \frac{\left[p \times \text{Convert. Value}_{\text{up}} + (1-p) \times \text{Convert. Value}_{\text{down}}\right]}{1 + \text{Discount Rate}} + \text{Coupon}$$

Clarification to reading:

Typically, in convertible arbitrage, bonds are not purchased at the time of their issuance.

When an arbitrageur uses secondary markets to establish a long position in the convertible bond it already has some portion of the current coupon accrued to it. The buyer of the bond (the arbitrageur) would compensate the current bond-holder for the accrued portion of the coupon. For the sake of simplicity, the binomial tree in figure 34.8 assumes that the long position in the bond is established exactly on the coupon payment date and the buyer fully compensates the previous owner for the value of the current coupon ($2.00).

Reading 1, Chapter 35
Global Macro and Currency Strategies

Keywords

Absolute PPP
Carry trade
Covered interest rate parity
Discretionary global macro managers
Exchange rate risk
Feedback-based global macro managers
Global macro hedge funds
Information-based global macro managers
Law of one price
Model-based global macro managers
Relative PPP
Systematic global macro managers
Uncovered interest rate parity

Learning Objectives

35.1 Demonstrate knowledge of macro strategies.

For example:

- Describe the mandate of global macro hedge funds
- Compare and contrast the approaches of discretionary global macro managers with those of systematic global macro managers
- Identify and describe the three schools of thought regarding the sources of returns that global macro managers try to tap into
- Recognize trades or models commonly used by model-based global macro managers
- Describe the approach multistrategy global macro funds take in their investment selections
- Compare and contrast the approaches of systematic global macro managers with those of systematic CTAs

35.2 Demonstrate knowledge of directional currency trades.

For example:

- Describe the events leading up to and the aftermath of the Exchange Rate Mechanism crisis of 1992–1993

35.3 Demonstrate knowledge of currency trading in emerging markets.

For example:

- Describe the relationship between a country's capital inflows and outflows and the appreciation or depreciation of its currency
- Discuss the role and effect hedge funds have in emerging markets

35.4 Demonstrate knowledge of models for currency trading.

For example:

- Explain why carry and momentum strategies appear to be profitable on average
- Describe carry trades and reasons for their use
- Recognize and apply the covered interest rate parity model
- Recognize and apply the uncovered interest rate parity
- Explain how the carry trade is based on the belief that uncovered interest rate parity does not hold
- Describe the momentum strategy for currency trading, and ways to determine gains and losses realized by following that strategy
- Identify and describe the three versions of purchasing power parity (i.e., relative PPP, absolute PPP, and the law of one price)

35.5 Demonstrate knowledge of contingent yield curve steepening.

For example:

- Describe how global macro funds can create a free contingent claim on yield curve steepening

35.6 Demonstrate knowledge of risk management and portfolio construction of global macro funds.

For example:

- Describe how global macro managers use VaR measures and stop-loss orders to manage their portfolio risk

Correction to reading:

Page 532-533, the last line of page 532

In other words, take a long position in FCU if $F_t < S_t$ or a short position in FCU if $F_t > S_t$.

Should read:

In other words, take a long (short) position in FCU (DCU) futures if $F_t < S_t$ or a short (long) position in FCU (DCU) futures if $F_t > S_t$.

The first paragraph, first sentence of page 533 should read:

The long strategy will be profitable if the future spot rate, S_{t+1}, turns out to be greater than the current forward rate, F_t. Similarly, the short strategy will be profitable if the future spot rate, S_{t+1}, turns out to be less than the current forward rate, F_t.

The long strategy will be profitable if the future spot rate, S_{t+1}, turns out to be less than the current forward rate, F_t. Similarly, the short strategy will be profitable if the future spot rate, S_{t+1}, turns out to be greater than the current forward rate, F_t.

Reading 1, Chapter 36
Fundamental Equity Hedge Fund Strategies

Keywords

Activists
Corporate actions
Discretionary techniques
Factor-based informational inefficiency
Firm-specific informational inefficiency
Form 13F filings
Fundamental equity long/short
Generalists
Growth approach
Process of short selling
Scenario analysis
Sector specialists
Short position
Short squeezes

Short stock rebate

Value long/short managers

Learning Objectives

36.1 Demonstrate knowledge of equity long/short hedge fund strategies.

For example:

- Describe the investment opportunity set, cash and leverage position, and market timing position that long/short managers have at their disposal
- Describe the typical portfolio concentration and turnover for long/short equity hedge fund portfolios
- Identify and describe the value, growth, and blend approaches
- Identify, describe, and contrast the bottom-up and top-down approaches
- Identify and describe generalists and sector specialists
- Describe the corporate governance (activist) approach

36.2 Demonstrate knowledge of the background of the long/short equity hedge fund strategy.

For example:

- Describe early pioneers of the long/short hedge fund strategy
- Describe the relative size of the long/short market compared to that of other hedge fund strategies

36.3 Demonstrate knowledge of the steps in the traditional long/short investment process.

For example:

- Describe the step of idea generation and its importance to the investment process
- Describe the step of optimal idea expression
- Describe the issues that a long/short manager must consider when sizing positions
- Describe how trades are typically executed
- Identify corporate actions, scenario analysis, and the importance of liquidity and market impact
- Describe short positions, the process of short selling, and short squeezes, and how they help in understanding or managing the risks of long/short investing

36.4 Demonstrate knowledge of the managerial expertise of equity long/short hedge fund managers and sources of return to long/short strategies.

For example:

- Describe the typical expertise profiles of equity long/short hedge fund managers
- Describe the types of companies on which value-oriented long/short managers tend to focus
- Identify and describe the potential sources of returns for equity hedge fund managers (i.e., firm-specific informational inefficiency and factor-based information inefficiency)

- Discuss the equity mispricing tendencies of developed countries and emerging countries and their relevance to equity long/short hedge fund managers
- Describe how a fundamental hedge fund manager may use Form 13F filings to gain information about the trades of other managers

36.5 Demonstrate knowledge of return attribution in long/short strategies.
For example:
- Identify a short stock rebate, and describe why it is used
- Identify the four components to which returns can be attributed for both long positions and short positions
- Recognize and apply an analysis of benefits and costs of a portfolio of long and short positions to determine the total return of the strategy

Reading 1, Chapter 37
Quantitative Equity Hedge Fund Strategies

Keywords

Black box strategies
Co-integration
Fundamental indicators
High-frequency trading
HML
Latency arbitrage
Mean reversion
Mkt-RF
Pairs trade
Price momentum
SMB
Statistical arbitrage funds
Systematic approaches
Trading frequency/holding period
Winsorizing
Z-scoring

Learning Objectives

37.1 Demonstrate knowledge of quantitative strategies.
For example:
- Identify pairs trading, mean reversion, co-integration, and statistical arbitrage funds
- Identify fundamental indicators that drive trading decisions
- Describe the underlying assumption of the use of fundamental factors to establish positions
- Describe how trading frequency is an important distinction among quantitative equity market neutral (EMN) funds

37.2 Demonstrate knowledge of the background of quantitative strategies.
For example:
- Describe how EMN managers screen the universe of equity investments
- Identify and describe z-scoring and Winsorizing
- Identify price momentum, and describe its importance in equity markets

37.3 Demonstrate knowledge of the mechanics of quantitative strategies.
For example:
- Outline the 10-step process to building a quantitative investment model, and explain each of the steps

37.4 Demonstrate knowledge of the sources of returns to quantitative hedge fund strategies.
For example:
- Identify and describe latency arbitrage
- Describe how ETF arbitrage can be structured
- Discuss the role of momentum as a return factor
- Describe the relationship between the Sharpe ratio of a successful fund and its capacity for assets under management

37.5 Demonstrate knowledge of quantitative EMN strategies.
For example:
- Describe the benefits of blending exposures to the three factors (i.e., market, size, and value) in the Fama-French model

37.6 Demonstrate knowledge of the great quant meltdown of August 2007.
For example:
- Describe the factors that led to the great quant meltdown of August 2007

Reading 1, Chapter 38
Funds of Hedge Funds

Keywords

Balanced FoF
Capacity constraint
Concentrated FoF
Multistrategy FoF
Single-strategy FoF

Learning Objectives

38.1 Demonstrate knowledge of approaches to accessing hedge funds.
For example:
- Describe the self-managed approach to accessing hedge funds
- Identify and describe the functions that funds of funds serve (i.e., portfolio construction, manager selection, risk management and monitoring, and due diligence)
- Describe the indexed approach to accessing hedge funds

38.2 Demonstrate knowledge of the characteristics of funds of hedge funds.
For example:
- Describe the structure of a fund of funds (FoF)
- Describe the trend of FoF investments as part of the hedge fund market

- Identify and describe the four strategies that FoFs can be grouped by (i.e., single-strategy, multistrategy, concentrated, and balanced)
- Describe the hedge fund biases that are reduced or eliminated when applied to FoFs (e.g., little or no hedge fund survivorship bias, no selection bias, and no instant history bias)

38.3 Demonstrate knowledge of fund of funds performance.

For example:

- Summarize historical trends in FoF returns, Sharpe ratios, and standard deviations

38.4 Demonstrate knowledge of the process of constructing a fund of funds portfolio.

For example:

- Describe the considerations involved when determining AUM weights to a portfolio
- Describe how to construct an equally weighted portfolio
- Describe how to construct an equally risk-weighted portfolio, and advantages to using this method
- Describe how to construct a mean-variance optimal portfolio
- Describe methods to reduce skew and excess kurtosis to zero
- Describe the presence of personal allocation biases in FoF investments

38.5 Demonstrate knowledge of manager selection for funds of funds.

For example:

- Describe the process of selecting the underlying managers for an FoF portfolio

38.6 Demonstrate knowledge of risk management for funds of funds.

For example:

- Describe the common practices in performing due diligence on a hedge fund
- Describe actionable risk management
- Describe the importance of due diligence and monitoring for preventing hedge fund manager fraud
- Describe methods for detecting hidden risks

38.7 Demonstrate knowledge of due diligence issues arising in the context of funds of funds.

For example:

- Recognize the 10 areas discussed in the AIMA due diligence questionnaire

38.8 Demonstrate knowledge of the benefits offered by funds of funds.

For example:

- Identify and describe the benefits that FoF investments offer to a portfolio (i.e., diversification, accessibility and economies of scale, information

advantage, liquidity, access to certain managers, negotiated fees, regulation, currency hedging, leverage, and educational role)

38.9 Demonstrate knowledge of the disadvantages offered by funds of funds.
For example:

- Identify and describe the disadvantages that FoF investments offer to investors (i.e., double layer of fees, performance fees on portions of the portfolio, taxation, lack of transparency, exposure to other investors' cash flows, lack of control, and lack of customization)

38.10 Demonstrate knowledge of how funds of funds compare to portfolios of individual hedge funds.
For example:

- Describe the three ways for an FoF manager to add value (i.e., strategically allocate to various hedge fund styles, tactically allocate across hedge fund styles, and select individual managers)
- Discuss the historical risk and return characteristics of FoFs compared to portfolios of individual hedge funds
- Describe the difference in the information ratios of FoFs and individual hedge funds based on historical evidence

38.11 Demonstrate knowledge of hedge fund indices.
For example:

- Describe the desirable properties of a hedge fund index (i.e., unambiguous, verifiable, accountable, investable, reasonable, and representative)
- Discuss issues present in tracking broad-based noninvestable hedge fund indices
- Describe the process of constructing an investable hedge fund index
- Describe issues in constructing an investable hedge fund index

Correction to reading:

Page 584, equation

$$\text{Equal risk weight } i = \frac{\text{Annualized Standard Deviation } i}{\sum_{i=1}^{n} \text{Annualized Standard Deviation } i}$$

Should be:

$$\text{Equal risk weight } i = \frac{1/\text{Annualized Standard Deviation } i}{\sum_{i=1}^{n} 1/\text{Annualized Standard Deviation } i}$$

Reading 1, Chapter 39
Regulation and Compliance

Keywords

Accredited investor
Alternative Investment Fund Managers Directive (AIFMD)
Chief compliance officer
Code of ethics
Dodd-Frank Act
Form ADV
Record keeping
Regulatory assets under management (RAUM)
SEC inspection
Side letters

Learning Objectives

39.1 Demonstrate knowledge of the history of hedge fund regulation in the United States.

For example:

- Describe the government regulations imposed on U.S. hedge funds
- Describe the significance of the private adviser exemption, and how investment advisers in the U.S qualify for them
- Discuss how the Dodd-Frank Act changed the investment adviser landscape in the U.S.

39.2 Demonstrate knowledge of registration and regulation of hedge funds in the United States.

For example:

- Describe the process of determining whether a hedge fund will register with the SEC or with a state commissions agency
- Describe when overseas hedge funds are required to register with the SEC
- Describe how a hedge fund manager can create a culture of compliance
- Identify and describe policies and procedures that should be included in an investment adviser's policy
- Describe the role the chief compliance officer plays at an investment firm
- Describe the duties of the chief compliance officer in administering a compliance program (i.e., compliance testing and reporting, reviewing marketing materials and other documents, record keeping, performing an annual review, and overseeing the code of ethics)
- Describe the purpose, process, and types of SEC inspections (i.e., regular, cause, and sweep)

39.3 Demonstrate knowledge of reporting requirements for hedge funds.

For example:

- Discuss reporting requirements that a hedge fund must follow as directed by the SEC

39.4 Demonstrate knowledge of the global regulatory environment for hedge funds.

For example:

- Describe the changes the AIFMD will have in the European Union, and the effects it will have on hedge funds
- Describe the spectrum of regulation that ranges across European countries
- Describe the steps to obtaining authorization from the Financial Services Authority
- Discuss the approach to regulation for many Asian governments
- Describe the requirements set forth for hedge funds by the Securities and Futures Commission

Reading 1, Chapter 40
Operational Due Diligence

Keywords

Capital-structure arbitrage
Contagion
Covered short selling
Gating provisions
Gross exposure
Hard lockup provisions
Manager alpha
Market-linked returns
Mortgage arbitrage
Naked short selling
Net exposure
Reverse mergers
Side pocket
Soft lockup provisions
Static returns
Swap-spread arbitrage
Triangulation
Volatility arbitrage
Yield-curve arbitrage

Learning Objectives

40.1 Demonstrate knowledge of operational due diligence for hedge fund investments.

For example:

- Describe the factors that affect the length of the hedge fund due diligence process
- Describe the role integrity plays in the behavior of hedge fund personnel
- Describe the step of confirming a manager's biography
- Identify and describe triangulation in the context of performing due diligence on a hedge fund manager
- Describe how personnel turnover can be problematic for a hedge fund manager
- Describe the value of conversations with prior employees in the due diligence process
- Describe the relationship of the hedge fund manager and the investor in the context of due diligence

- Describe the typical organizational structure of a hedge fund
- Describe how ownership is of key importance to due diligence
- Describe how assets under management affect due diligence
- Describe the typical fee structure of a hedge fund
- Identify and describe hard lockup provisions, soft lockup provisions, and gating provisions
- Describe the client profile information as part of the due diligence process
- Describe the importance of knowing who moves cash at a hedge fund in the due diligence process
- Describe the information learned by examining a hedge fund for proper valuation, fluid administration, and prime broker relationships
- Describe how knowing the process for idea generation is an important detail in due diligence
- Discuss how losses can occur because of technology issues
- Discuss how losses can occur because of external events, and why it is important to know of a hedge fund's preparations for these events
- Describe the five key areas for best practices identified by the Asset Managers' Committee for the hedge fund industry

40.2 Demonstrate knowledge of due diligence issues in long/short equity hedge funds.

For example:

- Describe information related to the strategy of the fund that a due diligence process should obtain
- Describe information related to the manager's short-selling processes that a due diligence process should obtain
- Describe information related to the liquidity of the fund's investments that a due diligence process should obtain
- Describe information related to the sources of return of the fund that a due diligence process should obtain

40.3 Demonstrate knowledge of due diligence issues in convertible arbitrage hedge funds.

For example:

- Describe information related to the approach of the fund that a due diligence process should obtain
- Describe information related to the pricing model of the fund that a due diligence process should obtain
- Describe information related to the valuation processes of the fund that a due diligence process should obtain
- Describe information related to the risk management of the fund that a due diligence process should obtain

40.4 Demonstrate knowledge of due diligence issues in merger arbitrage hedge funds.

For example:

- Describe information related to merger arbitrage funds that a due diligence process should obtain

40.5 Demonstrate knowledge of due diligence issues in fixed-income arbitrage hedge funds.

For example:

- Identify and describe the five major fixed-income arbitrage strategies (i.e., swap-spread arbitrage, yield-curve arbitrage, mortgage arbitrage, volatility arbitrage, and capital-structure arbitrage)
- Describe information related to the leverage of the fund that a due diligence process should obtain
- Describe information related to the handling of cash of the fund that a due diligence process should obtain

40.6 Demonstrate knowledge of due diligence issues in emerging markets hedge funds.

For example:

- Describe information related to the strategy, implementation, liquidity, and risk management of the fund that a due diligence process should obtain

40.7 Demonstrate knowledge of due diligence issues in multistrategy hedge funds.

For example:

- Describe information related to the strategy, liquidity, and risk management of the fund that a due diligence process should obtain

40.8 Demonstrate knowledge of due diligence issues in distressed securities hedge funds.

For example:

- Describe information related to the strategy, liquidity, valuation methodology, leverage, and risk management of the fund that a due diligence process should obtain

Reading 2, Article A
Are Funds of Funds Simply Multi-Strategy Managers with Extra Fees?

Keywords

Fee netting
Headline risk
Manager selection
Strategy allocation

Learning Objectives

Demonstrate knowledge of the impact of manager selection for multi-strategy hedge funds and funds of hedge funds.
For example:

- Describe the potential impact of strategy selection and manager selection on the performance of a hedge fund portfolio
- Compare the results to those related to traditional asset classes
- Describe the potential performance differences between multi-strategy managers and funds of hedge funds in terms of strategy allocation and manager selection, and the underlying assumptions for this conclusion

Demonstrate knowledge of risk management differences between multi-strategy hedge funds and funds of hedge funds.
For example:

- Discuss the relative benefits of diversification in funds of funds and multi-manager funds
- Discuss the relative impacts of the operational risk and fraud and headline risk of funds of funds and multi-manager funds

Demonstrate knowledge of the business models of multi-strategy hedge funds and funds of hedge funds.
For example:

- Compare and contrast the business models of funds of funds and multi-strategy funds from the investor's perspective, particularly with respect to fee structures and retaining talented managers

Reading 2, Article B
Investing in Credit Series Distressed Debt

Keywords

Chapter 11 bankruptcy
Control investing
Liquidation
Loan-to-own
Non-control investing
Out-of-court transactions
Reorganization
Restructuring
Tender offer
Trade claims
Workouts

Learning Objectives

Demonstrate knowledge of the distressed debt investment space.
For example:

- Describe the evolution of distressed debt as a sub-asset class
- Describe the current distressed debt market conditions
- Discuss the counter-cyclical nature of distressed debt opportunities

- Discuss the implications of Chapter 11 regulations for distressed debt investing
- Describe characteristics of distressed debt securities
- Contrast trading in loan-to-own securities, tender offers, and liquidations
- Identify advantages and disadvantages of out-of-court transactions
- Describe value generation and distribution in the context of distressed debt
- Discuss the U.S. bankruptcy process
- Recognize the return drivers of distressed debt investing
- Describe the active management approach to distressed debt investing
- Describe deal sourcing
- Recognize the main types of distressed debt investors
- Recognize the main ways of participating in distressed debt space (liquid short-term trading strategies, longer-term acquisitions, relatively illiquid fund vehicles)
- Recognize the main distressed debt investment strategies
- Discuss non-control/trading-oriented investing
- Discuss control investing
- Describe reorganizations and workouts
- Describe the main risks of distressed debt investing

Topic 6: Structured Products

Readings

1. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2012. ISBN: 978-1-939942-02-9. Part Five: Investment Products: Structured Products.
   A. Coval, J., J. Jurek, and E. Stafford. "The Economics of Structured Finance." *Journal of Economic Perspectives*, Winter 2009, Vol. 23, No. 1, pp. 3–25.
   B. Weistroffer, C. "Insurance Linked Securities." Deutsche Bank Research, October 2010.

Reading 1, Article A
The Economics of Structured Finance

Keywords

CDO^2	Overcollateralization
Collateralized debt obligation (CDO)	Pass-through securitization
Investment grade	Speculative grade
Non-conforming mortgages	Subprime mortgages

Learning Objectives

Demonstrate knowledge of the mechanics of structured finance.
For example:
- Describe the process through which financial institutions can create structured products of a given credit rating

Demonstrate knowledge of the challenge that rating structured products poses to rating agencies.
For example:
- Describe the importance of default correlation in estimating credit risk and in transferring default risk between tranches of structured products
- Compare and contrast the role of default correlation in the credit risk and credit ratings of single-name bonds versus CDO and CDO^2 tranches
- Discuss how errors in the assessment of default correlations, the default probabilities, and the ensuing recovery rates for the underlying securities of structured products can cause underestimation of the likelihood of large losses

Demonstrate knowledge of the pricing of systematic risk in structured products.
For example:
- Describe how the process of pooling and tranching creates securities whose payoff profiles resemble those of a digital call option.
- Assess the systemic (macroeconomic) risk exposures of certain CDO tranches

Demonstrate knowledge of the rise and fall of the structured products market.
For example:

- Describe the significance of conflict of interest and perverse incentives in the rise and fall of the structured finance market
- Describe the role of rating agencies, investors, banks, and regulators in the rise and fall of the structured finance market

Reading 1, Article B
Insurance Linked Securities

Keywords

Basis risk
Cat bonds
Embedded value financing
Insurance-linked securities (ILS)
Life risk
Non-life risks/insured perils
Payment triggers
Risk transfer

Learning Objectives

Demonstrate knowledge of the economics of insurance-linked securities (ILS)
For example:

- Discuss the role of ILS in hedging the risk and financing the operations of insurance companies
- Describe ILS as an investment opportunity, including the correlation between ILS and traditional investments

Demonstrate knowledge of the structure and risk transfer characteristics of ILS
For example:

- Explain the structure of cat bonds and the role of special purpose vehicles (SPVs) in isolating risks
- Describe the drivers of cat bond yields, including insurance risk, liquidity risk, risk in collateral, and investor risk appetite
- Contrast the role of embedded value financing with the issuance of cat bonds
- Structure and discuss an embedded value financing vehicle
- Discuss the life risks of insurance companies, including mortality risk and longevity risk, and reasons why life risk markets have yet to show substantial growth

Demonstrate knowledge of the market for ILS
For example:

- Compare and contrast market size and investment characteristics of ILS to other structured products, such as ABS, MBS, and CDOs
- List and describe instruments for alternative risk transfer, including ILS, insurance derivatives, and contingent capital
- Discuss diversification within the ILS sector, including life and non-life risks and the variety of insured perils

- Discuss the factors affecting the potential growth of the ILS market, including demand for risk coverage, pricing strategies, and financial crises
- Describe payment triggers and basis risk in the context of ILS

Topic 7: Asset Allocation and Portfolio Management

Readings

1. *CAIA Level II: Advanced Core Topics in Alternative Investments*, Wiley, 2012. ISBN: 978-1-118-36975-3. Part One: Asset Allocation and Portfolio Management, Chapters 2–4.
2. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9. Section VI: Asset Allocation and Portfolio Management.
   A. Perold, A. F. and W.F. Sharpe. "Dynamic Strategies for Asset Allocation." *Financial Analysts Journal*, January/February 1995. Vol. 51, No. 1, pp.149-160.
   B. Ilmanen, A. "Understanding Expected Returns." CFA Institute, cfapubs.org, June 2012, CFA Institute Conference Proceedings Quarterly.

Reading 1, Chapter 2
The Endowment Model

Keywords

Community foundations
Corporate foundations
Corpus
Endowment model
Endowments
First-mover advantage
Independent foundations
Intergenerational equity
Market timing
Network effect
Operating foundations
Rebalance
Return target
Security selection
Spending rate
Strategic asset allocation
Tactical asset allocation

Learning Objectives

2.1 Demonstrate knowledge of the types of endowments and foundations.
For example:
- Identify and describe endowments
- Identify and describe various structures for foundations (i.e., operating foundations, community foundations, corporate foundations, and independent foundations)
- Compare and contrast the characteristics of foundations with those of endowments

2.2 Demonstrate knowledge of the endowment goal of maintaining intergenerational equity.
For example:
- Identify and describe intergenerational equity

- Identify the spending rate, and describe its flexibility with respect to foundations and endowments
- Describe and apply the return target of a foundation
- Relate the asset allocation decision of endowments to inflation risks, return targets, and spending rates

2.3 Demonstrate knowledge of the endowment model with respect to alternative investment asset allocation.

For example:

- Identify and describe the endowment model of investing
- Explain why endowments have typically been substantial allocators to alternative investments

2.4 Demonstrate knowledge of factors that help explain why large endowments might outperform other investors.

For example:

- Explain how endowments can use an aggressive asset allocation strategy to achieve above-average investment performance
- Explain how endowments can achieve above-average investment performance because of effective investment manager research
- Explain how the first-mover advantage may help endowments select top managers in order to achieve above-average investment performance
- Explain how the network effect may contribute to endowments being able to select top managers in order to achieve above-average investment performance
- Explain how endowments have a greater tolerance for liquidity risk

Reading 1, Chapter 3
Risk Management for Endowment and Foundation Portfolios

Keywords

Equity options hedges
Illiquidity risk
Inflation beta
Liquidity
Liquidity-driven investing
Tail risk

Learning Objectives

3.1 Demonstrate knowledge of the approaches endowments have used in balancing their spending rates with inflation rates.

For example:

- Explain the fundamental competing tensions in managing an endowment portfolio
- Describe how and why endowment spending rates have changed over time
- Describe the impact of inflation on an endowment's long-term real value, and how endowments have worked to mitigate the risk inflation presents

3.2 Demonstrate knowledge of liquidity issues present in endowment and foundation portfolios.

For example:

- Describe the effects that market conditions can have on illiquidity risk, and how endowments have historically coped with an increase in illiquidity risk
- Identify and describe methods of measuring illiquidity risk
- Describe typical capital call and distribution cycles, and how they affect illiquidity in endowment portfolios
- Describe how leverage and small allocations to fixed income and cash can contribute to liquidity issues in an endowment portfolio
- Give reasons to either side of the argument that the endowment model is no longer valid

3.3 Demonstrate knowledge of rebalancing an endowment portfolio and tactical asset allocation

For example:

- Identify and describe the process, importance, and constraints of rebalancing an endowment portfolio
- Identify and describe the tactical asset allocation model, and describe its application in endowment portfolio management

3.4 Demonstrate knowledge of how tail risk affects endowments.

For example:

- Identify and describe tail risk with respect to endowments
- Discuss methods to avoid tail risk in an endowment portfolio

Reading 1, Chapter 4
Pension Fund Portfolio Management

Keywords

Accumulated benefit obligation (ABO)
Cost of living adjustment (COLA)
Defined benefit plan
Defined contribution plan
Drifting asset allocation
Frozen pension plan
Funded status
Inflation-protected bonds
Liability-driven investing (LDI)
Longevity risk
Matching contribution
Mortality risk
Pension plans
Portable
Projected benefit obligation (PBO)
Required return assumption
Retirement income-replacement ratio
Surplus
Surplus risk
Target-date fund
Terminated pension plan
Vesting period

Learning Objectives

4.1 Demonstrate knowledge of defined benefit plans.

For example:

- Identify and describe the typical characteristics of a defined benefit plan
- Identify and describe the benefit obligations that a pension provider is liable for
- Recognize and apply pension benefits owed to a plan participant
- Identify and describe funded status and surplus risk of pension plans
- Explain why defined benefit plans have trended downward in popularity over time
- Discuss historical asset allocation trends of defined benefit plans
- Discuss the importance of investment return assumptions and the liability discount rate of a pension plan
- Identify and describe liability-driven investing in the context of defined benefit plans
- Construct portfolios consistent with a liability-driven investment objective

4.2 Demonstrate knowledge of governmental social security plans.

For example:

- Describe the typical structures seen in governmental social security plans

4.3 Demonstrate knowledge of defined contribution plans.

For example:

- Identify and describe defined contribution plans
- Compare and contrast the features of defined contribution plans with those of defined benefit plans
- Contrast the role of plan sponsors and plan participants in defined benefit and defined contribution plans
- Identify and describe the concept of drifting asset allocation
- Identify and describe target-date funds

Reading 2, Article A
Dynamic Strategies for Asset Allocation

Keywords

Buy-and-hold
Concave payoff curves
Constant mix
Constant-proportion portfolio insurance
Convex payoff curves
Decision rule
Exposure diagram
Floor
Multiplier
Option-based portfolio insurance

Learning Objectives

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

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)

Demonstrate knowledge of resetting in dynamic strategies.
For example:

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

Reading 2, Article B
Understanding Expected Returns

Keywords

Carry
Concentrated risk
Contrarian timing
Illiquidity score
Style diversification

Learning Objectives

Demonstrate knowledge of expected returns.
For example:

- Recognize the role of expected returns in the development of an investor's overall investment strategy
- Identify and explain the five sources of expected returns (i.e., value, carry, momentum, volatility, and liquidity)
- Describe time-varying expected returns

Topic 8: Risk and Risk Management

Readings

1. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9. Part VII: Risk and Risk Management.
   A. Hill, J.M. "A Perspective on Liquidity Risk and Horizon Uncertainty." *The Journal of Portfolio Management*, Summer 2009, Vol. 35, No. 4, pp. 60-68.
   B. Nielsen, L., D. Villalon, and A. Berger. "Chasing Your Own Tail (Risk)." AQR Capital Management, LLC, Summer 2011.

Reading 1, Article A
A Perspective on Liquidity Risk and Horizon Uncertainty

Keywords

Delevering
De-risking
High-volatility regime
Selling contagion
Single horizon

Learning Objectives

Demonstrate knowledge of the characteristics of liquidity risk.
For example:
- Describe the three primary forces that affect the returns of broad equity indices during a tail-risk event
- Explain why, during financial crises, security prices may be determined by factors other than economic and financial fundamentals
- Describe selling contagion and its impact on security prices

Demonstrate knowledge of the dynamics of high liquidity-risk periods.
For example:
- Discuss the dynamics of high liquidity-risk periods in the U.S. throughout the last several decades

Demonstrate knowledge of capital market theory underpinnings and limitations.
For example:
- Analyze the underpinnings and limitations of capital market theory as it pertains to investment horizon uncertainty and liquidity risk

Demonstrate knowledge of the relationship between horizon uncertainty and liquidity issues.
For example:
- Describe the disadvantages of carrying illiquid investments

Demonstrate knowledge of alternative investment assets for managing risk in a portfolio.
For example:

- Argue whether derivatives are a cause or a solution (or both) of liquidity risk
- Discuss how options can be used to manage risk during periods of financial stress

Reading 1, Article B
Chasing Your Own Tail (Risk)

Keywords

Active volatility management
Collars
Defensive equity strategy
Drawdown control strategy
Low-beta equities
Low-correlated alternatives
Static in practice
Static in theory
Tail event plan
Tail hedges

Learning Objectives

Demonstrate knowledge of tail risk
For example:

- Discuss the need for tail risk hedging and when these hedges are most needed
- Explain the costs, benefits and drawbacks of traditional approaches to tail risk hedging, such as purchasing puts or structuring collars
- Discuss how portfolio performance changes after various forms of tail hedging have been implemented

Demonstrate knowledge of the five alternatives to traditional tail risk hedging strategies
For example:

- Discuss how multiple asset classes do not guarantee diversification and the difference between risk diversification and asset diversification
- Describe approaches for active volatility management, and the impact that volatility targeting can have on long-term risk and return
- List low-correlated alternatives, such as global macro, TAA, volatility arbitrage and managed futures
- Describe the performance of low-correlated alternative investments during times of systemic risk and the impact that these allocations can have on the total risk of a portfolio
- Discuss the case for low-beta equities in a tail risk strategy, including the historical risk, return and drawdown of equity securities with differing levels of beta exposure
- Structure a tail event plan and contrast the risk of a drawdown control strategy to that of theoretical and actual static allocations

Topic 9: Manager Selection, Due Diligence, and Regulation

Readings

1. *CAIA Level II: Core and Integrated Topics*, Institutional Investor, Inc., 2013. ISBN: 978-1-939942-02-9. Part VIII: Manager Selection, Due Diligence, and Regulation.
   A. De Souza, C. and S. Gokcan. "Hedge Fund Investing: *A Quantitative Approach to Hedge Fund Manager Selection and De-Selection*." *The Journal of Wealth Management*, Spring 2004, Vol. 6, No. 4, pp. 52-73.
   B. Clare, A. and N. Motson. "Locking in the Profits or Putting It All on Black? An Empirical Investigation into the Risk-Taking Behavior of Hedge Fund Managers." *The Journal of Alternative Investments*, Fall 2009, Vol. 12, No. 2, pp. 7-25.
   C. Smith, D. and A. Deutschmann. "Hedge Funds, Leverage and Counterparty Negotiations." JPMorgan Alternative Asset Management, 2008.

Reading 1, Article A
Hedge Fund Investing: A Quantitative Approach to Hedge Fund Manager Selection and De-Selection

Keywords

Calmar ratio
Cross product ratio (CPR)
D-statistic
Hurst exponent
Hurst portfolio
Omega
Sortino ratio

Learning Objectives

Demonstrate knowledge of risk budgeting for determining hedge fund allocations.
For example:
- Identify the types of strategies that are most likely to display large dispersion of performance among hedge fund managers
- Discuss the implications of the observed dispersion among managers

Demonstrate knowledge of the quantitative approach to hedge fund manager selection.
For example:
- Describe the goal of the study, the criteria used to choose the data, and general dispersion and volatility characteristics of the returns data
- Describe the Hurst exponent
- Explain how contingency tables are constructed to analyze persistence
- Compare the degree of persistence found in hedge fund returns, the volatility of hedge fund returns, and Sharpe ratios

- Describe the algorithm for risk budgeting, and contrast the approach with the typical approach to risk budgeting
- Explain how the Hurst exponent and D-statistic are calculated and used to analyze hedge fund performance and develop portfolios
- Apply the quantitative model for due diligence pre-screening

Reading 1, Article B
Locking in the Profits or Putting It All on Black? An Empirical Investigation into the Risk-Taking Behavior of Hedge Fund Managers

Keywords

Assessment period
Risk adjustment ratio (RAR)
Tournament behavior

Learning Objectives

Demonstrate knowledge of the nature of the concern over hedge fund fees and risk-taking behavior.
For example:
- Summarize the relationship between the fee structure and risk-taking behavior of hedge fund managers
- Discuss the two important reasons why hedge fund incentive fees are a contentious issue
- Compare and contrast the fund manager's risk choices under different theoretical models of behavior (i.e., Carpenter (2000), Goetzmann, Ingersoll and Ross (2003), Panageas and Westerfield (2009), and Hodder and Jackwerth (2007)

Demonstrate knowledge of the concept of the moneyness of incentive fees and its relationship to standard deviation of funds.
For example:
- Explain the concept of the moneyness of the incentive options for hedge funds
- Discuss two explanations for the finding that the standard deviation of funds with either out-of-the-money incentive options or in-the-money incentive options is statistically larger than the standard deviation of funds with at-the-money incentive options

Demonstrate knowledge of the risk-taking decisions of hedge funds.
For example:
- Discuss the relationship between the risk-taking decisions of hedge fund managers, their realized relative performance, and the value of their incentive options
- Discuss the relationship among fund size, age, survival, and risk taking

Corrections to reading:

Page 543, Equation 2

The sentence right above the equation and the equation itself should read:

Specifically, for each fund f in a given year y, we calculate the annualized rate of return earned during the first M month as follows:

$$\text{Return}_{fMy} = \left[\left(1+r_{f1y}\right)\times\left(1+r_{f2y}\right)\times\ldots\times\left(1+r_{fMy}\right)\right]^{\frac{12}{M}} - 1$$

Page 547, column one, first paragraph, first full sentence

In Exhibit 7 we present results analogous to those in Exhibit 6 but with *M* = 4, 5, 6, 7m and 8.

Should be:

In Exhibit 7 we present results analogous to those in Exhibit 6 but with *M* = 4, 5, 6, 7 and 8.

Pages 552 and 553, Exhibits 15 and 17

Current legend “Small” should be “Large” and “Large” should be “Small”

Pages 554 and 555, Exhibits 19 and 21

Current legend “Young” should be “Old” and “Old” should be “Young”

Reading 1, Article C
Hedge Funds, Leverage and Counterparty Negotiations

Keywords

Cure periods
Gates
Haircuts
Triggers
Termination events

Learning Objectives

Demonstrate knowledge of how hedge fund managers negotiate financing and counterparty agreements.

For example:

- Discuss how hedge funds create short-term, mid-term, and long-term leverage
- Discuss why hedge funds create short-term, mid-term, and long-term leverage
- Apply coverage ratios to hedge fund balance sheets
- Discuss the effects of leverage on portfolio solvency
- Identify and explain the important factors that hedge fund managers and their investors should consider when negotiating financing agreements
- Describe the relationship between basis risk, liquidity, and leverage
- Apply net and gross leverage measures to hedge fund portfolios
- Calculate return from leveraged spread
- Apply yield attribution to collateralized debt obligation (CDO) tranches

Equation Exception List

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

$$Spot\ Index = \begin{Bmatrix} w_1 \times F_1(t,t_1) + ... + w_N \times F_N(t,t_1) \\ w_1 \times F_1(t,t_2) + ... + w_N \times F_N(t,t_2) \\ w_1' \times F_1(t,t_1) + ... + w_N' \times F_N(t,t_1) \end{Bmatrix}$$

$$Excess\ Return\ Index_t = Excess\ Return\ Index_{t-1} \times \left(\frac{w_1 \times F_1(t,t_1) + ... + w_N \times F_N(t,t_1)}{w_1 \times F_1(t-1,t_1) + ... + w_N \times F_N(t-1,t_1)} \right)$$

$$Total\ Return\ Index_t = Total\ Return\ Index_{t-1} \times \left(\frac{Excess\ Return\ Index_t}{Excess\ Return\ Index_{t-1}} \right) \times (1 + TBill\ Rate)$$

$$Realized\ Roll\ Return_t = \left(\frac{Excess\ Return\ Index_t}{Excess\ Return\ Index_{t-1}} \right) - \left(\frac{Spot\ Index_t}{Spot\ Index_{t-1}} \right)$$

$$R_t = \beta_0 + \beta_1 E(\pi_t) + \beta_2 (\pi - E(\pi_t)) + e_t$$

$$R_t = \alpha + \beta_1 \times \Delta IPW_{t-1} + \beta_2 \times \Delta EXC_{t+e_2}$$

$$Total\ MMBtu = Number\ of\ Contracts \times 10,000 (NYM\ \ HH)$$

$$Possible\ impact\ cost = Impact\ cost\ \ per\ MMBtu \times Price\ \ per\ MMBtu \times Total\ MMBtu$$

$$\max_{size.eur} (-0.129753 \cdot size.eur.\ln^2 + 4.41042 \cdot size.eur.\ln)$$

$$\pi_{t+1} = \mu + \alpha(\pi_t - \mu) + \eta_{t+1}$$

$$r_{t+1} = \nu + \beta E_t\left[\pi_{t+1}\right] + \phi\eta_{t+1} + \varepsilon_{t+1}$$

$$R^k_{t+k} = w(r^k_{t+k} - \pi^k_{t+k}) + (1-w)(b^k_{t+k} - \pi^k_{t+k})$$

$$R^k_{t+k} = wr^k_{t+k} + (1-w)b^k_{t+k} - \pi^k_{t+k}$$

$$\Delta = \frac{((1-\alpha)\phi + \alpha\beta)\sigma^2_\eta}{(1-\alpha)^2\sigma^2_\varepsilon + ((1-\alpha)\phi + \alpha\beta)^2\sigma^2_\eta}$$

$$((1-\alpha)\phi + \alpha\beta) > 0$$

$$\Delta_1 = \frac{\phi\sigma^2_\eta}{\sigma^2_\varepsilon + \phi^2\sigma^2_\eta}$$

$$\frac{\partial\Delta}{\partial\alpha} = \Delta_\alpha$$

$$= \frac{(-\phi + \beta)\sigma^2_\eta}{(1-\alpha)^2\sigma^2_\varepsilon + ((1-\alpha)\phi + \alpha\beta)^2\sigma^2_\eta}$$

$$- \frac{((1-\alpha)\phi + \alpha\beta)\sigma^2_\eta(2((1-\alpha)\phi + \alpha\beta)\sigma^2_\eta(-\phi + \beta) - 2(1-\alpha)\sigma^2_\varepsilon}{((1-\alpha)^2\sigma^2_\varepsilon + ((1-\alpha)\phi + \alpha\beta)^2\sigma^2_\eta)^2}$$

$$A = F + (A_0 - F_0)\left(\frac{S}{S_0}\right)^m e^{(1-m)(r+0.5m\sigma^2)t}$$

$$B = SN(d) - Ke^{-rt}N(d - \sigma t^{0.5})$$

$$d = \frac{\log\left(\frac{S}{K}\right) + (r + 0.5\sigma^2 t)}{\sigma t^{0.5}}$$

$$n \cdot B(S, K, r, \sigma, O, T) = A_0 - F_0$$

$$B(S, K, r, \sigma, t, T) = (A - F) / n$$

$$S = \frac{E\left[(x-\mu)^3\right]}{\sigma^3}$$

$$K = \frac{E\left[(x-\mu)^4\right]}{\sigma^4} - 3$$

$$z = \frac{x - pT}{\sqrt{p(1-p)T}}$$

$$MRISK_i = \frac{\partial VaR}{\partial x_i} = \frac{\partial(\alpha \sigma_p W)}{\partial x_i} = \alpha \frac{Cov(R_i, R_p)}{\sigma_p} = \alpha \beta_{i,p} \sigma_p = \alpha \rho_{i,p} \sigma_i$$

$$CRISK_i = x_i(\alpha \beta_{i,P} \sigma_p) = x_i \cdot MRISK_i$$

$$CPR = \frac{W1W2 \cdot L1L2}{W1L2 \cdot L1W2}$$

$$\sigma = \sqrt{\left(\frac{1}{W1} + \frac{1}{W2} + \frac{1}{L2} + \frac{1}{L2}\right)}$$

$$Z - score = \frac{\ln(CPR)}{\sigma}$$

$$A_i\sigma_i = A_j\sigma_j$$

$$\sum_{i=1}^{N} A_i = A$$

$$A_j = A - \sum_{i \neq j}^{N} A_i$$

$$A_j = \frac{A}{\left(1 + \sum_{i \neq j}^{N} \frac{\sigma_j}{\sigma_i}\right)}$$

$$RS_t \cong (ct)^H$$

$$\ln RS_t = \ln(c) + H \ln(t)$$

$$D - statistic = \frac{sum\left|negativereturns\right|}{sum\left|allreturns\right|}$$

$$P_i = E(Y = 1 \Big| X_i) = F(X_i\beta) = \frac{1}{1 + e^{-(X_i\beta)}}$$

$$\Omega(L) = \frac{\int_{L}^{b} (1 - F(r))dr}{\int_{a}^{L} F(r)dr}$$

$$RaR_{fy} = \frac{\sqrt{\left(\frac{\sum_{m=M+1}^{12} (r_{fmy} - \bar{r}_{f(12-M)y})^2}{(12-M)-1} \right)}}{\sqrt{\frac{\sum_{M=1}^{M} (r_{fmy} - \bar{r}_{fMy})^2}{M-1}}}$$

$$Normalized\ Return_{fMy} = Return_{fMy} - Median\left[Return_{sMy} \right]$$

$$Normalized\ RAR_{fMy} = RAR_{fMy} - Median\left[RAR_{sMy} \right]$$

$$LEV_{it} = \frac{BVD_{it}}{BVD_{it} + MVE_{it}}$$

$$CDS_{it} = \alpha_0 + \beta_1 CDSL_{it} + \beta_2 Rating_{it} + \beta_3 Size_{it} + \beta_4 Lev_{it} + \beta_5 Vol_{it} + \beta_6 EDF_{it} + \beta_7 Yield_t + \beta_8 Slope_t + \beta_9 MMMF_t + \beta_{10} OnOff_t + \beta_{11} Tdebt_t + \beta_{12} Libor\_RP_t + \varepsilon_{it}$$

$$\Delta CDS_{it} = \alpha_0 + \beta_1 \Delta CDSL_{it} + \beta_2 Rating_{it} + \beta_3 R_{it} + \beta_4 \Delta Lev_{it} + \beta_5 \Delta Vol_{it} + \beta_6 \Delta EDF_{it} + \beta_7 \Delta Yield_t + \beta_8 \Delta Slope_t + \beta_9 \Delta MMMF_t + \beta_{10} \Delta OnOff_t + \beta_{11} \Delta Tdebt_t + \beta_{12} \Delta Libor\_RP_t + \varepsilon_{it}$$

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 you refer to the table below for clarification.
NOTE: The question examples in this table are NOT sample questions for the current exam.

Term	Definition	Question Example	Example of Term Use
Analyze	Study the interrelations	George has identified an opportunity for a convertible arbitrage reverse hedge. What risks are associated with this hedge? A. The convertible may remain overvalued, causing the positive cash flow to harm the position's return profile. B. The short convertible may be called in and the position must be delivered, forcing the hedge to be unwound at an inopportune time. C. The implied volatility may decrease, lowering the bond's value. D. The implied volatility may increase, lowering the bond's value.	You have to **analyze** the positions and factors impacting them. Correct Answer: B
Apply	Make use of	Alicia Weeks, CFA, Real Estate Investment Advisor, works in an Asian country where there are no securities laws or regulations. According to CFA Institute Standard I, Fundamental Responsibilities, Alicia: A. Must adhere to the standards as defined in a neighboring country that has the strictest laws and regulations. B. Need not concern herself with ethics codes and standards. C. Must adhere to the CFA Institute's codes and standards. D. Must adhere to the standards as defined in a neighboring country that has the least strict laws and regulations.	You have to apply CFA Institute Standard I to find the correct answer. Correct Answer: C

Term	Definition	Question Example	Example of Term Use
Argue	Prove by reason or by presenting the associated pros and cons; debate	Why did the shape of the supply curve for venture capital funds change after 1979?	You have to describe how the curve has changed AND **argue** why it changed by providing reasons and supporting the reasons with statements of facts (e.g., change in regulations).
Assess	Determine importance, size, or value	How are lower capital gains taxes expected to impact firm commitments? A. Through increased supply of capital, firm commitments are expected to rise. B. Through decreased supply of capital, firm commitments are expected to rise. C. Through decreased after-tax return on venture investments, firm commitments are expected to rise. D. Through increased after-tax return on venture investments, firm commitments are expected to decline.	You must **assess** the significance of the change in the tax rate for firm commitments. Correct Answer: A
Compare	Describe similarities and differences	Which of the following least accurately compares the Sharpe and Treynor ratios? A. Both ratios contain excess return in the numerator. B. Both ratios express a measure of return per unit of some measure of risk. C. The Sharpe ratio is based on total risk while the Treynor ratio is based on systematic risk. D. The Sharpe ratio is the inverse of the Treynor ratio.	You have to **compare** the ratios based on their most important similarities and their most important differences. Correct Answer: D
Compare and Contrast	Examine in order to note similarities or differences	A comparison of monthly payments and loan balances of a constant payment mortgage with a constant amortization mortgage with the same loan terms will show that: A. The initial payment will be the same. B. The payments of the constant payment mortgage are initially greater than those of the constant amortization mortgage, but at some point the payments of the constant payment mortgage become less. C. The present value of the payment streams of the two loan types are the same. D. The constant payment mortgage loan balance exceeds that of the constant amortization mortgage during the first six months of the loan.	You have to **compare** indices to arrive at the answer. Correct Answer: C

Term	Definition	Question Example	Example of Term Use
Construct	Make or form by combining or arranging parts or elements	A reverse convertible arbitrage hedge consists of a: A. Short convertible position plus a put option on the stock. B. Long convertible position plus a put option on the stock. C. Short convertible position plus a call option on the stock. D. Short convertible position plus a long position in the stock.	You have to combine positions to **construct** the hedge. Correct Answer: D
Contrast	Expound on the differences	Which of the following best characterizes a difference between value at risk (VaR) and modified VaR? A. Modified VaR is expressed as a percent while VaR is a dollar value. B. Modified VaR uses a user defined confidence interval while VaR uses a 99% interval. C. Modified VaR incorporates non-normality while traditional VaR assumes normality. D. Modified VaR is for a single trading period while traditional VaR is multiple period.	You have to **contrast** the assumptions of the first model to those of the second model so that the differences are clear. Correct Answer: C
Define	State the precise meaning	The interest rate charged by banks with excess reserves at a Federal Reserve Bank to banks needing overnight loans to meet reserve requirements is called the: A. Prime rate. B. Discount rate. C. Federal funds rate. D. Call money rate.	You have to **define**, in this case, the federal funds rate. Correct Answer: C
Describe	Convey or characterize an idea	Which of the following words best describes expected return? A. Spread B. Average C. Spread squared D. Average squared	You need to choose the word that best **describes** the concept from a list. Correct Answer: B
Differentiate	Constitute the distinction between; distinguish	What type of convertible hedge entails shorting a convertible and going long in the underlying stock? A. Call-option hedge B. Traditional convergence hedge C. Implied volatility convergence hedge D. Reverse hedge	You have to **differentiate** one type of hedge from another. Correct Answer: D

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

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

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