March 2013

CAIA® Level I Study Guide

Chartered Alternative Investment Analyst Association®

Contents

Introduction to the Level I Program

Congratulations on becoming a Chartered Alternative Investment Analyst℠ (CAIA) candidate, and welcome to the Level I examination program. The CAIA® program, organized by the CAIA Association® and co-founded by the Alternative Investment Management Association (AIMA) and the 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 by building applications in manager selection, risk management, and asset allocation. The CAIA program asks candidates to work through the curriculum to identify and describe various asset classes, risk-return characteristics of each asset class, the role of each class in a diversified portfolio, the role of active management in investment processes, the manager selection method, 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 I 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 I curriculum material in order to build confidence and be successful on examination day.

Our study guides are organized to facilitate quick learning and easy retention. Each topic is structured around keywords and learning objectives with action words that help candidates concentrate on what is most important for the examination. For 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.

Foundations of the CAIA Curriculum

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

At the beginning of each topic, specific references to relevant Foundations of the CAIA Curriculum materials are listed.

While most college investment and business statistic textbooks could serve as resources for learning the content included in the Foundations of the CAIA Curriculum, the CAIA Association recommends the following two books:

- *Investments*. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers, 9th Edition. 2010. ISBN-13: 978-0073530703.

- *Quantitative Investment Analysis*. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. ISBN: 978-0470052204.

Material in the Foundations of the CAIA Curriculum will not be tested directly on the CAIA Level I exam, but candidates can expect to see knowledge, skills, and concepts included in the Foundations of the CAIA Curriculum incorporated into Level I examination questions. For example, a candidate may be asked to evaluate the output of a regression analysis or calculate the value of a bond (both are concepts included in Foundations of the CAIA Curriculum) as part of a response to a broader examination question.

For further information about Foundations of the CAIA Curriculum, please visit www.caia.org/caia-program/curriculum/foundations.

Preparing for the Level I Examination

Candidates should obtain all the reading materials and follow the outline provided in this study guide. The reading materials for the Level I program are:

- *Standards of Practice Handbook*. 10th edition. Charlottesville, Virginia: CFA Institute, 2010. ISBN: 978-0938367222.

- *CAIA Level I: An Introduction to Core Topics in Alternative Investments.* Wiley. 2012. ISBN: 978-1-118-25096-9.

The learning objectives in this study guide are an important way for candidates to organize their study, as they form the basis for the examination questions. Learning objectives provide guidance on the concepts and keywords that are most important to understanding the CAIA curriculum. A candidate who is able to meet all learning objectives in this study guide should be well-prepared for the examination. Keywords can help candidates focus their progress towards fulfilling the learning objectives. 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 relevant passages and what type of questions they may expect to see on the examination. Note that actual examination questions are not limited in scope to the exact action word used within the learning objectives. For example, the action words "demonstrate knowledge" could result in an examination question that asks

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 are important to understand and that an equation sheet will not be provided on the exam. The equation 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, we estimate that Level I requires at least 200 hours of study.

Examination Format

The Level I examination, administered twice annually, is a five-hour computer-administered examination that is offered at test centers throughout the world. The Level I examination is composed of 200 multiple-choice questions. For more information visit the CAIA website at www.caia.org.

Level I Examination Topic Weights

Topic	Approximate Exam Weight
Professional Standards and Ethics	15% - 20%
Introduction to Alternative Investments	15% - 20%
Real Assets	5% - 10%
Hedge Funds	15% - 20%
Commodities	5% - 10%
Private Equity	5% - 10%
Structured Products	5% - 10%
Risk Management and Portfolio Management	15% - 20%

Errata Sheet

Correction notes appear in this study guide to address known errors existing in the assigned readings. Occasionally, additional errors in the readings and learning objectives are brought to our attention and we will then post the errata on the Curriculum 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 a calculator for the Level I 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 electronic devices will be allowed in the testing center.** The examination proctor will require that all calculator memory be cleared prior to the start of the examination.

The Level II Examination and Completion of the Program

All CAIA candidates must pass the Level I examination before sitting for the Level II examination. A separate study guide is available for the Level II curriculum. As with the Level I examination, the CAIA Association administers the Level II examination twice annually. 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 I Outline

Topic 1: Professional Standards and Ethics

Reading:

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

Topics 2 to 8

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012.

Part One, Introduction to Alternative Investments, Chapters 1 – 7

Chapter 1: What is an Alternative Investment?
Chapter 2: The Environment of Alternative Investments
Chapter 3: Statistical Foundations
Chapter 4: Risk, Return, and Benchmarking
Chapter 5: Correlation, Alternative Returns, and Performance Measurement
Chapter 6: Alpha and Beta
Chapter 7: Hypothesis Testing in Alternative Investments

Part Two – Real Assets, Chapters 8 – 10

Chapter 8: Land, Infrastructure, and Intangible Real Assets
Chapter 9: Real Estate Fixed-Income Investments
Chapter 10: Real Estate Equity Investments

Part Three – Hedge Funds, Chapters 11 – 17

Chapter 11: Introduction to Hedge Funds
Chapter 12: Hedge Fund Returns and Asset Allocation
Chapter 13: Macro and Managed Futures Funds
Chapter 14: Event-Driven Hedge Funds
Chapter 15: Relative Value Hedge Funds
Chapter 16: Equity Hedge Funds
Chapter 17: Funds of Hedge Funds

Part Four – Commodities, Chapters 18 – 19

Chapter 18: Commodity Futures Pricing
Chapter 19: Commodities: Applications and Evidence

Part Five – Private Equity, Chapters 20 – 22

Chapter 20: Introduction to Private Equity
Chapter 21: Equity Types of Private Equity
Chapter 22: Debt Types of Private Equity

Part Six – Structured Products, Chapters 23 – 25

Chapter 23: Credit Risk and the Structuring of Cash Flows
Chapter 24: Credit Derivatives
Chapter 25: Collateralized Debt Obligations

Part Seven, Risk Management and Portfolio Management, Chapters 26 – 31

Chapter 26: Lessons from Hedge Fund Failures
Chapter 27: Risk Analysis
Chapter 28: Due diligence of Fund Managers
Chapter 29: Regression, Multivariate, and Nonlinear Methods
Chapter 30: Portfolio Optimization and Risk Parity
Chapter 31: Portfolio Management, Alpha, and Beta

Topic 1: Professional Standards and Ethics

Readings

Standards of Practice Handbook. 10th edition. Charlottesville, Virginia: CFA Institute, 2010. ISBN: 978-0938367222.

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
Fair dealing
Firewalls
"Flash" report
Fraud
Front-running
Global Investment Performance Standards (GIPS)
"Hot issue" securities
Incentive fees
Independent contractors
Insider trading
Market manipulation
Material changes
Material nonpublic information
Misappropriation
Mosaic theory
Oversubscribed issue
Performance fees
Plagiarism
Pump and dump
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:

- State and interpret Standard I with respect to knowledge of the law, independence and objectivity, misrepresentation, and misconduct
- Recognize procedures for compliance 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:

- State and interpret Standard II with respect to material nonpublic information, and market manipulation
- Recognize procedures for compliance with respect to material nonpublic information

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

For example:

- State and interpret Standard III with respect to loyalty, prudence and care, fair dealing, suitability, performance presentation, and preservation of confidentiality
- Recognize procedures for compliance 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:

- State and interpret Standard IV with respect to loyalty, additional compensation arrangements, and responsibilities of supervisors
- Recognize procedures for compliance with respect to additional compensation arrangements, and responsibilities of supervisors

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

For example:

- State and interpret Standard V with respect to diligence and reasonable basis, communication with clients and prospective clients, and record retention
- Recognize procedures for compliance 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:

- State and interpret Standard VI with respect to disclosure of conflicts, priority of transactions, and referral fees
- Recognize procedures for compliance with respect to disclosure of conflicts, and priority of transactions

Topic 2: Introduction to Alternative Investments

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapters 1, 2, 5, 6, 8, 9 and 24.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters 3-11.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part One, Introduction to Alternative Investments, Chapters 1 - 7.

Chapter 1
What is an Alternative Investment?

Keywords

Absolute return products
Absolute return standard
Active management
Active return
Active risk
Alternative investment
Arbitrage
Benchmark
Benchmark return
Commodities
Compensation structures
Distressed debt
Diversifiers
Efficiency
Financial asset
Hedge funds
Illiquidity
Institutional structures
Investment
Leverage Buyouts (LBOs)
Lumpy assets
Mezzanine debt
Normal distribution
Passive investing
Private equity
Real assets
Real estate
Regulatory structures
Relative return standard
Return diversifier
Return enhancer
Securities structures
Structured products
Timberland

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations

Inefficiency
Infrastructure investments
Institutional quality alternative investments
Trading structures
Traditional investments
Venture capital

Learning Objectives

1.1 Demonstrate knowledge of the differences between alternative investments and traditional investments.

For example:

- Identify the distinguishing characteristics of institutional quality alternative investments
- Recognize traditional and alternative investments

1.2 Demonstrate knowledge of various alternative investment types.

For example:

- Describe real assets (i.e., real estate, land, infrastructure, and intangible assets) and distinguish real assets from financial assets
- Describe hedge funds
- Describe commodities
- Describe private equity (i.e., venture capital, leveraged buyouts, mezzanine debt, and distressed debt)
- Describe structured products (e.g., collateralized debt obligations [CDOs], credit derivatives)

1.3 Demonstrate knowledge of the concept of structures in investments.

For example:

- Describe how structures help to distinguish alternative investments from traditional investments
- Define the five primary types of structures
- Recognize the primary structures that influence the five alternative asset types
- Recognize the limits of using structures to categorize alternative investments

1.4 Demonstrate knowledge of how alternative and traditional investments are distinguished by return characteristics.

For example:

- Recognize the role of absolute return products as diversifiers
- Define illiquidity and describe the advantages and risks of illiquid investments
- Define efficiency and inefficiency and describe their relationship to competition and transactions costs

- Recognize normal and non-normal distributions and the structures that cause non-normality

1.5 Demonstrate knowledge of how alternative and traditional investments are distinguished by methods of analysis.

For example:

- Recognize return computation methodologies
- Recognize statistical methodologies
- Recognize valuation methodologies
- Recognize portfolio management methodologies

1.6 Demonstrate knowledge of the goals of alternative investing.

For example:

- Define active management and contrast active management and passive investing
- Recognize the importance of benchmarks and benchmark returns in managing investments
- Define active risk and active return
- Describe the absolute and relative standards for evaluating returns
- Describe the concept of arbitrage and the roles of return enhancers and return diversifiers in an investment program

Chapter 2
The Environment of Alternative Investments

Keywords

Bid-ask spread
Buy-side
Call markets
Churning
Commission de Surveillance du Seeteur Financier (CSSF)
Continuous markets
Dark pool
Data providers
Family office
Fourth markets
Management company operating agreement
Market making
Market orders
Market takers
MiFID
Partnership agreement
Platforms
Primary market
Private-placement memoranda
Regulation T margin rule
Secondary market
Section 3(c)1
Section 3(c)7
Sell-side
Soft dollar arrangements
Software

Subscription agreement
Systemic risk
The bid-ask spread
Third markets
Universal banking

Learning Objectives

2.1 Demonstrate knowledge of participants in the alternative investing environment.

For example:

- Identify buy side participants (e.g., plan sponsors; foundations and endowments; home office, private wealth institutions; sovereigns/non-federal government funds; hedge funds; funds of funds; private equity funds; commodity trading advisors; separately managed accounts) and describe their roles in the alternative investing environment
- Identify sell side participants (e.g., large dealer banks, brokers) and describe their roles in the alternative investing environment
- Identify outside service providers (e.g., prime brokers, accountants and auditors, attorneys, fund administrators, hedge fund infrastructure, consultants, depositories and custodians, commercial banks) and describe their roles in the alternative investing environment

2.2 Demonstrate knowledge of the financial markets involved in alternative investments.

For example:

- Define primary capital markets and describe their roles in alternative investments
- Define secondary capital markets and describe their roles in alternative investments
- Define third, fourth, and private markets and describe their roles in alternative investments

2.3 Demonstrate knowledge of regulatory issues related to alternative investments.

For example:

- Define and explain the concept of systemic risk
- Describe key components of U.S. regulations affecting securities issued to the public (e.g., the Company Act, the Securities Act), including exemptions commonly applied to hedge funds
- Describe key components of U.S. regulations affecting advisers to investment pools (e.g., the Advisers Act), including exemptions commonly applied to hedge fund managers

- Describe key components of European regulations affecting hedge funds (e.g., Undertakings for Collective Investment in Transferable Securities [UCITS], Markets in Financial Instruments Directive [MiFID]) and recognize major European regulatory institutions
- Describe key components of hedge fund regulations outside of the United States and European Union (e.g., Australia, Brazil, Canada, Japan, Singapore, South Africa, United Arab Emirates) and recognize major regulatory institutions in these regions

2.4 Demonstrate knowledge of how taxation affects investments and investment decisions.

For example:

- Recognize income tax conventions (e.g., taxes on capital gains, dividends, interest)
- Recognize non-income tax conventions (e.g., real estate tax, estate tax, value-added tax)
- Analyze how variation in income tax conventions around the world affect investments and investment decisions

Correction to reading:

Page 22, Section 2.1.1, section title and 1st sentence, change Home Office to Family Office.

Chapter 3
Statistical Foundations

Keywords

Arithmetic mean log return
Autoregressive
Autocorrelation
Conditional value-at-risk
Conditionally heteroskedastic
Continuous compounding
Discrete compounding
Drawdown
Ex ante
Ex post
Excess kurtosis
GARCH
Geometric mean return
Heteroskedasticity
Histogram
Homoskedasticity
Illiquidity
Jarque–Bera test
Kurtosis
Leptokurtosis
Log returns
Lognormal
Mean
Median
Mesokurtosis
Mode
Monte Carlo analysis
Non-linearity
Parametric VaR
Platykurtosis

Return computation interval
Semistandard deviation
Semivariance
Shortfall risk
Simple interest
Skewness
Standard deviation
Target semistandard deviation
Target semivariance
Tracking error
Value at risk (VaR)
Variance
Volatility

Learning Objectives

3.1 Demonstrate knowledge of frequency and probability distributions.

For example:

- Describe frequency distributions
- Describe the characteristics of ex ante and ex post return distributions
- Recognize the importance of the normal distribution in statistical analysis

3.2 Demonstrate knowledge of compounding multiple-period returns.

For example:

- Define compounding and apply it to model investment returns
- Describe continuous compounding and logarithmic returns and identify their uses in modeling investment returns
- Contrast continuous compounding and discrete compounding
- Define the return computation interval
- Apply return aggregation over different time intervals
- Recognize and apply the concepts of arithmetic log returns and geometric mean returns
- Identify the advantages of using continuous compounding, rather than discrete compounding, when modeling return probability distributions
- Describe the characteristics of log normal distributions

3.3 Demonstrate knowledge of autocorrelation and non-normality in return distributions.

For example:

- Define autocorrelation, describe factors that cause and prevent autocorrelation, and describe the effects of autocorrelation on return distributions
- Describe the effects of illiquidity on return distributions
- Describe the effects of non-linearity on return distributions

3.4 Demonstrate knowledge of moments of return distributions (i.e., mean, variance, skewness, and kurtosis).

For example:

- Explain the first four raw moments of return distributions
- Explain the central moments of return distributions
- Explain skewness of return distributions
- Explain kurtosis and excess kurtosis of return distributions

3.5 Demonstrate knowledge of methods for computing sample statistics.

For example:

- Recognize and apply the mean for a given set of data
- Recognize and apply the variance and standard deviation for a given set of data
- Recognize and apply the relative skewness for a given set of data
- Recognize and apply the excess kurtosis for a given set of data
- Describe the characteristics of platykurtic, mesokurtic, and leptokurtic distributions

3.6 Demonstrate knowledge of standard deviation (volatility) and variance.

For example:

- Define and describe return standard deviation (volatility)
- Describe the properties of return variance and standard deviation as they relate to the analysis of investment returns
- Apply the concepts of return variance and standard deviation to the analysis of investment returns

3.7 Demonstrate knowledge of methods used to test for normality of distributions.

For example:

- Discuss tests for normality that use sample moments
- Recognize and apply the Jarque-Bera test

3.8 Demonstrate knowledge of alternative measures of financial risk.

For example:

- Define and apply the concepts of semivariance and semi-standard deviation
- Describe shortfall risk, target semivariance, and target semi-standard deviation
- Define and apply the concept of tracking error
- Describe and apply the concept of drawdown
- Define and interpret Value at Risk (VaR) and discuss its strengths and weaknesses as a risk measure
- Define and interpret Conditional Value at Risk (CVaR)

3.9 Demonstrate knowledge of methods for estimating value at risk (VaR).

For example:

- Apply a parametric approach to estimate VaR with normally distributed returns or with normally distributed underlying factors
- Describe methods for estimating volatility as an input for VaR calculations
- Describe methods for estimating VaR for leptokurtic positions
- Describe methods for estimating VaR directly from historical data
- Describe the how Monte Carlo analysis can be used to estimate VaR
- Discuss the aggregation of portfolio component VaRs to determine the VaR for a portfolio under various assumptions (i.e., perfect correlation, zero correlation, and perfect negative correlation)

3.10 Demonstrate knowledge of time series return volatility models.

For example:

- Identify various measures used in time series models (e.g., price levels, price variation, risk)
- Recognize the key components of the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) method
- Describe how the GARCH method is used to model risk evolution through time
- Contrast the GARCH method with the Autoregressive Conditional Heteroskedasticity (ARCH) method

Corrections to reading:

Page 48, Section 3.3.1, 1st paragraph, 3rd sentence:
Positive first-order autocorrelation is when a positive (negative) return in time period t – 1 tends to be followed by a positive (negative) return in time period t. Conversely, negative first-order autocorrelation is when a return in time period t – 1 tends to be followed by a return of the opposite sign in time period t.

Should be:

Positive first-order autocorrelation is when an above-average (below-average) return in time period t – 1 tends to be followed by an above-average (below-average) return in time period t. Conversely, negative first-order autocorrelation is when an above-average return in time period t – 1 tends to be followed by a below-average return in time period t.

Continued on next page:

Page 63; Section 3.6.4, first paragraph below Equation 3.33, last sentence

A popular annualization factor in alternative investments is to find the annual standard deviation by multiplying the standard deviation of monthly returns by $\sqrt{2}$.

Should be:

A popular annualization factor in alternative investments is to find the annual standard deviation by multiplying the standard deviation of monthly returns by $\sqrt{12}$.

Page 63, Section 3.6.4, first paragraph below Equation 3.34, 2nd sentence

We see that the standard deviation of a multiperiod return varies from being proportional to T in the uncorrelated (independent) case to being proportional to $\sqrt{T}$ in the perfectly correlated case.

Should be:

We see that the standard deviation of a multiperiod return varies from being proportional to $\sqrt{T}$ in the uncorrelated (independent) case to being proportional to T in the perfectly correlated case.

Page 67, Section 3.8.1, Equation 3.37:

$$\text{Semivariance} = \frac{1}{T^*}\sum_t (R_t - \bar{R})^2 \quad \text{For all } R_t < \bar{R}$$

Should be:

$$\text{Semivariance} = \frac{1}{T^* - 1}\sum_t (R_t - \bar{R})^2 \quad \text{For all } R_t < \bar{R}$$

Continued on next page:

Page 68, Section 3.8.4, Equation 3.38:

$$\text{Tracking Error} = \frac{1}{T-1}\sum_{t=1}^{T}\left(R_t - R_{Bench,t} - \mu\right)^2$$

Should be:

$$\text{Tracking Error} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(R_t - R_{Bench,t} - \mu\right)^2}$$

Chapter 4
Risk, Return, and Benchmarking

Keywords

Abstract models
Applied models
Asset pricing models
Benchmarking
Cross-sectional models
Empirical models
Ex ante models
Ex post model
Excess return
Fama-French model
Fama-French-Carhart model
Idiosyncratic returns
Idiosyncratic risk
Multifactor models
Normative model
Panel data sets
Peer group
Positive model
Return attribution
Single factor
Systematic returns
Systematic risk
Theoretical models
Time-series models

Learning Objectives

4.1 Demonstrate knowledge of benchmarking and its role in the analysis of risk and return of investments.

For example:

- Define benchmarking in the context of investing
- Recognize various types of benchmarks (i.e., peer benchmarks and benchmark indices)
- Apply the concept of benchmarking
- Examine complexities involved in interpreting the results of benchmark analyses

4.2 Demonstrate knowledge of asset pricing models.

For example:

- Describe the key components of asset pricing models

4.3 Demonstrate knowledge of various types of asset pricing models.

For example:

- Define normative and positive models and compare their key characteristics
- Define theoretical and empirical models and compare their key characteristics
- Define applied and abstract models and compare their key characteristics
- Describe the advantages and disadvantages of various types of models in the context of alternative investments

4.4 Demonstrate knowledge of cross-sectional and time-series approaches.

For example:

- Define cross-sectional and time-series approaches and compare their key characteristics
- Discuss applications of asset pricing models in cross-sectional and time-series analyses

4.5 Demonstrate knowledge of single-factor asset pricing models and ex ante pricing.

For example:

- Describe the key characteristics of ex ante and ex post asset pricing models
- Recognize the distinctions between ex ante asset pricing and ex post asset pricing
- Apply ex ante and ex post pricing for a single-factor model
- Define systematic and idiosyncratic risk and return
- Compare the capital asset pricing model (CAPM) with other single-factor models

4.6 Demonstrate knowledge of the use of the capital asset pricing model (CAPM) in empirical analysis.

For example:

- Perform return attribution using the CAPM and interpret the results
- Examine time-series returns with a CAPM-based regression model
- Apply CAPM-based benchmarking and interpret the results
- Examine and interpret cross-sectional returns with a CAPM-based regression model
- Analyze the strengths and weaknesses of the CAPM model in empirical testing

4.7 Demonstrate knowledge of multi-factor return models.

For example:

- Apply and interpret equations representing ex ante and ex post forms of multi-factor asset pricing models
- Distinguish between empirically identified and theoretically derived return factors
- Describe the steps typically involved in empirical modeling of returns
- Recognize the key components of the Fama-French and Fama-French-Carhart models and discuss the appropriate application of these models in alternative investing
- Evaluate various approaches for identifying potential factors
- Examine the use of the Fama-French-Carhart model in benchmarking
- Discuss the value of ex ante multi-factor asset pricing models in predicting future expected returns

4.8 Demonstrate knowledge of alternative asset benchmarking.

For example:

- Evaluate the use of single-period models for multi-period applications with regard to alternative investments
- Describe the effects of non-normality on alternative investment benchmarking
- Describe the effects of illiquidity of returns on alternative investments

Chapter 5
Correlation, Alternative Returns, and Performance Measurement

Keywords

Aggregation of IRRs
Average tracking error
Beta
Borrowing type cash flow patterns
Carried interest
Catch-up provision
Catch-up rate
Clawback clause
Complex cash flow pattern
Correlation coefficient
Covariance
Deal-by-deal carried interest
Dollar weighted returns
First order autocorrelation
Fully collateralized
Fund-as-a-whole carried interest
Hard hurdle rate
Hurdle rate
Incentive fee
Information ratio
Interim or Since Inception IRRs
Internal rate of return (IRR)
Jensen's alpha
Lifetime IRRs
M2 approach
Management fees
Moneyness
Multiple sign-change cash flow patterns
Notional principal

Partially collateralized
Perfect linear negative correlation
Perfect linear positive correlation
Performance-based fee
Point-to-point IRRs
Preferred return
Reinvestment assumption
Return on notional principal
Return on VAR (RoVaR)
Scale differences
Sharpe ratio
Soft hurdle rate
Sortino ratio
Spearman rank correlation
Time-weighted returns
Treynor ratio
Vesting
Waterfall
Well-diversified portfolios

Learning Objectives

5.1 Demonstrate knowledge of various measures of correlation between assets.

For example:

- Recognize the importance of correlation in alternative investment portfolio management
- Define and apply the concept of covariance
- Define and apply the concept of the correlation coefficient
- Define and apply the Spearman rank correlation coefficient
- Discuss the role of correlation in portfolio diversification
- Define and apply the concept of beta in the context of the CAPM
- Define autocorrelation
- Apply the concepts of the first order autocorrelation coefficient
- Recognize and apply the Durbin-Watson statistic

5.2 Demonstrate knowledge of the internal rate of return (IRR) approach to alternative investment analysis.

For example:

- Define and apply the IRR
- Recognize the three types of IRR based on time periods for which cash flows are available (i.e., lifetime, interim, and point-to-point) and their relationship to valuation of alternative investments

5.3 Demonstrate knowledge of problems with the use of IRR in alternative investment analysis.

For example:

- Recognize complex cash flow patterns and discuss their effect on the computation and interpretation of IRRs
- Discuss the challenges (e.g., scale differences) of comparing investments based on IRRs
- Discuss the difficulties of aggregating IRRs
- Recognize factors that contribute to the sensitivity of IRRs to cash flows

- Discuss the reinvestment assumption inherent in the IRR and how it is addressed by the modified IRR
- Compare and apply time-weighted and dollar-weighted returns

5.4 Demonstrate knowledge of returns based on notional principal.

For example:

- Define and apply the concepts of notional principal and full collateralization for forward contracts
- Apply the concept of the log return to a fully collateralized derivatives position
- Apply the concept of the log return to a partially collateralized derivatives position

5.5 Demonstrate knowledge of the distribution of cash waterfall.

For example:

- Explain the distribution of cash waterfall provision of a limited partnership agreement
- Recognize terminology associated with the cash waterfall provision (e.g., carried interest, hurdle rate, catch-up provision, vesting, clawback clause)
- Discuss factors (e.g., management fees, incentive-based fees) to consider in a fund's compensation structure and the potential effects of decisions regarding compensation structure
- Contrast and apply fund-as-a-whole carried interest and deal-by-deal carried interest
- Discuss the concept of clawback provisions, including their purposes and limitations
- Compare and apply hard and soft hurdle rates and their sequences of distribution
- Discuss the potential effects of incentive fees on decision making and their option-like nature

5.6 Demonstrate knowledge of performance measures used in alternative investment analysis.

For example:

- Define the ratio-based performance measure type
- Recognize and apply various ratio-based performance measures (i.e., the Sharpe ratio, the Treynor ratio, the Sortino ratio, the Information ratio, and return on VaR)
- Define the risk adjusted performance measure type
- Recognize and apply various risk adjusted performance measures (i.e., Jensen's alpha, M^2 [M-squared], and average tracking error)

Correction to reading:

Page 145-146, Exhibit 5.7 and Equation 5.23:

The definition of M-Squared in Equation 5.23 is correct. However, there is also an alternative definition in the literature that is equally correct. Candidates should use the definition shown in Equation 5.23.

Chapter 6
Alpha and Beta

Keywords

Abnormal return persistence
Alpha
Alpha driver
Alternative/cheap beta
Asset gathers
Beta creep
Beta driver
Beta expansion
Beta nonstationarity
Equity premium puzzle
Equity risk premium
Ex ante alpha
Ex post alpha
Full market cycle
Model misspecification
Passive beta driver
Process drivers
Product innovators

Learning Objectives

6.1 Demonstrate knowledge of beta and alpha.
For example:

- Recognize the role of beta in the analysis of traditional and alternative investments
- Recognize the role of alpha in the analysis of traditional and alternative investments

6.2 Demonstrate knowledge of the concepts of ex ante and ex post alpha.
For example:

- Define and apply the concept of ex ante alpha and identify its key characteristics
- Define and apply the concept of ex post alpha and identify its key characteristics
- Distinguish between ex ante and ex post alpha

6.3 Demonstrate knowledge of empirical approaches to inferring ex ante alpha from ex post alpha.

For example:

- Identify the steps involved in estimating ex ante alpha from historical performance
- Discuss challenges to empirical analysis of manager skill

6.4 Demonstrate knowledge of return attribution.

For example:

- Identify the primary goal of return attribution
- Recognize the key questions to be answered in return attribution analysis
- Recognize the three primary types of model misspecification (i.e., omitted systematic return factors, misestimated betas, and non-linear risk-return relationships) and their effects on return attribution
- Describe various types of beta non-stationarity (i.e., beta creep, beta expansion, and market timing) and their effects on return attribution
- Discuss how alpha and beta can become commingled

6.5 Demonstrate knowledge of ex ante alpha estimation and persistence.

For example:

- Recognize the characteristics of return persistence
- Define abnormal return persistence
- Discuss attribution of idiosyncratic returns to luck or skill

6.6 Demonstrate knowledge of return drivers.

For example:

- Discuss return drivers, beta drivers, and alpha drivers
- Discuss the characteristics of beta drivers and their behavior over time
- Discuss passive beta drivers as pure plays on beta
- Discuss the characteristics of six broad categories of alpha drivers (i.e., long/short investing, absolute return strategies, market segmentation, concentrated portfolios, nonlinear return processes, and alternative/cheap beta)
- Define process innovators, asset gatherers, and process drivers

Chapter 7
Hypothesis Testing in Alternative Investments

Keywords

Alternative hypothesis
Backfill bias
Backfilling
Backtesting

Bayesian Formula
Causality
Cherry picking
Confidence level
Data dredging
Data mining
Economic significance
Null hypothesis
Outlier
Overfitting
p-Value
Selection bias
Self-selection bias
Significance level
Spurious correlation
Survivorship bias
Test statistic
Type I error
Type II error

Learning Objectives

7.1 Demonstrate knowledge of the four steps of hypothesis testing.

For example:

- Identify the four steps of hypothesis testing (i.e., state the hypotheses, formulate an analysis plan, analyze sample data, and interpret results)
- Recognize the components of hypothesis statements (i.e., null hypothesis and alternative hypothesis)
- Describe the process of designing hypothesis tests
- Describe the process of forming test statistics to analyze sample data
- Explain the decision-making process for rejecting or failing to reject the null hypothesis

7.2 Demonstrate knowledge of hypothesis testing assuming normality.

For example:

- Develop hypotheses based on given information and assumptions
- Design hypothesis tests
- Apply hypothesis tests to sample data
- Interpret results of hypothesis tests (i.e., reject or fail to reject the null hypothesis)

7.3 Demonstrate knowledge of inferential statistics.

For example:

- Define statistical significance and recognize common errors in the interpretation of statistical significance
- Recognize Type I and Type II errors in hypothesis testing
- Identify errors in the interpretations of test results

7.4 Demonstrate knowledge of sampling and testing problems.

For example:

- Recognize the characteristics of unrepresentative datasets (e.g., selection bias, self-selection bias, survivorship bias) and their effects on the interpretation of test results
- Discuss data mining and data dredging and recognize their effects on the interpretation of test results
- Discuss backtesting and backfilling and recognize their effects on the interpretation of test results
- Discuss cherry picking and chumming and recognize their effects on the interpretation of test results

7.5 Demonstrate knowledge of performance reports based on cumulative returns.

For example:

- Recognize the characteristics of cumulative return charts and potential errors in their interpretation
- Recognize the characteristics of cumulative log return charts and how they avoid issues present in cumulative return charts
- Examine how erroneous interpretations of cumulative return charts can lead to cherry picking

7.6 Demonstrate knowledge of statistical issues in analyzing alpha and beta.

For example:

- Recognize the effect of non-normality on the cross-sectional search for alpha
- Estimate ex ante alpha from ex post alpha and identify potential issues with interpreting alpha estimates and the potential effects of outliers
- Discuss the challenges of spurious correlation in the estimation of beta
- Compare causality of values with true correlation of values
- Discuss the effects of data dredging in the context of alpha and beta analysis

7.7 Demonstrate knowledge of fallacies of alpha and beta estimation.

For example:

- Recognize three major fallacies of alpha estimation and the lessons that arise from them
- Recognize two major fallacies of beta estimation and the lessons that arise from them

Corrections to reading:

Page 172; Section 7.1.5, first paragraph, first sentence

In the previous section, a *p*-value of 2% was referred to as "failing to reject the null hypothesis" when the significance level was **5%.**

Should be:

In the previous section, a *p*-value of 2% was referred to as "failing to reject the null hypothesis" when the significance level was **1%.**

Page 175; Section 7.2.3, Equation 7.2

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{s_1^2 + s_2^2}{n-1}}}$$

Should be:

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{s_1^2 + s_2^2}{n}}}$$

Page 179, last line

This is the unconditional probability of finding an honest trader. It is equal to **0.99%** in this case.

Should read:

This is the unconditional probability of finding an honest trader; it is equal to **99.99%** in this case.

Continued on next page:

Page 180, the second line of Equation (7.3)

$$= \frac{1 \times 0.0001}{1 \times 0.0001 + 0.01 \times \mathbf{0.99}} = 0.01$$

Should read:

$$\frac{1 \times 0.0001}{1 \times 0.0001 + 0.01 \times \mathbf{99.99}} = 0.01$$

Topic 3: Real Assets

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers, 9th Edition. 2010. Chapter 4 and the chapters cited in Topic 2.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters 1 and 2.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Two, Real Assets, Chapters 8 - 10.

Chapter 8
Land, Infrastructure, and Intangible Real Assets

Keywords

Agency risk
Binomial option pricing
Blue top lots
Brownfield project
Cap rate
Excludable good
Favorable mark
Finished lots
Gates
Greenfield project
Intangible assets
Intellectual property
Land banking
Managed returns
Market manipulation
Model manipulation
Moneyness of an option
Negative costs
Paper lots
Political risk
Privatization
Public-private partnership
Real assets
Regulatory risk
Rotation
Selective appraisals
Smoothing
Timberland Investment Management Organizations (TIMOs)
Unbundling

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

Learning Objectives

8.1 Demonstrate knowledge of land as an alternative asset.

For example:

- Identify the three types of land in anticipation of development (i.e., paper lots, blue top lots, and finished lots) and describe their characteristics
- Discuss investment in undeveloped land as a call option
- Apply the binomial option pricing model approach to valuing land as a call option
- Describe the risks and returns of investing in land and apply the concept of the expected return of land based on the probability of its development

8.2 Demonstrate knowledge of timber and timberland as alternative assets.

For example:

- Describe timber and timberland as investments
- Describe the risks and returns of timber investment and identify the advantages and disadvantages of timber investment
- Identify methods of timberland ownership

8.3 Demonstrate knowledge of farmland as an alternative asset.

For example:

- Describe farmland as an investment and discuss the characteristics of investing in farmland
- Recognize and apply the processes for valuing real estate using a cap rate and explain financial analysis of farmland investments
- Discuss factors that affect farmland prices and returns
- Describe farmland as a multiple use option
- Identify methods of obtaining exposure to farmland

8.4 Demonstrate knowledge of infrastructure as an alternative asset.

For example:

- Discuss infrastructure as an investment and identify the seven elements that help identify investable infrastructure (i.e., public use, monopolistic power, government-related, essential, cash generating, conducive to privatization of control, and capital intensive with long-term horizons)
- Recognize the types of infrastructure investments
- Discuss the influence of government on infrastructure investments
- Describe investment vehicles for investing in infrastructure
- Describe the risks and rewards of infrastructure investments

8.5 Demonstrate knowledge of intellectual property as an alternative asset.

For example:

- Discuss intellectual property as an investment
- Describe characteristics of intellectual property
- Describe the financial analysis of intellectual property and the factors that contribute to its returns
- Identify and apply the simplified model for valuing intellectual property

8.6 Demonstrate knowledge of the effect of smoothing on the valuation and volatility of real assets investments.

For example:

- Discuss the smoothing of prices and returns
- Explain the effect of smoothing on observed volatility
- Describe ways that values and returns are managed
- Discuss how appraisals contribute to smoothing of real asset prices
- Compare smoothed returns with market returns

8.7 Demonstrate knowledge of historical performance of timber and farmland.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of timber and farmland investing with their historical stand-alone and portfolio performance

Chapter 9
Real Estate Fixed-Income Investments

Keywords

Balloon payment
Collateralized mortgage obligations (CMOs)
Commercial mortgage loans
Commercial mortgage-backed securities (CMBS)
Conditional prepayment rate (CPR)
Contraction risk
Covenants
Cross-collateral provision
Debt service coverage ratio (DSCR)
Default risk
Equity REITs
Extension risk
Interest rate cap
Loan-to-value (LTV) ratio
Margin rate
Mortgage
Mortgage REITs
Mortgage-backed securities (MBS)
Option adjustable-rate mortgage loans
Prepayment option
PSA benchmark
Recourse
REITs (Real estate investment trusts)
Residential mortgage loans
Residential mortgage-backed securities (RMBS)

Fixed-rate mortgages
Floating-rate tranches
Hybrid REITs
Idiosyncratic prepayment factors
Index rate
Interest coverage ratio
Sequential-pay collateralized mortgage obligation
Subprime mortgages
Tranche
Unscheduled principal payments
Variable-rate mortgages

Learning Objectives

9.1 Demonstrate knowledge of residential mortgages in the context of alternative investments.

For example:

- Describe characteristics of fixed rate mortgages
- Identify and apply the formula for valuation of fixed rate mortgages
- Describe characteristics of interest-only mortgages
- Identify and apply the formula for valuation of interest-only mortgages
- Describe characteristics of variable-rate mortgages
- Identify and apply the formula for valuation of variable-rate mortgages
- Describe other variations of mortgages (i.e., option adjustable rate mortgage loans, and balloon payments)
- Describe default risk for residential mortgages

9.2 Demonstrate knowledge of commercial mortgages in the context of alternative investments.

For example:

- Describe characteristics of commercial mortgages
- Identify, describe, and apply financial ratios (i.e., Loan-to-Value, Interest Coverage Ratio, and Debt Service Coverage Ratio) employed in analysis of commercial mortgages
- Discuss default risk in the context of commercial mortgages

9.3 Demonstrate knowledge of mortgage-backed securities.

For example:

- Discuss residential mortgages and their prepayment options
- Discuss and apply methods of measuring unscheduled prepayment rates
- Describe and apply analysis of residential mortgage-backed securities using Public Securities Association (PSA) rates
- Identify and describe commercial mortgage-backed securities and compare and contrast them with residential mortgage-backed securities

9.4 Demonstrate knowledge of collateralized mortgage obligations (CMOs).

For example:

- Describe the general characteristics of CMOs

- Identify and describe sequential-pay CMOs
- Apply sequential-pay structuring of tranches
- Identify and describe other types of CMO structures and tranches (i.e., Planned Amortization Class, Targeted Amortization Class, Principal-only CMO, and Floating-rate)
- Discuss the financial crisis of 2004 involving CMOs
- Discuss commercial CMOs and their default risk

9.5 Demonstrate knowledge of real estate investment trusts (REITs).

For example:

- Identify and describe types of REITs and the potential advantages they offer to investors

9.6 Demonstrate knowledge of historical performance of mortgage REITs.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of mortgage REITs with their historical stand-alone and portfolio performance

Chapter 10
Real Estate Equity Investments

Keywords

After-tax approach
Appraisals
Arbitraging stale prices
Backward induction
Business risk
Closed-end real estate mutual funds
Commingled real estate funds
Comparable sale prices
Data smoothing
Decision node
Depreciation
Depreciation tax shield
Discounted cash flow (DCF) method
Effective gross income
Effective tax rate
Equity residual approach
Exchange-traded funds (ETF)
Financial risk
Fixed expenses
FTSE NAREIT Composite Index
Gearing
Hedonic price index
Income approach
Inflation risk
Information node
Legal risks
Liquidity risk
Loan-to-value (LTV) ratio
Management/Operational risk
NCREIF property index (NPI)
Net lease
Net operating income (NOI)
Net sale proceeds (NSP)
Open-end real estate mutual funds
Operating expenses
Potential gross income
Pre-tax approach
Private equity real estate funds
Profit approach
Real estate development projects

Real estate joint ventures
Real estate valuation
Real option
Risk premium approach
Stale pricing
Syndications
Vacancy loss rate
Variable expenses

Learning Objectives

10.1 Demonstrate knowledge of real estate development in the context of alternative investments.

For example:

- Describe the processes of developing real estate
- Identify and describe the valuing of real estate development as a string of real options
- Describe and explain decision trees
- Discuss and apply backward induction using a decision tree

10.2 Demonstrate knowledge of valuation and risks of real estate equity.

For example:

- Apply decision trees to the valuation of a real estate development project
- Recognize and apply the discounted cash flow approach (i.e., income approach) to valuing real estate
- Discuss the use of comparable sale prices for valuing real estate
- Identify and describe the risks of real estate as an investment

10.3 Demonstrate knowledge of alternative real estate investment vehicles.

For example:

- Identify and describe private equity real estate funds
- Identify and describe commingled real estate funds
- Identify and describe syndications
- Identify and describe joint ventures
- Identify and describe limited partnerships
- Identify and describe open-end real estate mutual funds
- Discuss options and futures on real estate indices
- Identify and describe exchange-traded funds based on real estate indices
- Identify and describe closed-end real estate mutual funds
- Discuss equity real estate investment trusts

10.4 Demonstrate knowledge of depreciation of real estate.

For example:

- Describe and apply various methods of depreciation of real estate (i.e., without income taxation, with depreciation disallowed for tax purposes, with economic depreciation allowed for tax purposes, with accelerated depreciation

allowed for tax purposes, and with expensing of capital expenditures for tax purposes)

10.5 Demonstrate knowledge of real estate equity risks and returns as represented by real estate indices.

For example:

- Discuss real estate indices based on appraisals
- Identify and describe data smoothing, its explanations, and its major effects
- Discuss real estate indices based on adjusted privately traded prices
- Discuss real estate indices based on market prices

10.6 Demonstrate knowledge of historical performance of equity REITs.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of equity REITs with their historical stand-alone and portfolio performance

Topic 4: Hedge Funds

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapters 3, 7, 11, 14-16, 18, 20-21 and the chapters cited in Topics 2 and 3.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters cited in Topics 2 and 3.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Three, Hedge Funds, Chapters 11 - 17.

Chapter 11
Introduction to Hedge Funds

Keywords

Accredited investor standard
Annuity view of hedge fund fees
Classification of hedge fund strategies
Closet indexer
Consolidation
Excessive conservatism
Fund mortality
Fund of funds
Hedge Fund
High-water mark (HWM)
Incentive fee option
Lock-in effect
Managerial coinvesting
Managing returns
Massaging returns
Multistrategy fund
Optimal contracting
Option view of incentive fees
Perverse incentive
Pure asset gatherer
Qualified purchaser standard
Safe harbor
Single-manager hedge fund

Learning Objectives

11.1 Demonstrate knowledge of the distinguishing features of hedge funds and their growth and concentration over time.
For example:

- Identify and describe the three primary elements of hedge funds

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

- Recognize and explain the reasons for hedge fund industry growth and concentration

11.2 Demonstrate knowledge of various types of hedge funds.

For example:

- Recognize and describe the CAIA classification of hedge fund strategies
- Contrast single-manager hedge funds, funds of funds, and multi-strategy funds

11.3 Demonstrate knowledge of hedge fund fees.

For example:

- Recognize and apply the approach for determining total annual hedge fund fees
- Describe the effects of high water marks (HWM) and hurdle rates on hedge fund fees over time
- Discuss the potential effects of incentive fees on hedge fund manager behavior
- Recognize and apply the annuity view of hedge funds fees
- Recognize and apply the option view of incentive fees and its implications on manager behavior
- Describe the empirical evidence regarding hedge fund fees and managerial behavior

Chapter 12
Hedge Fund Returns and Asset Allocation

Keywords

Absolute return
Absolute return strategies
Backfill bias
Capacity
Directional strategies
Diversified strategies
Event risk strategies
Fee bias
Headline risk
Hedge fund program
Hybrid hedge funds
Instant history bias
Investability
Liquidation bias
Off-balance-sheet risk
Opportunistic
Participation bias
Relative return
Representativeness
Selection bias
Short volatility exposures
Strategy definitions
Strategy drift
Survivorship bias
Synthetic hedge funds

Learning Objectives

12.1 Demonstrate knowledge of the hedge fund universe.

For example:

- Describe the effect of diversification on performance measures of hedge fund portfolios relative to individual funds

12.2 Demonstrate knowledge of mean, variance, skewness, and kurtosis of the returns of hedge fund strategies.

For example:

- Interpret the statistical moments of return distributions of hedge fund strategies

12.3 Demonstrate knowledge of various hedge fund strategies.

For example:

- Identify the four main types of hedge fund strategies (i.e., directional, event risk, absolute return, and diversified) and their characteristics
- Identify and explain the parameters that may be used in a hedge fund investment program
- Recognize the value of parameterization

12.4 Demonstrate knowledge of reasons for incorporating hedge funds into an investment program.

For example:

- Recognize the return enhancement and diversification potential of hedge funds as additions to portfolios of traditional assets
- Describe and recognize the characteristics and potential benefits of opportunistic hedge fund investing
- List the empirical evidence regarding the results of adding hedge funds to portfolios of traditional assets

12.5 Demonstrate knowledge of research regarding the relationship between hedge funds trading and market volatility.

For example:

- Discuss the conclusions of empirical studies regarding the relationship between trading by hedge fund managers and the level of market volatility

12.6 Demonstrate knowledge of hedge fund indices.

For example:

- Describe the challenges of accounting for the effects of management and incentive fees in hedge fund indices
- Compare asset-weighted hedge fund indices and equal-weighted hedge fund indices

- Recognize the concepts of representativeness and data biases (e.g., survivorship, selection, instant history, liquidation) and their effects on hedge fund returns reported by databases
- Recognize the challenges involved in defining hedge fund strategies and the effect of style drift
- Identify issues that determine investability of hedge fund indices

Chapter 13
Macro and Managed Futures Funds

Keywords

Black-box trading models
Breakout strategies
Capacity
Capacity risk
Commodity pools
Commodity trading advisors
Conditional correlation coefficient
Counterparty risk
Countertrend strategies
Degradation
Discretionary fund trading
Event risk
Exponential moving average
Fundamental
Global macro funds
Individually managed futures account
Leverage risk
Liquidity risk
Managed futures
Market risks
Mean-reverting
MLMI (Mount Lucas Management Index)
Model risk
Momentum
Moving average
Natural hedger
Pattern recognition systems
Private commodity pools
Public commodity pools
Random walk
Regulatory risk
Robustness
Simple moving average
Slippage
Systematic fund trading
Technical analysis
Transparency risk
Trend-following strategies
Validation
Weighted moving average
Whipsawing

Learning Objectives

13.1 Demonstrate knowledge of major distinctions within the category of macro and managed futures funds.

For example:

- Distinguish between discretionary fund trading and systematic fund trading
- Define technical analysis and fundamental analysis and discuss the reasons for pursuing each

13.2 Demonstrate knowledge of global macro funds.

For example:

- Describe the key characteristics of global macro funds
- Recognize the main risks (i.e., market, event, and leverage) of macro investing

13.3 Demonstrate knowledge of the historical performance of macro investing.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of macro investing with its historical stand-alone and portfolio performance

13.4 Demonstrate knowledge of managed futures.

For example:

- Describe the key characteristics of managed futures funds
- Discuss regulation, background, and organizational structures (i.e., public commodity pools, private commodity pools, and individually managed accounts) of the managed futures industry

13.5 Demonstrate knowledge of systematic trading.

For example:

- Identify methods for and issues involved in deriving systematic trading rules
- Recognize key questions to ask when evaluating individual trading strategies
- Describe key components of methods used to validate systematic trading rules and the detection and effects of trading rule degradation

13.6 Demonstrate knowledge of systematic trading strategies.

For example:

- Describe the characteristics of trend-following strategies
- Define and apply simple moving averages, weighted moving averages, and exponential moving averages
- Define and apply breakout trading rules
- List the conclusions of research on the nature and efficacy of trend-following strategies
- Describe the characteristics of non-trend-following strategies
- Describe the characteristics of relative value strategies

13.7 Demonstrate knowledge of empirical research on managed futures.

For example:

- Discuss empirical evidence regarding the downside risk protection offered by managed futures
- Describe the reasons why managed futures might provide superior returns
- Describe the risks of managed futures funds

13.9 Demonstrate knowledge of historical performance of managed futures and macro funds.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of managed futures and macro investing with their historical stand-alone and portfolio performance

Corrections to reading:

Page 347, under heading 13.1.3, 2nd sentence:

The key distinction is that global macro funds tend to focus on cash securities and managed futures tend to use futures contracts.

Should be:

Global macro funds frequently place bets in cash markets while managed futures funds focus on futures (and forward) markets.

Page 366, Section 13.6.5, Exhibit 13.5:

In the last sentence of the Description *average price* should be *average price change*.

U = Average of all prices for each period with positive price changes for the last *n* periods

Should be

U = Average of all price changes for each period with positive price changes for the last *n* periods

---

D = Average of all prices for each period with negative price changes for the last *n* periods

Should be

D = Average of absolute value of all price changes for each period with negative price changes for the last *n* periods

Chapter 14
Event-Driven Hedge Funds

Keywords

Activist investment strategy
Agency costs
Agency theory
Bankruptcy process
Bidding contest
Capital structure arbitrage
Compensation scheme
Corporate governance
Distressed debt hedge funds
Event-driven
Event driven multi-strategy funds
Event risk
    Financial market segmentation
    Financing risk
Freerider
Interlocking boards
Liquidation process
Long binary call option
Long binary put option
Merger arbitrage
Naked option position
One-off transaction
Principal-agent relationship
Proxy battle
Recovery rate
Recovery value
Reorganization process
Selling insurance
Shareholder activism
Special situation funds
Stock-for-stock merger proposals
Traditional merger arbitrage

Learning Objectives

14.1 Demonstrate knowledge of the sources of event-driven strategy returns.
For example:
- Explain the insurance-selling view of event-driven strategy returns
- Explain the binary option view of event-driven strategy returns

14.2 Demonstrate knowledge of activist investing.
For example:
- Define activist investing and identify the components of activist investment strategies
- Recognize the structure of corporate governance
- Identify types of shareholder activists and the key players in financial activism
- Discuss agency costs and the conflicts of interest between shareholders and managers
- Recognize and discuss approaches commonly used by activist investors to generate alpha
- Recognize inferences that can be drawn from comparing definable characteristics of activist investing with its historical stand-alone and portfolio performance

14.3 Demonstrate knowledge of merger arbitrage.

For example:

- Recognize the characteristics of traditional merger arbitrage
- Recognize the characteristics of stock-for-stock mergers
- Discuss the effects of third-party bidders and bidding wars on merger arbitrage
- Describe regulatory risk in the context of merger arbitrage
- Describe financing risk in the context of merger arbitrage
- Recognize inferences that can be drawn from comparing definable characteristics of merger arbitrage with its historical stand-alone and portfolio performance

14.4 Demonstrate knowledge of distressed securities hedge funds.

For example:

- Distinguish between distressed debt strategies in hedge funds and in private equity
- Identify key components of the bankruptcy process
- Define a naked option position
- Describe the risks and returns of short sales of distressed equities
- Describe considerations involved in buying undervalued securities and estimating the recovery value of distressed securities
- Recognize activist approaches to investing in distressed securities
- Describe the characteristics of capital structure arbitrage
- Explain the strategy of buying distressed firms using distressed securities
- Recognize inferences that can be drawn from comparing definable characteristics of distressed securities funds with their historical stand-alone and portfolio performance

14.5 Demonstrate knowledge of event-driven multistrategy funds.

For example:

- Describe key characteristics of event-driven multistrategy funds

Chapter 15
Relative Value Hedge Funds

Keywords

Anticipated volatility
Asset-backed securities
Busted convertibles
Carry trades
Classic convertible bond arbitrage trade
Classic dispersion trade
Classic relative value strategy trade
Complexity premium
Components of convertible arbitrage returns
Convergence
Convertible bonds
Correlation risk

Correlations go to one
Counterparty risk
Delta
Delta-neutral
Duration
Duration-neutral
Effective duration
Equity-like convertible
Fixed-income arbitrage
Gamma
General collateral stocks
Hybrid convertibles
Implied volatility
Intercurve arbitrage positions
Interest rate immunization
Intracurve arbitrage positions
Marking-to-market
Marking-to-model
Modified duration
Moneyness
Mortgage-backed securities
arbitrage
Option-adjusted spread
Parallel shift
Portfolio insurance
Price transparency
Pricing risk
Realized volatility
Rebate
Relative value strategies
Riding the yield curve
Rolling down
Short correlation
Short squeeze
Sovereign debt
Special stock
Tail risk
Term structure of interest rates
Theta
Variance notional value
Variance swaps
Vega
Vega notional value
Vega risk
Volatility risk
Volatility swap
Yield curve

Learning Objectives

15.1 Demonstrate knowledge of relative value hedge funds.

For example:

- Define and describe relative value strategies
- Define and describe the classic relative value strategy trade
- Define and describe the classic convertible arbitrage trade
- Define convertible bonds and apply the unbundling approach for pricing convertible bonds
- Define busted, hybrid, and equity-like convertibles
- Define and describe the concepts of delta, gamma, and theta
- Explain the effects of gamma and volatility on the profitability of a delta-neutral position
- Discuss short selling in the context of convertible arbitrage
- Recognize the role complexity plays in making convertible bond arbitrage attractive to some hedge fund managers
- Identify the four reasons that issuers may continue to offer convertible bonds at attractive prices
- Identify the components of convertible arbitrage returns

- Recognize and discuss return drivers and risks of convertible bond arbitrage
- Recognize inferences that can be drawn from comparing definable characteristics of convertible arbitrage funds with their historical stand-alone and portfolio performance

15.2 Demonstrate knowledge of volatility arbitrage.

For example:

- Define and describe the concepts of vega and anticipated volatility
- Recognize instruments used by volatility arbitrage funds
- Identify and apply the approach for determining the final payoff of a variance swap and a volatility swap
- Compare the risks of exchange-traded derivatives and over-the-counter (OTC) derivatives
- Recognize the types of volatility arbitrage strategies
- Discuss the characteristics of market-neutral volatility funds
- Recognize the challenges of estimating and forecasting dispersion
- Discuss the characteristics of tail risk strategies and how their performance depends on correlation among assets
- Discuss the characteristics of dispersion trades
- Recognize inferences that can be drawn from comparing definable characteristics of volatility arbitrage funds with their historical stand-alone and portfolio performance

15.3 Demonstrate knowledge of fixed-income arbitrage.

For example:

- Discuss duration-neutrality, leverage, and liquidity in the context of fixed-income arbitrage
- Recognize types and characteristics of fixed-income arbitrage strategies
- Discuss the risks and returns of sovereign debt in fixed-income arbitrage strategies
- Recognize the characteristics of asset-backed and mortgage-backed securities strategies
- Discuss the effects of prepayment risk and option-adjusted spreads on asset-backed and mortgage-backed securities strategies
- Analyze the risks of asset-backed and mortgage-backed securities arbitrage
- Recognize inferences that can be drawn from comparing definable characteristics of fixed-income arbitrage with its historical stand-alone and portfolio performance

15.4 Demonstrate knowledge of relative value multistrategy funds.

For example:

- Describe key characteristics of relative value multistrategy funds

Chapter 16
Equity Hedge Funds

Keywords

130/30 funds
Accounting accruals
Asynchronous trading
Breadth
Complexity premium
Earnings momentum
Earnings surprise
Equity long/short funds
Equity market-neutral funds
Fundamental law of active management (FLOAM)
Illegal insider trading
Information coefficient
Informationally efficient
Issuance of new stock
Legal insider trading
Limits to arbitrage
Liquidity
Market anomalies
Market impact
Market maker
Mean neutrality
Model misspecification
Multiple-factor scoring models
Net stock issuance
Nonactive bets
Overreacting
Pairs trading
Post-earnings-announcement drift
Price momentum
Providing liquidity
Share buyback program
Short bias funds
Short interest
Speculation
Standardized unexpected earnings (SUE)
Taking liquidity
Test of joint hypotheses
Under-reacting
Variance neutrality

Learning Objectives

16.0 Demonstrate knowledge of equity hedge funds styles.
For example:
- Recognize characteristics of various equity hedge funds styles

16.1 Demonstrate knowledge of sources of return for equity hedge funds.
For example:
- Discuss providing liquidity as a source of return for equity hedge funds
- Discuss providing informational efficiency as a source of return for equity hedge funds
- Discuss the process of using factor analysis s to enhance returns for equity hedge funds

16.2 Demonstrate knowledge of market anomalies.
For example:
- Discuss how market efficiency tests are tests of joint hypotheses

- Identify issues involved in predicting persistence of market anomalies
- Describe and apply accounting accruals as potential predictors of ex ante alpha
- Define price momentum and recognize its potential role in generating ex ante alpha
- Define earnings momentum and recognize its potential role in generating ex ante alpha
- Define net stock issuance and recognize its potential role in generating ex ante alpha
- Define insider trading and recognize its potential role in generating ex ante alpha

16.3 Demonstrate knowledge of the fundamental law of active management (FLOAM).

For example:

- Identify the key components (i.e., breadth and the information coefficient) of the FLOAM
- Describe how the FLOAM can be used to understand changes in the information ratio
- Recognize trade-offs involved in changing or maintaining the information ratio
- Define non-active bets and recognize their role in the FLOAM

16.4 Demonstrate knowledge of approaches to implementing anomaly strategies.

For example:

- Recognize methods for integrating anomalies using factor models
- Define pairs trading and describe the steps involved in constructing the portfolio
- Discuss the effect of short selling on reducing risk and increasing alpha
- Describe the limits to arbitrage and their effect on market efficiency and investment strategies

16.5 Demonstrate knowledge of the three major strategies of equity hedge funds.

For example:

- Describe the key characteristics of short-bias hedge funds
- Recognize inferences that can be drawn from comparing definable characteristics of short-bias hedge funds with their historical stand-alone and portfolio performance
- Describe the key characteristics of equity long/short hedge funds
- Recognize inferences that can be drawn from comparing definable characteristics of equity long/short hedge funds with their historical stand-alone and portfolio performance
- Describe the key characteristics of equity market-neutral hedge funds

- Recognize inferences that can be drawn from comparing definable characteristics of equity market-neutral funds with their historical stand-alone and portfolio performance

Chapter 17
Funds of Hedge Funds

Keywords

Access
Funds of funds
Investable index
Liquidity facility
Seeding funds
Self-selection effect

Learning Objectives

17.1 Demonstrate knowledge of the benefits and costs of diversification in hedge fund investing.
For example:
- Recognize how indices can serve as valuable tools in constructing hedge fund portfolios and analyzing portfolio performance
- Identify and evaluate six methods by which investors can obtain or approximate the returns of a well-diversified hedge fund portfolio
- Discuss the relationship between the number of funds in a portfolio and the level of diversification
- Describe the process for identifying funds for an institutional portfolio or fund of funds
- Recognize the costs involved in building a hedge fund portfolio with internal staff

17.2 Demonstrate knowledge of investing in multistrategy funds.
For example:
- Evaluate fee related advantages of multistrategy funds
- Evaluate flexibility and transparency in the context of multistrategy funds
- Evaluate potential advantages related to manager selection and operational risk management by funds of funds

17.3 Demonstrate knowledge of the process of investing in funds of hedge funds.
For example:
- Identify advantages that funds of funds have over direct hedge fund investments
- Discuss empirical evidence regarding fund of funds returns and the potential for reduced biases in reported performance
- Recognize the varying investment objectives of funds of hedge funds

- Describe how funds of funds can act as venture capitalists

17.4 Demonstrate knowledge of historical performance of funds of hedge funds.
For example:

- Recognize inferences that can be drawn from comparing definable characteristics of market-defensive funds of funds with their historical stand-alone and portfolio performance
- Recognize inferences that can be drawn from comparing definable characteristics of conservative funds of funds with their historical stand-alone and portfolio performance
- Recognize inferences that can be drawn from comparing definable characteristics of strategic funds of funds with their historical stand-alone and portfolio performance
- Recognize inferences that can be drawn from comparing definable characteristics of diversified funds of funds with their historical stand-alone and portfolio performance

Topic 5: Commodities

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapters 12, 22 and 23 and the chapters cited in Topics 2 - 4.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters cited in Topics 2 and 3.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Four, Commodities, Chapters 18 - 19.

Chapter 18
Commodity Futures Pricing

Keywords

Arbitrage
Arbitrage-free model
Backwardation
Basis
Calendar spread
Contango
Convenience yield
Cost-of-carry
Deferred contracts
Financed positions
Forward contract
Futures contract
Inelastic supply
Initial margin
Maintenance margin
Margin call
Marked-to-market
Open interest
Nearby contract
Normal backwardation
Normal contango
Perfectly elastic supply
Rolling contracts
Spot market
Spot price
Storage costs
Swap
Term structure of forward prices
The law of one price
Variation margin

*To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

Learning Objectives

18.1 Demonstrate knowledge of forward and futures contracts.

For example:

- Describe the differences between forward and futures contracts
- Describe and apply initial margin to futures positions
- Describe marking-to-market of futures positions
- Describe and apply maintenance margins to futures positions

18.2 Demonstrate knowledge of the roll process of futures contracts.

For example:

- Explain the process of creating and maintaining long-term futures exposures through short-term futures positions
- Discuss the effects of rollover decisions on the returns of long-term futures exposures

18.3 Demonstrate knowledge of the term structure of forward prices and the pricing models of futures and forward prices.

For example:

- Explain the term structure of forward prices
- Explain arbitrage-free models
- Describe various shapes that the term structure of futures prices can assume
- Understand and apply the cost-of-carry model
- Describe and apply arbitrage-free pricing models of financial forward prices
- Describe and apply arbitrage-free pricing models of forward contracts on physical assets
- Discuss the effect of elasticity, demand shifts, and supply shifts on the term structure of forward prices
- Discuss the potential barriers to implementing arbitrage strategies in physical commodity markets

18.4 Demonstrate knowledge of the concepts of backwardation, normal backwardation, contango, and normal contango.

For example:

- Discuss backwardation and contango in an efficient market
- Explain the relationships between forward prices and spot prices under normal backwardation and normal contango
- Discuss expected returns to spot positions and forward positions (long and short) under normal backwardation and normal contango

18.5 Demonstrate knowledge of the characteristics of returns on forward and futures contracts.

For example:

- Discuss the potential of futures and forward contracts as sources of ex ante alpha and/or beta
- Discuss the relationship between ex ante alpha and the shape of the term structure of forward prices
- Discuss the basis of forward contracts, calendar spreads, and trading strategies involving hedging futures exposures using positions in spot or futures contracts of different maturity

Corrections to reading:

Page 529, Section 18.1.4:

1st paragraph, 4th to last sentence:

……to meet the maintenance margin requirement.

Should be

……to meet the initial margin requirement.

4th Paragraph, 5th sentence:

If the required maintenance margin is $170,000, the jewelry manufacturer is required to post an additional $50,000 in collateral to prevent a forced closure of its positions.

Should be:

If the required maintenance margin is not met, the jewelry manufacturer will receive a margin call and will be required to post an additional $100,000 in collateral to meet the initial margin requirement and to prevent a forced closure of its positions.

Chapter 19
Commodities: Applications and Evidence

Keywords

Basis risk
Collateral yield
Excess return
Inflation
Inflation risk
Market weight

Roll return
Roll yield

Spot return

Learning Objectives

19.1 Demonstrate knowledge of the diversification benefits of commodities .
For example:
- Explain the sources of potential diversification benefits offered by commodities
- Discuss commodities in the context of equilibrium diversification
- Discuss how market imperfections relate to determining allocations to commodities
- Discuss commodities as a diversifier of inflation risk

19.2 Demonstrate knowledge of commodities as potential return enhancers.
For example:
- Discuss potential return enhancement from idiosyncratic returns
- Discuss potential return enhancement from systematic returns in efficient markets
- Discuss potential return enhancement from systematic returns in inefficient markets

19.3 Demonstrate knowledge of investing in commodities without futures.
For example:
- Recognize direct investments in physical commodities
- Recognize investments in commodities through related equity instruments
- Recognize investments in commodities through exchange-traded funds (ETFs)
- Recognize investments in commodities through commodity linked notes
- Apply option valuation methods to commodity linked notes

19.4 Demonstrate knowledge of commodity investment through futures contracts.
For example:
- Recognize the basis risk and investments in commodities through futures contracts
- Recognize and apply various components of returns to futures positions (i.e., spot return, roll yield, collateral yield, and excess return)
- Discuss and explain roll yield (roll return) for financial and physical commodity futures
- Discuss convergence and the relationship between futures and spot prices through time
- Recognize rollover strategies and their effect on returns from futures investments

19.5 Demonstrate knowledge of fallacies with regards to roll return.

For example:

- Discuss three common fallacies associated with the concept of roll return

19.6 Demonstrate knowledge of commodity indices.

For example:

- Discuss properties of commodity indices
- Discuss the characteristics of three popular commodity indices (i.e., S&P GSCI, DJ-UBSCI, and CRB)
- Compare and contrast popular commodity indices

19.7 Demonstrate knowledge of risks associated with commodity investments.

For example:

- Discuss the effect of event risk on returns from investments in commodities
- Discuss the role of commodities as defensive investments
- Discuss acceptance of commodity investments by institutional investors

19.8 Demonstrate knowledge of the return characteristics of commodity investments.

For example:

- Recognize inferences that can be drawn from comparing definable characteristics of commodities with their historical stand-alone and portfolio performance

Topic 6: Private Equity

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapter 18 and the chapters cited in Topics 2 – 5.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters cited in Topics 2 and 3.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Five, Private Equity, Chapters 20 - 22.

Chapter 20
Introduction to Private Equity

Keywords

Charge-off loans
Conversion price
Conversion ratio
Covenants
Cov-lite loans
Distressed debt investing
Equity kicker
Haircut
Incurrence covenants
Junk bonds
Leveraged buyouts (LBOs)
Leveraged loans
Maintenance covenants
Management buyouts
Merchant banking
Mezzanine debt
Middle market
Negative covenants
Positive covenants
Private equity firms
Private equity funds
Private investments in public equity (PIPE)
Prudent person standard
Segmentation
Story credit
Structured PIPEs
Syndicated
Toxic PIPE
Traditional PIPEs
Underlying business enterprises
Venture capital
Vintage year

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

Learning Objectives

20.1 Demonstrate knowledge of private equity terminology.

For example:

- Recognize the structure of private equity funds and investments
- Explain the roles of various entities involved in private equity investments

20.2 Demonstrate knowledge of the major forms of private equity investments that involve direct ownership of equity.

For example:

- Recognize characteristics of venture capital investment and its role in business startups
- Recognize characteristics of leveraged buyouts and the role of debt in these transactions
- Recognize characteristics of management buyouts
- Recognize characteristics of merchant banking and the benefits it offers to financial institutions

20.3 Demonstrate knowledge of the major forms of private equity that involve direct ownership of debt securities.

For example:

- Describe mezzanine debt and explain why it is considered to be a type of private equity investment
- Recognize the role of mezzanine debt as a source of funding in private equity transactions
- Describe distressed debt securities
- Explain the factors that have contributed to the growth of the market for distressed debt securities
- Explain various types of debt covenants
- Describe leverage loan securities and factors contributing to their growth

20.4 Demonstrate knowledge of trends and innovations in private equity markets.

For example:

- Discuss secondary markets in the context of private equity
- Explain private investment in public equity (PIPE) transactions and compare them to other private equity investments
- Describe advantages that PIPEs offer investors
- Describe various types of PIPEs and the purposes for their creation and use
- Discuss hedge fund participation in private equity
- Contrast private equity funds and hedge funds

Chapter 21
Equity Types of Private Equity

Keywords

20-bagger
Angel investing
Auction process
Business plan
Buy-and-build
Buyout-to-buyout
Capital calls
Clawback provision
Club deal
Committed capital
Compound option
Conglomerates
Efficiency buyouts
Entrepreneurship
Escrow agreement
Exit plan
First- or early-stage venture capital
Gearing
Limited liability
Mezzanine stage
Second- or late-stage/expansion venture capital
Seed capital
Sourcing investments
Turnaround strategies

Learning Objectives

21.1 Demonstrate knowledge of the relationships between venture capital and leveraged buyouts.

For example:

- Recognize the role of venture capital and leverage buyouts as sources of funding for corporations through their life cycle

21.2 Demonstrate knowledge of the underlying businesses (portfolio companies) of venture capital.

For example:

- Recognize characteristics of businesses underlying venture capital investment
- Describe the role of business plans and exit plans in venture capital investment

21.3 Demonstrate knowledge of venture capital funds.

For example:

- Recognize how venture capital fund managers raise capital
- Recognize the structure of venture capital funds and the roles played by various entities
- Describe and apply typical venture capital fund fees
- Describe the stages of the life cycle of venture capital funds and portfolio companies
- Explain the importance of financing stages in distinguishing among various venture capital funds

- Explain the compound option that is embedded in most venture capital investments
- Discuss the concept of the J-curve in the context of a startup company

21.4 Demonstrate knowledge of the risk and return characteristics of venture capital investments.

For example:

- Describe the sources of return (risk premiums) to venture capital investments and compare them with sources of return (risk premiums) for publicly traded equities
- Describe access and vintage year diversification as keys to successful venture capital investment
- Discuss persistence of performance in venture capital firms
- Recognize inferences that can be drawn from comparing definable characteristics of venture capital investments with their historical stand-alone and portfolio performances

21.5 Demonstrate knowledge of leveraged buyout (LBO) transactions.

For example:

- Recognize how LBO transactions are distinguished from traditional investments in public securities
- Describe the structure of LBO funds and the role of various entities involved in LBO transactions
- Describe and apply fees associated with investments in LBO funds
- Describe agency relationships, their associated costs, and their role as a potential source of return to LBO transactions
- Describe general categories of LBO transactions and how they create value
- Discuss the characteristics of portfolio companies of LBO funds
- Describe how LBOs potentially improve the management of the target company
- Identify and discuss performance enhancements and risks that arise as a result of LBOs
- Apply various methods to value LBO transactions
- Describe typical exit strategies of LBOs
- Describe the concept of spillover of corporate governance to the public markets
- Explain auction markets and club deals as alternatives to the single-sourced approach to funding LBO transactions

21.6 Demonstrate knowledge of the risk and return characteristics of LBOs.

For example:

- Discuss the reasons why LBO funds have less risk than venture capital funds

Chapter 22
Debt Types of Private Equity

Keywords

Absolute priority
Acceleration
Assignment
Blanket subordination
Blocking position
Chapter 11 bankruptcy
Chapter 7 bankruptcy
Classification of claims
Cramdown
Debtor-in-possession financing
Fulcrum securities
Intercreditor agreement
Loan-to-EBITDA multiple
Mezzanine funds
PIK toggle
Plan of reorganization
Prepackaged bankruptcy filing
Springing subordination
Stretch financing
Takeout provision
Weighted average cost of capital

Learning Objectives

22.1 Demonstrate knowledge of mezzanine debt.

For example:

- Describe characteristics of mezzanine debt
- Describe the typical exit strategy for mezzanine debt investors
- Analyze how mezzanine debt affects company cost of capital
- Apply weighted average cost of capital valuation to capital structures with mezzanine debt
- Compare and contrast mezzanine debt to leveraged loans and high-yield bonds
- Describe seven typical examples of transactions that use mezzanine debt
- Describe types of mezzanine debt investors and recognize their motivations
- Identify and describe eight characteristics that distinguish mezzanine debt from other types of financing

22.2 Demonstrate knowledge of distressed debt as a form of private equity investment.

For example:

- Recognize characteristics of distressed debt
- Describe the supply of distressed debt
- Describe the demand for distressed debt
- Explain typical distressed debt investment strategies
- Describe two major types of corporate bankruptcy processes
- Identify the various terms and standards that relate to bankruptcy processes

22.3 Demonstrate knowledge of the risks associated with investments in distressed debt.

For example:

- Discuss the role of business risk in distressed debt investing

Topic 7: Structured Products

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapters 22, 23 and the chapters cited in Topics 2 - 6.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters cited in Topics 2 and 3.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Six, Structured Products, Chapters 23 - 25.

Chapter 23
Credit Risk and the Structuring of Cash Flows

Keywords

Arbitrage-free model
Black-Scholes option pricing model
Bull option spreads
Calibrate a model
Collateralized debt obligation (CDO)
Credit risk
Credit spread risk
Default risk
Detachment point
Downgrade risk
Equity tranche
Lower attachment point
Merton's structural model
Mezzanine tranche
Put-call parity
Ratings migration
Recovery rate
Reduced-form models
Risk-neutral probabilities
Senior tranche
Structural models
Structuring of cash flows
Tranche
Upper attachment point

Learning Objectives

23.1 Demonstrate knowledge of credit risk.
For example:
- Explain default risk
- Explain downgrade risk
- Explain credit spread risk

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

23.2 Demonstrate knowledge of approaches to credit risk modeling.
For example:
- Distinguish structural and reduced-form credit risk models
- Explain arbitrage-free credit risk models

23.3 Demonstrate knowledge of the structural approach to credit risk modeling.
For example:
- Recognize the option-like nature of structured cash flows
- Recognize the intuition of Merton's structural model
- Recognize and apply the mechanics of Merton's structural model
- Recognize and apply the binomial option approach to pricing structured cash flows
- Recognize the Black-Scholes approach to pricing structured cash flows
- Discuss advantages and disadvantages of structural credit risk models

23.4 Demonstrate knowledge of the reduced-form approach to credit risk modeling.
For example:
- Recognize and apply the concept of expected loss due to credit risk
- Recognize and apply the risk-neutral approach to pricing risky bonds
- Recognize and apply credit spreads within the reduced-form approach
- Discuss how the relationships from risk-neutral models can be generalized
- Discuss the application of the reduced-form approach to valuing different bonds within the same capital structure
- Discuss advantages and disadvantages of reduced-form credit risk models

23.5 Demonstrate knowledge of the concept of structuring cash flows using collateralized debt obligations (CDO).
For example:
- Explain the concept of a CDO using a stylized example
- Discuss attachment points and detachment points
- Explain the relationship between option spreads, mezzanine tranches, and other tranches

Chapter 24
Credit Derivatives

Keywords

American credit options
Binary options
CDS indices
Counterparty risk
Credit default swap
Credit derivatives

Credit protection buyer
Credit protection seller
Credit-linked notes (CLNs)
Derivatives
European credit options
Funded credit derivatives
Mark-to-market adjustment
Multi-name instruments
Operational risk in derivatives
Novation
Referenced asset
Single-name credit derivatives
Standard ISDA agreement
Total return swap
Unfunded credit derivatives

Learning Objectives

24.1 Demonstrate knowledge of credit derivative markets.

For example:

- Explain how a bank can use credit derivatives to transfer credit risk
- Recognize three groupings of credit derivatives: single-name versus multi-name, funded versus unfunded, and sovereign versus non-sovereign
- Describe the four stages of credit derivative activity

24.2 Demonstrate knowledge of credit default swaps.

For example:

- Compare and contrast credit default swaps and total return swaps
- Explain the mechanics of credit default swaps including standard provisions and parameters
- Explain the marking to market of credit default swaps
- Explain three methods for unwinding credit default swap transactions
- Recognize typical credit default swap market participants and their swap transactions
- Identify and explain five typical motivations for using credit default swaps

24.3 Demonstrate knowledge of credit options and credit-linked notes.

For example:

- Contrast credit default swaps and credit options
- Recognize the terminology of credit options
- Explain call options on credit default swaps
- Describe credit-linked notes

24.4 Demonstrate knowledge of the risks of credit derivatives.

For example:

- Explain excessive credit exposure using off-balance-sheet derivatives, pricing risk from over-the-counter derivatives, and liquidity risk of over-the-counter derivatives
- Explain the counterparty risk of over-the-counter credit default swaps and the basis risk of credit default swaps
- Describe credit default swap index products

Chapter 25
Collateralized Debt Obligations

Keywords

Amortization period
Arbitrage CDOs
Balance sheet CDOs
Bankruptcy remote
Cash flow CDO
Cash-funded CDO
Collateralized fund obligation (CFO)
Copula approach
Distressed debt CDOs
Diversity score
External credit enhancement
Financial engineering risk
Internal credit enhancement
Market value CDO
Overcollateralization
Ramp-up period
Reference portfolio
Reserve account
Revolving period
Risk shifting
Single-tranche CDOs
Special purpose vehicle (SPV)
Sponsor of the trust
Spread compression risk
Subordination
Synthetic CDO
Weighted average rating factor (WARF)
Weighted average spread (WAS)
Yield curve risk

Learning Objectives

25.1 Demonstrate knowledge of collateralized debt obligations (CDOs).
For example:
- Describe the history of CDOs
- Describe the general structure and life cycle of a CDO
- Explain the terminology and details of CDOs

25.2 Demonstrate knowledge of balance sheet CDOs and arbitrage CDOs.
For example:
- Discuss the purposes and attributes of balance sheet CDOs
- Discuss the purposes and attributes of arbitrage CDOs
- Describe and apply a typical arbitrage CDO structure
- Analyze the cash flows in a typical arbitrage CDO structure

25.3 Demonstrate knowledge of cash-funded CDOs and synthetic CDOs.
For example:
- Compare and contrast cash-funded CDOs and synthetic CDOs
- Explain how a cash-funded CDO can be used to reduce required regulatory capital
- Apply a typical cash-funded CDO structure

- Describe the characteristics of synthetic CDOs

25.4 Demonstrate knowledge of cash flow and market value CDOs.
For example:
- Describe the characteristics of cash flow CDOs
- Describe the characteristics of market value CDOs

25.5 Demonstrate knowledge of credit risk and enhancement of CDOs.
For example:
- Describe subordination as a CDO credit enhancement
- Describe excess spread as an internal CDO enhancement
- Describe excess cash as an internal CDO enhancement
- Describe external credit enhancements to CDOs
- Explain the effects of risk shifting on the tranches of CDOs

25.6 Demonstrate knowledge of new developments in CDOs.
For example:
- Describe distressed debt CDOs
- Describe hedge fund CDOs
- Describe single-tranche CDOs

25.7 Demonstrate knowledge of the risks of CDOs.
For example:
- Recognize the risks related to the underlying collateral
- Recognize the financial engineering risk
- Describe the CDO risk due to differences in the periodicity and payment dates of a CDO
- Explain the basis risk and spread compression risk
- Describe the yield curve risk
- Describe how CDO credit risk can be modeled

Correction to reading:

Page 689; Section 25.2.1, Exhibit 25.1

The title of Exhibit 25.1 should be changed from EXHIBIT 25.1 Arbitrage CDOs to EXHIBIT 25.1 A Balance Sheet CDO.

Topic 8: Risk Management and Portfolio Management

Foundations*

Investments. Bodie, Z., A. Kane, and A. Marcus. McGraw Hill Publishers. 9th Edition. 2010. Chapters 22, 23 and the chapters cited in Topics 2 - 6.

Quantitative Investment Analysis. DeFusco, R., D. McLeavey, J. Pinto, and D. Runkle. Wiley Publishers. 2nd Edition. 2007. Chapters cited in Topics 2 and 3.

Readings

CAIA Level I: An Introduction to Core Topics in Alternative Investments. Wiley. Second Edition, 2012. ISBN: 978-1-118-25096-9. Part Seven, Risk Management and Portfolio Management, Chapters 26 - 31.

Chapter 26
Lessons from Hedge Fund Failures

Keywords

Affinity fraud
Anchoring
Behavioral biases
Behavioral finance
Confirmation bias
Leverage
Option collar
Ponzi scheme
Restitution
Return on assets
Return on equity
Window dressing

Learning Objectives

26.1 Demonstrate knowledge of the effect of market forces in generating hedge fund losses.

For example:

- Discuss the collapse of Amaranth Advisors, LLC, the due diligence issues related to it, and lessons learned from the case
- Discuss the collapse of Peloton Partners, the due diligence issues related to it, and lessons learned from the case
- Discuss the collapse of Carlyle Capital Corporation, the due diligence issues related to it, and lessons learned from the case

* To understand the CAIA Curriculum and to pass the CAIA Level I exam successfully, candidates must be familiar with the concepts that are covered in "Foundations." For further information see www.caia.org/caia-program/curriculum/foundations.

- Discuss the surprising decline of Marin Capital, the due diligence issues related to it, and lessons learned from the case
- Discuss the link between declining investment opportunities and use of leverage
- Apply the concepts of return on equity, return on assets, and leverage to evaluate levered investment situations
- Identify and describe behavioral biases and their potential effects on risk taking

26.2 Demonstrate knowledge of major fund failures caused by fraud.
For example:

- Discuss the case of Bayou Management, the due diligence issues related to it, and lessons learned from it
- Discuss the case of Bernie Madoff, the due diligence issues related to it, and lessons learned from it
- Discuss the case of Lancer Group, the due diligence issues related to it, and lessons learned from it

26.3 Demonstrate knowledge of lessons drawn from analysis of fund failures.
For example:

- Discuss themes and lessons that emerge from the analysis of various types of fund failures

Chapter 27
Risk Analysis

Keywords

Actual investment strategy
Business risk
Computer algorithm
Custody
Dynamic positions
Fund culture
Gaming
Investment management governance process
Investment mandate
Investment process risk
Investment strategy
Operational errors
Operational fraud
Operational risk
Permitted investment strategies
Position limit
Risk limits
Rogue trader
Slack variable
Stated investment strategy
Style drift
Synergistic risk effect

Learning Objectives

27.1 Demonstrate knowledge of investment strategy risks.
For example:
- Identify and describe style drift risk

27.2 Demonstrate knowledge of market risk.
For example:
- Contrast the general and narrower definitions of market risk
- Discuss potential interactions of market risk with other investment risks
- Describe the market risk of a stated investment strategy
- Compare the market risks of stated and actual investment strategies

27.3 Demonstrate knowledge of operational risk.
For example:
- Discuss two interpretations of operational risk
- Identify and describe operational errors
- Identify and describe types of agency conflicts
- Identify and describe operational fraud

27.4 Demonstrate knowledge of investment process risk.
For example:
- Discuss investment process risk and its detection
- Describe how style drift relates to investment process risk
- Discuss the process risk of implementing an investment strategy

27.5 Demonstrate knowledge of methods for controlling the operational risk of an investment.
For example:
- Explain how incentives can increase operational risk
- Discuss how internal control procedures can detect and reduce operational risk
- Explain the importance of valuation procedures and independence in the valuation process
- Discuss concerns related to the custody of a fund's assets
- Identify and describe the concept of fund culture and how it affects operational risk

27.6 Demonstrate knowledge of the total risk of a fund.
For example:
- Explain the difference between investment, operational, and business risk
- Recognize and explain how leverage, strategy risk, and operational risk affect the total fund risk and return
- Identify and describe synergistic risk effects

- Discuss the optimal levels of operational risk

27.7 Demonstrate knowledge of risk analysis for portfolios of options.
For example:
- Show how put-call parity can be used to form a riskless hedge
- Discuss sensitivities of individual option positions and portfolios
- Explain how sensitivities of portfolios containing options can be managed
- Discuss how options can be used as volatility bets

Chapter 28
Due Diligence of Fund Managers

Keywords

Annual volatility
Attorneys
Auditors
Bias blind spot
Chief Risk Officer
Daily volatility
Due diligence
Expectation bias
Gaming
Gate
Hard lock up period
Herd behavior
Information filtering
Information gathering
Investment objective
Investment process
Key personnel clause
League table
Limited liability shield
Lockup period
Mark to model
Master trust
N-sigma event
Omega-score
Prime broker
Process risk
Shorting volatility
Side pocket arrangement
Soft lockup period
Trade allocation

Learning Objectives

28.1 Demonstrate knowledge of the three questions critical to understanding the nature of a manager's investment program.
For example:
- Define and describe due diligence processes related to investigation of investment objectives of hedge funds
- Define and describe due diligence processes related to investigation of investment processes of hedge funds
- Define and describe due diligence processes related to investigation of how hedge fund managers add value
- Describe and contrast information gathering and information filtering

28.2 Demonstrate knowledge of the due diligence of hedge fund structures.

For example:

- Describe the main issues related to the review of a fund's organization
- Discuss the master trust account structure and recognize its uses by hedge funds
- Explain the importance of reviewing fund managers' organizational structures
- Discuss separation of duties and how organizational charts can be used to evaluate it
- Recognize the importance of reviewing and documenting regulatory registrations
- Describe evaluation and documentation of outside service providers including the auditor, attorneys, and the prime broker

28.3 Demonstrate knowledge of the strategic review of a fund manager in the due diligence process.

For example:

- Explain the importance of understanding the markets and securities in which the manager invests
- Discuss the issues related to benchmarking of fund returns
- Describe key considerations in the analysis of managers' competitive advantages and sources of investment ideas
- Describe key considerations in the review of managers' current portfolio positions
- Describe key considerations in the review of the source of investment ideas
- Discuss investment strategy capacity in the context of evaluating the structural risk

28.4 Demonstrate knowledge of the administrative review of funds.

For example:

- Discuss the importance of due diligence on the ethical and legal history of fund employees
- Discuss the reasons for review of the employee turnover
- Discuss ideal organization of investor relations
- Describe the importance of business continuity management

28.5 Demonstrate knowledge of the procedure for conducting a performance review of a fund manager in the due diligence process.

For example:

- Describe the behavioral biases that can interfere with performance analysis
- Identify and discuss three important questions to ask regarding all assets controlled by the fund manager
- Discuss the analysis of drawdowns

- Identify and discuss the five issues related to the use of past data to predict future performance
- Discuss issues related to subscriptions, redemptions, and volatility of assets under management
- Describe considerations in the review of the asset manager's process for pricing securities in a portfolio

28.6 Demonstrate knowledge of the procedure for conducting a portfolio risk review of a fund manager in the due diligence process.

For example:

- Identify and discuss three important risk management questions
- Describe the role of leverage in determining the total risk of a fund
- Discuss the role of the Chief Risk Officer (CRO)

28.7 Demonstrate knowledge of the procedure for conducting a legal review of a fund manager in the due diligence process.

For example:

- Discuss considerations in the review of the fund structure
- Discuss considerations in the review of the fund fees
- Discuss considerations in the review of the lockup and redemption provisions, including gates and hard and soft lockup periods
- Discuss considerations in the review of the subscription amount
- Discuss the role of the advisory committee

28.8 Demonstrate knowledge of the procedure for conducting reference checks on service providers and other fund investors.

For example:

- Discuss the process of conducting reference checks on service providers
- Identify key questions to ask when conducting reference checks on other investors

28.9 Demonstrate knowledge of the procedure for measuring operational risk.

For example:

- Discuss the role of the omega-score in measuring operational risk
- Discuss the cost of fund manager due diligence

Chapter 29
Regression, Multivariate, and Nonlinear Methods

Keywords

Auto correlation
Conditional correlation
Dependent variable
Goodness of fit
Hedge fund replication
Heteroskedasticity
Multicollinearity
Multiple regression model

Negative conditional correlation
Non-stationary
Outliers
Positive conditional correlation
Principal components analysis
Regression
R-square
Simple linear regression
Slope coefficient
Stepwise regression
Style analysis

Learning Objectives

29.1 Demonstrate knowledge of single-factor regression models.
For example:
- Explain the use of ordinary least squares to estimate regression parameters
- Describe the problem outliers pose to regression analysis
- Describe the problem that autocorrelation poses to regression analysis
- Describe the problem that heteroskedasticity poses to regression analysis
- Recognize and apply the CAPM-based regression
- Interpret results of a regression analysis using the CAPM as an example

29.2 Demonstrate knowledge of multiple-factor regression models.
For example:
- Recognize and apply the ex post version of the Fama-French model
- Describe the problem that multicollinearity poses to multiple-factor regression analysis
- Discuss the selection process of independent variables for multiple-factor regression analysis and the potential shortcomings to the stepwise regression technique

29.3 Demonstrate knowledge of nonlinear return models.
For example:
- Recognize and apply dynamic risk exposure models
- Identify and apply statistical models that estimate the market timing skill of fund managers

29.4 Demonstrate knowledge of methods for modeling changing correlation.
For example:
- Recognize and describe conditional correlation
- Apply the concept of conditional correlation
- Describe the rolling window approach to modeling changing correlation

29.5 Demonstrate knowledge of approaches to analyzing fund returns using multi-factor models.
For example:
- Describe how asset classes can be used to analyze returns of a fund

- Describe how strategy index returns can be used in style analysis
- Describe how a fund's returns can be analyzed using returns of similar funds
- Describe how market-wide factors can be used to analyze returns of a fund
- Describe how specialized market factors can be used to analyze returns of a fund
- Describe hedge fund replication and how it relates to modeling of fund returns

29.6 Demonstrate knowledge of hedge fund performance persistence.
For example:
- Discuss approaches to estimating hedge fund performance persistence

Chapter 30
Portfolio Optimization and Risk Parity

Keywords

Dominant
Efficient frontier
Efficient portfolio
Equilibrium expected return
Feasible portfolio
Heuristic method
Hurdle rate
Marginal risk contribution
Risk budgeting
Risk parity
Two-fund separation theorem

Learning Objectives

30.1 Demonstrate knowledge of mean-variance portfolio optimization.
For example:
- Discuss and apply the methods for determining a portfolio's expected return and standard deviation
- Describe the efficient frontier and its application to mean-variance optimization
- Recognize and apply the objectives and constraints of the mean-variance portfolio optimization process
- Describe the two-fund separation theorem
- Describe a hurdle rate and apply it to evaluate the addition of an asset to a portfolio
- Discuss the advantages and disadvantages of mean-variance optimization, the CAPM, and two-fund separation in the context of determining optimal portfolios

30.2 Demonstrate knowledge of complications to mean-variance optimization.
For example:
- Describe the concept of mean-variance optimizers as "error maximizers"

- Describe how mean-variance optimizers ignore higher moments and explain how this complication can be addressed
- Describe how mean, variance, and covariance estimation errors affect mean-variance optimization
- Discuss extensions of and modifications to mean-variance optimization models

30.3 Demonstrate knowledge of risk budgeting in portfolio construction.

For example:

- Describe the specification of risk in the risk budgeting approach
- Explain why risk budgeting does not emphasize return optimization
- Describe the process of risk budgeting in a CAPM framework

30.4 Demonstrate knowledge of the risk parity approach to portfolio construction and maintenance.

For example:

- Describe the risk parity approach
- Identify and describe the three steps to solving for risk parity
- Recognize an asset's marginal contribution to the total portfolio risk
- Recognize how the total risk of a portfolio can be expressed as the sum of the marginal risk contributions of its components
- Recognize how an asset's marginal contribution to the total portfolio risk can be expressed in terms of the beta of each asset with respect to the total portfolio
- Recognize and apply methods for determining an asset's marginal contribution to the total portfolio risk
- Discuss the generation of portfolio weights using the risk-parity approach
- Discuss the economic rationales for the risk-parity approach
- Provide examples of other approaches to forming low-risk portfolios
- Discuss the characteristics of alternative investments in risk parity portfolios

Corrections to reading:

Page 812, Section 30.4.3:

$$MC_{MSCI} = 60\% \times \left(\frac{60\% \times (4.50\%)^2 + 40\% \times 0.021}{2.95\%} \right) = 2.64\%$$

$$MC_{BarCap} = 40\% \times \left(\frac{40\% \times (1.62\%)^2 + 60\% \times 0.021}{2.95\%} \right) = 0.31\%$$

Continued on next page:

Should be

$$MC_{MSCI} = 60\% \times \left(\frac{60\% \times (4.50\%)^2 + 40\% \times 0.021\%}{2.95\%} \right) = 2.64\%$$

$$MC_{BarCap} = 40\% \times \left(\frac{40\% \times (1.62\%)^2 + 60\% \times 0.021\%}{2.95\%} \right) = 0.31\%$$

Page 812, Exhibit 30.7:

Covariance between the two 0.021

Should be

Covariance between the two 0.021%

Chapter 31
Portfolio Management, Alpha, and Beta

Keywords

Active return
Active risk
Actively managed portfolio
Distinguishing alpha and beta
Enhanced index products
Index products
Passively managed portfolio
Portable alpha
Separating alpha and beta
Strategic asset allocation decision
Tactical asset allocation
Traditional approach to portfolio allocation
Zero-sum game

Learning Objectives

31.1 Demonstrate knowledge of factors involved in the estimation of alpha and beta.

For example:

- Discuss errors in estimating ex ante alpha
- Discuss errors in estimating beta
- Discuss the challenges and techniques of estimating dynamic alpha and beta

31.2 Demonstrate knowledge of the concept of separating alpha and beta.

For example:

- Describe the concept of separation of alpha and beta

31.3 Demonstrate knowledge of portable alpha.

For example:

- Demonstrate how to transfer risk with appropriately-sized positions in derivatives
- Apply the concept of notional value to determine futures positions designed to transfer risk
- Discuss the application of portable alpha
- Apply the concept of portable alpha to portfolio management
- Discuss challenges with porting alpha

31.4 Demonstrate knowledge of asset allocation using the concepts of alpha and beta.

For example:

- Describe the process of traditional asset allocation
- Explain strategic and tactical asset allocation
- Describe the new investment model
- Discuss active risk and active returns for traditional investment products
- Evaluate the proposition that alpha is a zero-sum game

Equation 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.

$$\text{Excess Kurtosis} = \frac{E\left[\left(R-\mu\right)^4\right]}{\sigma^4} - 3 \tag{3.19}$$

$$S_{\text{K}} = \left[\frac{n}{(n-1)(n-2)}\right]\frac{\sum_{i=1}^{n}\left(R_i-\overline{R}\right)^3}{S^3} \tag{3.20}$$

$$K_E = \left(\frac{n(n+1)}{(n-1)(n-2)(n-3)}\frac{\sum_{i=1}^{n}\left(R_i-\overline{R}\right)^4}{S^4}\right) - \frac{3(n-1)^2}{(n-2)(n-3)} \tag{3.21}$$

$$JB = \frac{n}{6}\left(S^2 + \frac{K^2}{4}\right) \tag{3.35}$$

$$\rho_s = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \tag{5.4}$$

$$k\text{-Order Autocorrelation} = \frac{E\left[\left(R_t-\mu\right)\left(R_{t-k}-\mu\right)\right]}{\sigma_t\sigma_{t-k}} \tag{5.6}$$

$$\rho_{t,t-k} = \left(\rho_{t,t-1}\right)^k \tag{5.8}$$

$$DW = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2} \tag{5.9}$$

$$R_{fcoll} = \ln(1+R) + R_f \tag{5.13}$$

$$R_{pcoll} = \left[l \times \ln(1+R) \right] + R_f \tag{5.14}$$

$$M^2 = R_f + \frac{\sigma_m}{\sigma_p}\left(E\left[R_p - R_f \right] \right) \tag{5.23}$$

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\frac{s_1^2 + s_2^2}{n-1}}} \tag{7.2}$$

$$\text{Prob}[\text{TC} \mid \text{NR}] = \frac{\text{Prob}[\text{NR} \mid \text{TC}] \times \text{Prob}[\text{TC}]}{\text{Prob}[\text{NR} \mid \text{TC}] \times \text{Prob}[\text{TC}] + \text{Prob}[\text{NR} \mid \text{TN}] \times \text{Prob}[\text{TN}]} \tag{7.3}$$

$$EMA_t(\lambda) = \lambda P_{t-1} + \lambda(1-\lambda) P_{t-2} + \lambda(1-\lambda)^2 P_{t-3} + \lambda(1-\lambda)^3 P_{t-4} + \ldots \tag{13.3a}$$

$$\text{Variance Swap Payoff} = \frac{\text{Vega Notional Value} \times (\text{Realized Variance} - \text{Strike Variance})}{2 \times \sqrt{\text{Strike Variance}}} \tag{15.3}$$

$$\text{Total accruals} = \Delta\text{CA} - \Delta\text{CL} - \Delta\text{Cash} + \Delta\text{STDEBT} - \text{D\&A} \tag{16.1}$$

$$B(0,1) = \lambda \times \frac{K \times R}{(1+r)} + (1-\lambda) \times \frac{K}{(1+r)} = \frac{K}{(1+r)}\left(R \times \lambda + (1-\lambda) \right) \tag{23.15}$$

$$\sigma_{fund} = \text{Leverage} \times \sqrt{\sigma_{strat}^2 + \sigma_{or}^2 + 2\rho_{strat,or}\sigma_{strat}\sigma_{or}} \tag{27.3}$$

$$R_{it} - R_f = a_i + \left[b_{i,u} + \left(D_1 \times b_{i,diff} \right) \right] \times \left(R_{mt} - R_f \right) + e_{it} \tag{29.3}$$

$$\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + w_3^2\sigma_3^2 + 2w_1w_2\sigma_{12} + 2w_1w_3\sigma_{13} + 2w_2w_3\sigma_{23} \tag{30.3}$$

$$MC_1 = w_1 \times \frac{\Delta\sigma_p}{\Delta w_1} = w_1 \times \left(\frac{w_1\sigma_1^2 + w_2\sigma_{12}}{\sigma_p} \right) \tag{30.8a}$$

$$MC_2 = w_2 \times \frac{\Delta\sigma_p}{\Delta w_2} = w_2 \times \left(\frac{w_2\sigma_2^2 + w_1\sigma_{12}}{\sigma_p} \right) \tag{30.8b}$$

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 this 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** the CFA Institute Standard I to find the correct answer. Correct Answer: C

Term	Definition	Question Example	Example of Term Use
Compare	Describe similarities and differences	Which of the following least accurately compares the Sharpe and Treynor ratios? A. Both ratios contain excess return in the numerator. B. Both ratios express a measure of return per unit of some measure of risk. C. The Sharpe ratio is based on total risk while the Treynor ratio is based on systematic risk. D. The Sharpe ratio is the inverse of the Treynor ratio.	You have to **compare** the three approaches 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 the constant payment mortgage with the 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 time period 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
Contrast	Expound on the differences	Which of the following best characterizes a difference between Value at Risk (VaR) and Modified Value at Risk? 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 an idea or characterize	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
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.

Term	Definition	Question Example	Example of Term Use
Distinguish	Separate using differences	Which of the following best distinguishes between the covariance and the correlation coefficient? A. The covariance indicates the extent to which two assets move together or apart. B. The correlation coefficient is the expected product of the deviations of two variables. C. The covariance is the square root of the correlation coefficient. D. The correlation coefficient is scaled and bounded between +1 and -1.	You have to **distinguish** between risk measurement approaches based on their assumptions regarding the distribution of returns. Correct Answer: D
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

Term	Definition	Question Example	Example of Term Use
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%. If you invest in a 2-year CD, the bank will pay you 6% interest. You should choose the: A. 30-day CD, no matter what you expect interest rates to do in the future. B. 2-year CD, no matter what you expect interest rates to do in the future. C. 30-day CD if you expect that interest rates will fall in the future. D. 2-year CD if you expect that interest rates will fall in the future.	You have to **interpret** the features of an investment scenario. Correct Answer: D
List	Create a series of items	List the determinants of real interest rates.	You have to differentiate from a **list** those items that are consistent with the question.
State	Set forth in words or declare	State the main risks faced by distressed securities investors.	You have to present a list or set of sentences that **states** main ideas.
Understand	Perceive and comprehend nature and significance; grasp meaning	Which of the following would increase the net asset value of a mutual fund share, assuming all other things remain unchanged? A. An increase in the number of fund shares outstanding B. An increase in the fund's accounts payable C. A change in the fund's management D. An increase in the value of one of the fund's stocks	You have to use reasoning to illustrate an **under-standing** of a specific issue. Correct Answer: D

CAIA Editorial Staff
Hossein Kazemi, Ph.D., CFA, Program Director
Keith Black, Ph.D., CAIA, CFA, Associate Director of Curriculum
Don Chambers, Ph.D., CAIA, Associate Director of Curriculum
Jeanne Miller, Associate Director, Curriculum Project Manager
Kathy Champagne, Associate Director of Exam Administration
Andrew Tetreault, Program Assistant