

# CAIA® Level I Study Guide

Learning  
objectives and  
keywords to  
facilitate your  
exam study



September 2022

# CAIA Level I Study Guide

## September 2022 Exam

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## Introduction to the CAIA Charter Program

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

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

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

### Level I of the CAIA Charter Program

Welcome to Level I of the CAIA® Charter program. The Level I curriculum builds a critical foundation by introducing candidates to alternative investments at the asset class and industry level. Candidates are first provided an overview of the alternative investments industry, including quantitative methods, followed by readings on the four institutional alternative investment industries: real assets, private securities, hedge funds, and structured products.

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

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

## 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 curriculum are:

*Standards of Practice Handbook*, 11<sup>th</sup> edition, CFA Institute, 2014. ISBN 978-0-938367-85-7.  
*CAIA Level I, 2022 Curriculum*

### Learning Objectives (LOs) and Keywords

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

**Learning objective in bold**

*Including:*

- Supporting concept for the learning objective

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

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

### Preparation Time

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

### Examination Format

The Level I examination, administered twice annually, is a four-hour computer-administered examination that is offered at test centers throughout the world. The Level I examination is composed of 200 multiple-choice questions, fewer than 30% of which will require calculations. For more information, visit the CAIA website at [www.caia.org](http://www.caia.org).

## Level I Examination Topic Weights

Level I Topic	Approximate Exam Weight
Professional Standards and Ethics	15% - 25%
Introduction to Alternative Investments	20% - 28%
Real Assets	11% - 17%
Private Securities	12% - 20%
Hedge Funds	11% - 17%
Structured Products	10% - 14%

Occasionally, errors in the readings and learning objectives are brought to our attention. If an error is considered material to a candidate's understanding of the reading or learning objective, we will post the erratum on the Curriculum and Study Materials page of the CAIA website: <https://caia.org/content/curriculum-study-tools>. We will also simultaneously post the same erratum (if applicable) to the online version of the curriculum. It is the responsibility of the candidate to review all errata prior to taking the examination. Please report suspected errata to [curriculum@caia.org](mailto:curriculum@caia.org).

## Calculator Policy

You will need to bring a calculator for the Level 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 any other electronic devices will be allowed in the testing center, and calculators will not be provided at the test center.**

## The Level II Examination and Completion of the Program

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

## CAIA Level I Outline

### Topic 1: Professional Standards and Ethics

*Standards of Practice Handbook*, 11<sup>th</sup> Edition, CFA Institute, 2014.

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

### Topic 2: Introduction to Alternative Investments

- Reading 2.1: What is an Alternative Investment?
- Reading 2.2: The Environment of Alternative Investment
- Reading 2.3: Quantitative Foundations
- Reading 2.4: Statistical Foundations
- Reading 2.5: Foundations of Financial Economics
- Reading 2.6: Derivatives and Risk-Neutral Valuation
- Reading 2.7: Measures of Risk and Performance
- Reading 2.8: Alpha, Beta, and Hypothesis Testing

### Topic 3: Real Assets

- Reading 3.1: Natural Resources and Land
- Reading 3.2: Commodities
- Reading 3.3: Other Real Assets
- Reading 3.4: Real Estate and Debt
- Reading 3.5: Real Estate Equity

### Topic 4: Private Securities

- Reading 4.1: Private Equity Assets
- Reading 4.2: Private Equity Funds
- Reading 4.3: Private Equity Funds of Funds
- Reading 4.4: Evolution of Investing in Private Equity
- Reading 4.5 Private Credit and Distressed Debt

## **Topic 5: Hedge Funds**

Reading 5.1: Structure of Hedge Funds  
Reading 5.2: Macro and Managed Future Funds  
Reading 5.3: Event-Driven and Relative Value Hedge Funds  
Reading 5.4: Equity Hedge Funds  
Reading 5.5: Funds of Hedge Funds

## **Topic 6: Structured Products**

Reading 6.1: Introduction to Structuring  
Reading 6.2: Credit Risk and Credit Derivatives  
Reading 6.3: CDO Structuring of Credit Risk  
Reading 6.4: Equity-Linked Structured Products

## Topic 1: Professional Standards & Ethics

### Readings

*Standards of Practice Handbook*, 11<sup>th</sup> Edition, CFA Institute, 2014.

### Learning Objectives

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

*Including:*

- 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.

*Including:*

- 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.

*Including:*

- 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.

*Including:*

- 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.

*Including:*

- 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.**

*Including:*

- 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, priority of transactions, and referral fees

## Topic 2: Introduction to Alternative Investments

### Reading 2.1

#### What Is an Alternative Investment?

##### Keywords:

absolute return products	institutional factors
absolute return standard	institutional-quality investment
active management	investment
active return	land
active risk	lumpy assets
alternative investments	mezzanine debt
benchmark	moral hazard
benchmark return	operationally focused real assets
commodities	passive investing
compensation structure	private equity
distressed debt	pure arbitrage
diversifier	real assets
efficiency	real estate
farmland	regulatory factors
financial asset	relative return standard
hedge fund	return diversifier
illiquidity	return enhancer
incomplete markets	structured products
inefficiency	structuring
information asymmetries	timberland
infrastructure investments	trading strategies
innovation	traditional investments

### Learning Objectives

#### 2.1.1 Demonstrate knowledge of the view of alternative investments by exclusion.

*Including:*

- Recognize characteristics of institutional quality investments.

#### 2.1.2 Demonstrate knowledge of various alternative investment types.

*Including:*

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

**2.1.3 Demonstrate knowledge of the defining characteristics of alternative investments.**

*Including:*

- Recognize that the lines between traditional and alternative investments are not distinct and universal
- Understand which categories of investments are generally qualified as traditional, generally qualified as alternative, and which can be placed under both

**2.1.4 Demonstrate knowledge of the history of alternative investments in the United States.**

*Including:*

- Understand how assets typically held by institutional investors have transformed over time

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

*Including:*

- 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 transaction costs
- Recognize normal and non-normal distributions and the structures that cause non-normality of returns

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

*Including:*

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

**2.1.7 Demonstrate knowledge of other characteristics that distinguish alternative investments from traditional investments.**

*Including:*

- Describe regulatory factors and their role in alternative investments
- Define how cash flow claims can be partitioned
- Describe trading strategies and how they determine the investments' characteristics
- Describe compensation structures within alternative investments and their implications
- Recognize institutional factors and their implications in trading
- Define information asymmetries and their issues within financial analysis and portfolio management
- Explain incomplete markets and their challenges
- Explain the influences of innovation on alternative investments

**2.1.8 Demonstrate knowledge of the goals of alternative investing.**

*Including:*

- Define active management and contrast active management to passive investing
- Recognize the role of benchmarks in managing investments
- Define active risk and active return
- Describe the absolute and relative standards for evaluating returns
- Describe the concept of arbitrage and contrast pure arbitrage with arbitrage as an active absolute return strategy
- Understand the distinction between the goal of return enhancement and return diversification in an investment program

**2.1.9 Demonstrate knowledge of the two pillars of alternative investment management**

*Including:*

- Understand how empirical analysis is used to determine which new types of assets to include in a portfolio
- Understand how economic reasoning is used to determine which new types of assets to include in a portfolio
- Describe how alternative investment categories can be placed within a 2X2 framework

**Reading 2.2**

## The Environment of Alternative Investments

**Keywords**

40 Act funds	market orders
adverse selection	market takers
back-office operations	master limited partnerships (MLPs)
bid-ask spread	master trust
bought in	master-feeder funds
buy side	middle office operations
closed-end mutual fund	mutual funds
commercial bank	partnership agreement
consulting conflicts of interest	passive investments
corporation	plan sponsor
custodians	primary market
depositories	prime broker
Depository Trust Company (DTC)	private limited partnerships
dividend irrelevancy	private-placement memoranda
endowment	probity
family office	progressive taxation
feeder fund	proprietary trading
financial data providers	qualified majority
financial platforms	rebate
financial software	secondary market
foundation	Section 1256 contracts
fourth markets	securitization
front office operations	sell side
fund administrator	separately managed accounts
general collateral stocks	short selling
hedge fund infrastructure	short squeeze
hedge fund replication	sovereign wealth funds
investment bank	special purpose entity (SPE)
large dealer banks	special purpose vehicle (SPV)
limit orders	special stock
limited liability	street name
limited liability company (LLC)	subscription agreement
limited partner advisory committee (LPAC)	substitute dividends
limited partnership agreement (LPA)	systemic risk
liquid alternatives	third markets
management company operating agreement	universal banking
market making	

## Learning Objectives

### 2.2.1 Demonstrate knowledge of the participants in the alternative investing environment.

*Including:*

- Identify buy-side participants (e.g., plan sponsors and foundations) and describe their roles in the alternative investing environment
- Identify sell-side participants (e.g., large dealer banks and brokers) and describe their roles in the alternative investing environment
- Identify outside service providers (e.g., prime brokers and accountants) and describe their roles in the alternative investing environment

### 2.2.2 Demonstrate knowledge of the legal structures in alternative investing.

*Including:*

- Describe the role of limited liability in passive investments
- Explain the role of entities (i.e., limited liability companies, corporations), and their purposes in alternative investing
- Describe limited partnership structures
- Identify bankruptcy remote entities (e.g., special purpose vehicles, special purpose entities), and explain their differences
- Recognize the structures of various entities (e.g., master-feeder funds, master trusts) that facilitate investor taxation differences

### 2.2.3 Demonstrate knowledge of the key features of fund structures.

*Including:*

- Recognize the four key documents (i.e., private-placement memoranda, partnership agreement, subscription agreement, management company operating agreement) used in establishing and maintaining a hedge fund, private equity fund, or other private partnerships
- Explain the importance and components of a limited partners agreement
- Identify and explain moral hazard and adverse selection
- Describe corporate governance in private funds
- Recognize components of investments objectives, fund size, and fund terms within an LPA
- Explain the role of management fees and expenses in how investments are managed
- Identify and explain global regulations (e.g., MiFID, MiFID II, AIFMD)
- Recognize global fund structures (e.g., FIFs, SICAV, SICAF, ICAV)

### 2.2.4 Demonstrate knowledge of the financial markets involved in alternative investments.

*Including:*

- 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

### 2.2.5 Demonstrate knowledge of the regulatory environment of alternative investments.

*Including:*

- Identify the five primary forms of hedge fund regulation

### 2.2.6 Demonstrate knowledge of liquid alternative investments.

*Including:*

- Define liquid alternative investments
- Recognize the spectrum of liquid alternative products and the five distinct types of alternative investments
- Describe the factors driving the growth of liquid alternative investments

- Recognize the regulatory constraints that affect liquid alternative investments
- Recognize the main factors that contribute to the differences between the returns of private placement vehicles and those of alternative investments

**2.2.7 Demonstrate knowledge of taxation of investments.**

*Including:*

- 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)
- Recognize how variations in income tax conventions around the world affect investments and investment decisions

**2.2.8 Demonstrate knowledge of short-selling processes and mechanics.**

*Including:*

- Identify and explain the mechanics of institutional short selling
- Identify and explain the mechanics of short-selling to the short-seller
- Identify special situations involving short selling

**Session 2.3****Quantitative Foundations****Keywords**

accounting convention of conservatism	lifetime IRR
aggregation of IRRs	log return
borrowing type cash flow pattern	management fee offsets
carried interest	management fees
catch-up provision	modified IRR
catch-up rate	multiple sign change cash flow pattern
clawback	notional principal
compensation scheme	partially collateralized
complex cash flow pattern	performance-based fee
continuous compounding	preferred return
deal-by-deal carried interest	Public Market Equivalent (PME) Method
discrete compounding	reinvestment rate assumption
distribution to paid-in (DPI) ratio	residual value to paid-in (RVPI) ratio
dollar-weighted returns	return computation interval
Financial Accounting Standard (FAS) 157	return on notional principal
fully collateralized	scale differences
fund-as-a-whole carried interest	simple interest
hard hurdle rate	since-inception IRR
hurdle rate	soft hurdle rate
incentive fee	time-weighted returns
interim IRR	total value to paid-in (TVPI) ratio
internal rate of return (IRR)	vesting
J-curve	waterfall

**Learning Objectives****2.3.1 Demonstrate knowledge of return and rate mathematics.***Including:*

- Distinguish simple from compound interest and discrete from continuous compounding
- Define and calculate logarithmic returns
- Understand the concept of return computation interval
- Aggregate returns over different time intervals
- Define and apply both arithmetic mean log returns and geometric mean returns

**2.3.2 Demonstrate knowledge of returns based on notional principal.***Including:*

- Understand the challenge of calculating returns on positions with zero value
- Define and apply the concepts of notional principal and full collateralization for forward contracts
- Calculate the log return on a fully collateralized derivatives position
- Calculate the log return on a partially collateralized derivatives position

**2.3.3 Demonstrate knowledge of the internal rate of return (IRR) approach to alternative investment analysis***Including:*

- Define and calculate the IRR



- Contrast the different IRR measurement intervals
- Define and calculate three types of IRRs based on the time periods for which cash flows are available (i.e., lifetime, interim, and since inception)

**2.3.4 Demonstrate knowledge of the problems associated with the internal rate of return (IRR).**

*Including:*

- Recognize complex cash flow patterns and discuss their effect on the computation and interpretation of IRRs
- Explain challenges of comparing investments based on IRRs
- Discuss the difficulties of aggregating IRRs
- Recognize the relationship between IRR and the reinvestment rate assumption
- Define and apply the modified internal rate of return approach
- Identify advantages and disadvantages of modified internal rate of return
- Compare and calculate time-weighted and dollar-weighted returns

**2.3.5 Demonstrate knowledge of other performance measures associated with illiquid investments.**

*Including:*

- Recognize and define three ratios that can be used as performance measures
- Explain the Public Market Equivalent (PME) method

**2.3.6 Demonstrate knowledge of illiquidity, accounting conservatism, IRR, and the J-Curve as they relate to the valuation of alternative investments.**

*Including:*

- Identify how accounting conservatism relates to early fund losses
- Identify the implication of accounting conservatism on deferred recognition of gains
- Recognize and interpret the J-Curve

**2.3.7 Demonstrate knowledge of the distribution of cash waterfall.**

*Including:*

- 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
- Discuss and calculate fund-as-a-whole carried interest and deal-by-deal carried interest
- Define and apply clawback provisions
- 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 optionlike nature

**Reading 2.4****Statistical Foundations****Keywords**

ARCH	kurtosis
autocorrelation	leptokurtosis
autoregressive	lognormal distribution
beta	mean
central limit theorem	mesokurtosis
conditionally heteroskedastic	normal distribution
correlation coefficient	partial autocorrelation coefficient
covariance	perfect linear negative correlation
ex ante returns	perfect linear positive correlation
ex post returns	platykurtosis
excess kurtosis	skewness
first-order autocorrelation	Spearman rank correlation
GARCH	standard deviation
heteroskedasticity	variance
homoskedasticity	volatility
Jarque-Bera test	

**Learning Objectives****2.4.1 Demonstrate knowledge of the characteristics of return distributions.***Including:*

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

**2.4.2 Demonstrate knowledge of moments of return distributions (i.e., mean, variance, skewness, and kurtosis).***Including:*

- 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
- Describe the characteristics of platykurtic, mesokurtic, and leptokurtic distributions

**2.4.3 Demonstrate knowledge of various measures of correlation of returns.***Including:*

- Recognize the importance of correlation in alternative investment portfolio management
- Define and calculate covariance
- Define and calculate correlation coefficient
- Define and calculate the Spearman rank correlation coefficient
- Discuss the role of correlation in portfolio diversification
- Define and calculate beta in the context of the CAPM
- Define and calculate autocorrelation
- Define and calculate higher-order autocorrelation and partial autocorrelation
- Define and apply the Durbin-Watson test

**2.4.4 Demonstrate knowledge of standard deviation (volatility) and variance.**

*Including:*

- Define and explain standard deviation (volatility)
- Describe the properties of variance and standard deviation
- Calculate variance and standard deviation

**2.4.5 Demonstrate knowledge of methods used to test for normality of distributions.**

*Including:*

- Recognize the three main reasons for non-normality observed in alternative investment returns (i.e., autocorrelation, illiquidity, and nonlinearity) and discuss the effect of each on returns
- Discuss tests for normality that use sample moments
- Recognize and apply the Jarque-Bera test

**2.4.6 Demonstrate knowledge of time-series return volatility models.**

*Including:*

- Define the concepts of heteroskedasticity and homoskedasticity
- 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

**Reading 2.5****Foundations of Financial Economics****Keywords**

absolute pricing model	liquidity preference theory
anticipated inflation rate	market portfolio
arbitrage	market segmentation theory
arbitrage-free model	market weight
asset pricing model	modified Fisher equation
binomial tree	nominal interest rate
capital asset pricing model (CAPM)	real interest rate
cash market	recombining binomial tree
duration	relative pricing model
duration of a fixed coupon bond	risk-neutral model
ex ante models	semistrong form informational market efficiency
ex post model	single-factor asset pricing model
excess return	spot market
Fisher effect or Fisher equation	strong form informational market efficiency
idiosyncratic return	systematic return
idiosyncratic risk	systematic risk
implied forward rate	term structure of implied forward rates
inflation	term structure of interest rates
informational market efficiency	unbiased expectations theory
interest rate immunization	weak form informational market efficiency
key externality of arbitrage activities	yield to maturity

**Learning Objectives****2.5.1 Demonstrate knowledge of the concept of informational market efficiency.***Including:*

- Define informational market efficiency
- Recognize various forms of informational market efficiency, including efficient inefficiency
- Identify factors driving informational market efficiency
- Discuss the factors influencing informational efficiency in alternative asset markets

**2.5.2 Demonstrate knowledge of the time value of money, prices, and rates.***Including:*

- Understand zero-coupon bonds and its present value function
- Define and calculate interest rates from zero coupon bond prices
- Determine and calculate short-term interest rates using the Fisher equation
- Estimate the term structure of interest rates with zero-coupon bonds
- Understand how the bond pricing formula is used to calculate bond yields
- Estimate (i.e., bootstrap) the term structure of interest rates with coupon bonds

**2.5.3 Demonstrate knowledge of the three primary theories of the term structure of interest rates.***Including:*

- Define the unbiased expectations theory
- Define the liquidity preference theory
- Define the market segmentation theory
- Understand the managerial implications of the three term structure theories

**2.5.4 Demonstrate knowledge of forward interest rates.***Including:*

- Define and apply implied forward rates using incremental cash flows
- Calculate implied forward rates with annual and continuous compounding
- Explain the term structure of implied forward rates

**2.5.5 Demonstrate knowledge of arbitrage-free financial models.***Including:*

- Describe arbitrage-free models
- Discuss applications of arbitrage-free models
- Describe arbitrage-free pricing in spot markets
- Describe hedged and unhedged carry trades

**2.5.6 Demonstrate knowledge of binomial tree models.***Including:*

- Understand and explain the mechanics of binomial trees
- Explain the differences between a binomial tree and a recombining binomial tree
- Show how a simplified binomial tree can use stock prices to model the value of a call option
- Explain risk-neutral models and when they are appropriate to employ
- Identify the advantages of binomial tree models

**2.5.7 Demonstrate knowledge of single factor default-free bond models.***Including:*

- Define traditional duration
- Interpret duration in the case of a fixed coupon bond
- Interpret and apply the duration for a bond portfolio
- Describe how the duration of a long-only bond portfolio can be used to manage interest rate risk
- Identify challenges and solutions for using duration when cash flows are stochastic
- Explain duration as it relates to the longevity of a zero-coupon bond
- Discuss and apply hedging or immunizing a long-short portfolio with duration through time
- Explain extensions to traditional duration

**2.5.8 Demonstrate knowledge of single factor equity pricing models.***Including:*

- Define an asset pricing model
- Interpret and apply a single-factor asset pricing model (e.g., the capital asset pricing model (CAPM))
- Describe ex ante forms of the CAPM and their implications
- Describe ex post forms of the CAPM and their applications

**Reading 2.6****Derivatives and Risk-Neutral Valuation****Keywords**

bear spread	marked-to-market
Black-Scholes call option formula	naked option
bull spread	omega
carrying cost	omicron
convenience yield	open interest
cost of carry	option collar
cost-of-carry model	option combination
covered call	option spread
crisis at maturity	option straddle
distant contracts	option strangle
elasticity	protective put
financed positions	put-call parity
forward contract	ratio spreads
forward rate agreement (FRA)	reference rate
front month contract	rho
initial margin	risk reversal
lambda	rolling contracts
maintenance margin requirement	storage costs
margin call	swap
marginal market participant	

**Learning Objectives****2.6.1 Demonstrate knowledge of foundations of forward contracts.***Including:*

- Describe the settlement and delivery processes of forward contracts
- Understand the no-arbitrage approach to determining forward prices
- Determine the forward contract price of a zero-coupon default-free bond
- Analyze forward prices and expected spot prices under risk neutrality
- Understand forward prices and expected bond rates under different term structure theories

**2.6.2 Demonstrate knowledge of the impacts of forward contracts on rates.***Including:*

- Describe the forward rate agreement (FRA) process
- Understand and apply the relationship between FRAs and implied forward interest rates
- Explain forward rates and their extensions

### 2.6.3 Demonstrate knowledge of the impacts of forward contracts on equities.

*Including:*

- Understand the concept of a forward contract price of a stock that pays no dividends
- Calculate the no-arbitrage forward price of a stock
- Discuss riskless interest rates and their relationship with risk neutrality in forward prices
- Discuss the forward prices of financial assets given the riskless interest rate
- Determine the forward contract price of a stock with dividends
- Understand how forward curves for stocks can be derived under four distinct cases (no dividends and no financing costs, dividend rates equal to financing costs, dividend rates less than financing costs, and dividend rates exceeding financing costs)

### 2.6.4 Demonstrate knowledge of the impact of forward contracts on assets with benefits and costs of carry.

*Including:*

- Discuss the benefits and costs of carrying (i.e., holding) a cash position and the incorporation of convenience yields and storage costs in cost of carry models
- Calculate the forward price of a commodity
- Identify and discuss four factors that differentiate forward pricing on financial assets with those of physical assets
- Understand challenges involving measuring storage costs and convenience yields
- Discuss the difficulties of short-selling physical assets and the resulting implication to the formula for forward prices
- Calculate forward contracts with non-zero market value

### 2.6.5 Demonstrate knowledge of forward and futures contracts.

*Including:*

- Describe the trading differences between forward and futures contracts
- Describe and apply the marking-to-market process for futures positions
- Discuss the effect of marking-to-market on counterparty risk
- Recognize the effect of marking-to-market and the time value of money on risk and on prices
- Define and calculate initial margin for futures positions
- Define and calculate maintenance margin for futures positions

### 2.6.6 Demonstrate knowledge of managing long-term futures exposures.

*Including:*

- Discuss futures contracts with different settlement dates
- Understand how rollover decisions alter long-run returns

### 2.6.7 Demonstrate knowledge of option exposures.

*Including:*

- Understand option risk exposure diagrams
- Recognize the key characteristics of long and short positions in an underlying asset
- Recognize the key characteristics of call and put exposures
- Recognize the key characteristics of protective put exposures
- Discuss characteristics of option spreads (e.g., bull spreads, bear spreads, and ratio spreads)
- Recognize the key characteristics of option combinations (e.g., straddles, strangles, and the concept of risk reversals)
- Define and apply the concepts of option collars and of put-call parity

**2.6.8 Demonstrate knowledge of option pricing models.**

*Including:*

- Understand the concept of an option on a portfolio
- Recognize and apply the Black-Scholes call-option formula
- Recognize and apply the Black forward option pricing model
- Recognize and apply the currency option pricing model

**2.6.9 Demonstrate knowledge of option sensitivities.**

*Including:*

- Recognize and describe the five most popular option sensitivities (i.e., delta, vega, theta, rho, and gamma)
- Describe option sensitivities such as omicron, lambda, and omega
- Discuss the uses of option sensitivities in risk management



**Reading 2.7****Measures of Risk and Performance****Keywords**

average tracking error	return on VaR (RoVaR)
benchmarking	semistandard deviation
conditional value-at-risk	semivariance
drawdown	semivolatility
information ratio	Sharpe ratio
Jensen's alpha	shortfall risk
M2 approach	Sortino ratio
maximum drawdown	target semistandard deviation
Monte Carlo analysis	target semivariance
parametric VaR	tracking error
peer group	Treynor ratio
performance attribution	value at risk
return attribution	well-diversified portfolio

**Learning Objectives****2.7.1 Demonstrate knowledge of measures of risk.***Including:*

- Define and calculate semivariance and semistandard deviation
- Define and calculate semivolatility
- Describe shortfall risk, target semivariance, and target semistandard deviation
- Define and calculate tracking error
- Describe and calculate drawdown
- Define and interpret value at risk (VaR) and conditional value-at-risk (CVaR)
- Discuss the strengths and weaknesses of VaR

**2.7.2 Demonstrate knowledge of methods for estimating value at risk (VaR).***Including:*

- 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 how the Monte Carlo analysis can be used to estimate VaR
- Discuss and apply 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)

**2.7.3 Demonstrate knowledge of benchmarking and performance attribution.***Including:*

- Define benchmarking
- Identify types of benchmarks
- Discuss performance attribution

**2.7.4 Demonstrate knowledge of ratio-based performance measures used in alternative investment analysis.**

*Including:*

- Describe the two major types of performance measures
- Define and calculate the Sharpe ratio for different units of time (e.g., annual, semiannual, and quarterly)
- Understand four important properties of the Sharpe ratio
- Define and calculate the Treynor ratio
- Understand four important properties of the Treynor ratio
- Recognize and calculate the Sortino ratio, the information ratio, and return on VaR

**2.7.5 Demonstrate knowledge of risk-adjusted performance measures used in alternative investment analysis.**

*Including:*

- Define and calculate Jensen's Alpha
- Define and calculate the  $M^2$  (M-Squared) approach
- Understand average tracking error

**Reading 2.8**

## Alpha, Beta, and Hypothesis Testing

**Keywords**

abnormal return persistence	intercept
alpha	linear risk exposure
alpha driver	misestimated betas
alternative hypothesis	model misspecification
asset gatherers	nonlinear risk-return relation error
backfill bias	null hypothesis
backfilling	omitted (more misidentified) systematic return factors
backtesting	outlier
beta creep	overfitting
beta driver	passive beta driver
beta expansion	process drivers
beta nonstationarity	product innovators
causality	p-value
cherry-picking	regression
churning	residuals
confidence interval	return driver
data dredging	r-squared
data mining	selection bias
dependent variable	self-selection bias
economic significance	significance level
equity risk premium	simple linear regression
equity risk premium puzzle	slope coefficient
ex ante alpha	spurious correlation
ex post alpha	survivorship bias
full market cycle	test statistic
goodness of fit	t-statistic
hypotheses	t-test
independent variable	type I error
	type II error

## Learning Objectives

### 2.8.1 Demonstrate knowledge of beta and alpha.

*Including:*

- 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

### 2.8.2 Demonstrate knowledge of the concepts of ex ante and ex post alpha.

*Including:*

- 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

### 2.8.3 Demonstrate knowledge of single-factor regression models.

*Including:*

- Explain the simple linear regression and single-factor market model
- Explain the use of ordinary least squares to estimate regression parameters
- Describe the problem outliers pose to regression analysis
- Describe the problem autocorrelation poses to regression analysis
- Describe the problem heteroskedasticity poses to regression analysis
- Interpret a regression's goodness of fit
- Understand and apply the statistical significance of regression parameter estimates

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

*Including:*

- Identify the steps involved in estimating ex ante alpha from historical performance
- Discuss how an experiment of a fair casino game can illustrate the challenges to empirical analysis of manager skill

### 2.8.5 Demonstrate knowledge of return attribution.

*Including:*

- Calculate beta, ex ante alpha, and ex post alpha
- Recognize the three primary types of model misspecification (i.e., omitted systematic return factors, misestimated betas, and nonlinear risk-return relationships) and their effects on return attribution
- Describe various types of beta nonstationarity (i.e., beta creep, beta expansion, and market timing) and their effects on return attribution
- Discuss how alpha and beta can become commingled

### 2.8.6 Demonstrate knowledge of ex ante alpha estimation and return persistence.

*Including:*

- Define abnormal return persistence
- Discuss attribution of idiosyncratic returns to luck or skill
- Interpret estimated return persistence

### 2.8.7 Demonstrate knowledge of return drivers.

*Including:*

- Discuss the classification of assets into 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 alpha drivers
- Discuss product innovators and process drivers

**2.8.8 Demonstrate knowledge of statistical methods for locating alpha.**

*Including:*

- Identify the four steps of hypothesis testing (i.e., state the hypothesis, formulate an analysis plan, analyze sample data, and interpret results)
- Discuss the error of accepting a hypothesis
- Recognize the four common problems with using inferential statistics (i.e., misinterpretation of high p-values, failure to distinguish between statistical significance and economic significance, violation of distributional assumptions, and misinterpretation of level of confidence)
- Define and discuss type I and type II errors in hypothesis testing
- Understand erroneous conclusions with statistical testing

**2.8.9 Demonstrate knowledge of sampling and testing problems.**

*Including:*

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

**2.8.10 Demonstrate knowledge of statistical issues in analyzing alpha and beta.**

*Including:*

- Recognize the effect of non-normality on the cross-sectional search for alpha
- Identify the potential effects of outliers on reported results
- Recognize issues involving biased testing in the search for alpha
- Discuss the challenges of spurious correlation and causality in beta estimation
- Recognize three major fallacies of alpha estimation and two major fallacies of beta estimation and the lessons that arise from them

## Topic 3: Real Assets

### Reading 3.1

#### Natural Resources and Land

##### Keywords

agency risk	negative survivorship bias
agronomy	paper lots
binomial option pricing	permanent cropland
blue top lots	perpetual option
cap rate	political risk
contagion	pure play
exchange option	Reduced integration in the forest products industry
favorable mark	risk-neutral probability
finished lots	rotation
intrinsic option value	row cropland
land banking	selective appraisals
low-hanging-fruit principle	smoothing
managed returns	split estate
market manipulation	stale prices
model manipulation	timberland investment management organizations (TIMOs)
natural resources	time value of an option

##### Learning Objectives

#### 3.1.1 Demonstrate knowledge of natural resources other than land.

*Including:*

- Discuss natural resources as an exchange option
- Discuss the concept of moneyness as it pertains to the development of natural resources
- Discuss why some in-the-money development options should not be immediately exercised
- Describe the relationship between the moneyness of natural resource options and short-term financial risks

#### 3.1.2 Demonstrate knowledge of land as an alternative asset.

*Including:*

- Define land banking
- Describe the three types of land lots (i.e., paper lots, blue top lots, and finished lots)
- Discuss investment in undeveloped land as a call option
- Apply the binomial option pricing technique for valuing land as a call option
- Describe the risks and returns of investing in land
- Calculate the expected return of land investments

**3.1.3 Demonstrate knowledge of timber and timberland as alternative assets.**

*Including:*

- Discuss the characteristics of timber and timberland
- Discuss the role of timberland investment management organizations (TIMOs)
- Describe the risks and returns of timberland investments
- Identify methods of gaining exposure to timberland
- Explain benefits and disadvantages of timber investment

**3.1.4 Demonstrate knowledge of farmland as an alternative asset.**

*Including:*

- Discuss the characteristics of farmland investments
- Calculate the value of farmland based on annual operating income and the cap rate
- Understand the structure of farmland ownership and management
- Discuss supply and demand factors of agricultural products
- Identify three key benefits and three key disadvantages of farmland investment
- Identify methods of obtaining exposure to farmland
- Discuss the value and importance of assets with multiple purposes

**3.1.5 Demonstrate knowledge of valuation and volatility of real assets.**

*Including:*

- Discuss the smoothing of prices and returns
- Determine the effect of smoothing on observed volatility
- Identify the primary ways that returns can be managed
- Discuss how appraisals contribute to smoothing of real asset prices
- Compare smoothed returns with market returns

**3.1.6 Demonstrate knowledge of pricing and historic data analysis.**

*Including:*

- Interpret models of stale prices
- Describe and calculate the effect of stale pricing on historic mean returns
- Describe and calculate the effect of stale pricing on volatility

**3.1.7 Demonstrate knowledge of contagion, price indices, and biases in real estate values.**

*Including:*

- Discuss the reliability of market prices versus appraisal-based data
- Define contagion

**3.1.8 Demonstrate knowledge of observations regarding historical returns of timberland.**

*Including:*

- Summarize the key observations on historical timber returns that are consistent with economic reasoning

**3.1.9 Demonstrate knowledge of observations regarding historical returns of farmland.**

*Including:*

- Summarize the key observations on farmland returns that are consistent with economic reasoning

## Reading 3.2

### Commodities

#### Keywords

backwardation	investable index
basis	nominal price
basis risk	normal backwardation
Bloomberg Commodity Index (BCOM)	normal contango
calendar spread	perfectly elastic supply
collateral yield	production-weighted index
commodity-linked note	real price
contango	roll return
excess return of a futures contract	roll yield
fully collateralized position	spoilage cost
heterogeneous	spot return
Hotelling's theory	Standard & Poor's GSCI (S&P GSCI)
humped curve	stock-out
inelastic demand	Thomson Reuters Core Commodity Research Bureau (CRB) Index
inelastic supply	volatility asymmetry
inflation risk	Working curve
inventory shrinkage	

#### Learning Objectives

##### 3.2.1 Demonstrate knowledge of investing in commodities without futures.

*Including:*

- Discuss disadvantages of direct investment in physical commodities
- Define and interpret Hotelling's theory
- Explain Julian Simon's argument related to direct commodity returns
- Understand the idiosyncratic risks and two-betas of commodity-related equity returns
- Recognize investments in commodities through exchange-traded funds (ETFs)
- Discuss advantages and disadvantages of commodity-linked notes (CLNs)
- Apply option valuation methods to price commodity-linked notes

##### 3.2.2 Demonstrate knowledge of the term structure of forward prices on commodities.

*Including:*

- Understand and calculate the costs of carry for commodities
- Define supply elasticity and how it relates to harvests and shifts in demand
- Define backwardation and contango with respect to the term structure of forward prices
- Explain backwardation and contango in relation to cost of carry in a perfect market
- Explain backwardation and contango in relation to cost of carry in an imperfect market
- Discuss the basis of forward and futures contracts
- Interpret calendar spreads on forward contracts
- Calculate the return on calendar spreads
- Discuss the risks of a calendar spread



**3.2.3 Demonstrate knowledge of rolling of forward and futures contracts.**

*Including:*

- Discuss why returns on a futures contract can differ from the spot return
- Understand the components of future returns and how they are calculated
- Understand differing interpretations of rolling contracts
- Explain roll yield and how it relates to the slope of a forward curve
- Explain roll yield, carrying costs, and the basis in the context of alpha
- Discuss how the strategy of rolling contracts affects return expectations
- Interpret the impact of rolling contracts on alpha
- Discuss three propositions regarding roll return

**3.2.4 Demonstrate knowledge of normal backwardation and normal contango.**

*Including:*

- Explain normal backwardation
- Explain normal contango
- Interpret normal backwardation and normal contango with respect to the risks and returns of commodities and forward contracts on commodities
- Discuss John Maynard Keynes' argument of normal backwardation
- Discuss commodity forward curves and how they relate to storage costs and inventory variation
- Define the market segmentation hypothesis and how it applies to commodity forward prices
- Interpret option-based models of the forward curve for commodities

**3.2.5 Demonstrate knowledge of commodity exposure and diversification.**

*Including:*

- Discuss four reasons why commodity returns may have low correlation with stock and bond prices
- Discuss commodities as diversifiers in a perfect market equilibrium
- Discuss commodities as diversifiers in the presence of market imperfections
- Discuss commodities as diversifiers against unexpected inflation

**3.2.6 Demonstrate knowledge of expected returns on commodities.**

*Including:*

- Interpret empirical evidence on long-run commodity price changes
- Interpret theoretical evidence on expected commodity returns
- Discuss irrelevancy of commodity price expectations to returns on futures contracts

**3.2.7 Demonstrate knowledge of commodity indices.**

*Including:*

- Discuss the process of construction of commodity futures indices
- Discuss the characteristics of commodity indices given by S&P GSCI, BCOM, and CRB
- Discuss production-weighted long only commodity indexes
- Discuss market liquidity-weighted long only commodity indexes
- Discuss tier-weighted long only commodity indices

**3.2.8 Demonstrate knowledge of commodity risk attributes.**

*Including:*

- Identify four favorable characteristics of commodities with respect to event risks
- Describe commodities as a defensive investment
- Discuss institutional investing demand and its effect on commodity prices

**3.2.9 Demonstrate knowledge of observations regarding historical returns of commodities.**

*Including:*

- Summarize the key observations on historical commodity returns that are consistent with economic reasoning

**Reading 3.3****Other Real Assets****Keywords**

aesthetic benefit	investable infrastructure
brownfield phase	mature intellectual property
brownfield project	midstream operations
closed-end infrastructure funds	negative costs
critical property of infrastructure	political infrastructure risk
double taxation	privatization
downstream operations	public-private partnership (PPP)
economic infrastructure	regulated pricing
evergreen funds	regulatory risk
excludable good	social infrastructure
gates	unbundled intellectual property
greenfield phase	unrelated business income tax (UBIT)
greenfield project	upstream operations
intangible assets	visual works of art
intellectual property	

**Learning Objectives****3.3.1 Demonstrate knowledge of commodity producers.***Including:*

- Describe how commodity prices drive the performance of an operating company
- Describe the empirical evidence between commodity prices and operating firms
- Discuss the empirical evidence on the correlation between commodity prices and equity prices of commodity-producing firms

**3.3.2 Demonstrate knowledge of liquid alternative real assets.***Including:*

- Describe the structure of master limited partnerships (MLPs) within the MLP sector
- Identify tax characteristics of MLPs
- Discuss valuations and distribution rates of MLPs

**3.3.3 Demonstrate knowledge of infrastructure in the alternative investment space.***Including:*

- Describe seven elements that help identify investable infrastructure
- Contrast economic infrastructure and social infrastructure
- Recognize the role of public-private partnerships in infrastructure investing
- Discuss the risks and government regulation of infrastructure investing
- Identify the stages of infrastructure investing
- Explain infrastructure investment vehicles
- Identify twelve determinants of infrastructure
- Discuss opportunities and allocations infrastructure investments

**3.3.4 Demonstrate knowledge of intellectual property.**

*Including:*

- Identify and discuss characteristics of intellectual property
- Identify six characteristics of real assets and how those relate to intellectual properties
- Understand and apply a simplified model of intellectual property

**3.3.5 Demonstrate knowledge of cash flows of intellectual property.**

*Including:*

- Discuss film production and its distribution revenues as an alternative investment
- Discuss film production and its distribution expenses as an alternative investment
- Discuss film financing in the context of investment
- Explain the profitability of film investment

**3.3.6 Demonstrate knowledge of historical performance data on visual works of art.**

*Including:*

- Discuss the historical performance data of visual works of art

**3.3.7 Demonstrate knowledge of research and development and patents as unbundled intellectual property.**

*Including:*

- Explain the process of accessing research and development via patents
- Discuss the process of patent acquisition and licensing strategies of patents
- Discuss the enforcement of patent law and various litigation strategies
- Identify patent sale license-back strategies
- Identify patent lending strategies
- Analyze patent sales and pooling
- Discuss risks relevant to investing in patents

**Reading 3.4****Real Estate Assets and Debt****Keywords**

amortization	negative amortization
balloon payment	opportunistic real estate
collateralized mortgage obligations (CMOs)	option adjustable-rate mortgage (option ARM)
commercial mortgage loans	pass-through MBS
commercial mortgage-backed securities	prepayment option
commercial real estate properties	primary real estate market
conditional prepayment rate	prime mortgages
core real estate	private real estate
covenants	private real estate equity
cross-collateral provision	private real estate market
debt service coverage ratio	PSA benchmark
equity REITs	public real estate investment
fixed charges ratio	real estate investment trust (REIT)
fixed-rate mortgage	real estate style boxes
fully amortized	recourse
idiosyncratic prepayment factors	refinancing burnout
index rate	residential mortgage loans
interest coverage ratio	residential mortgage-backed securities
interest rate cap	residential real estate
loan-to-value ratio (LTV ratio)	seven challenges to international real estate investing
lumpiness	styles of real estate investing
margin rate	subprime mortgages
mortgage	unscheduled principal payments
mortgage REITs	value-added real estate
mortgage-backed securities (MBS)	variable-rate mortgage

**Learning Objectives****3.4.1 Demonstrate knowledge of categories of real estate.***Including:*

- Discuss equity versus debt
- Understand the challenges of international real estate investments
- Contrast residential and commercial real estate
- Contrast private and public real estate
- Discuss real estate categorization based on market size

**3.4.2 Demonstrate knowledge of advantages, disadvantages, and styles of real estate investments.**

*Including:*

- Discuss five potential advantages of investing in real estate
- Discuss three potential disadvantages of investing in real estate
- Describe styles of real estate investing
- Understand the core real estate style of investment
- Understand the value-added real estate style of investment
- Understand the opportunistic real estate style of investment
- Describe the attributes of differentiating real estate styles
- Discuss the purposes of real estate style analysis

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

*Including:*

- Identify the categorizations of real estate style boxes

**3.4.4 Demonstrate knowledge of residential mortgages.**

*Including:*

- Discuss and calculate payments of fixed-rate mortgages
- Discuss and calculate payments of interest-only mortgages
- Discuss and calculate payments of variable-rate mortgages
- Identify and discuss other variations of mortgages and apply balloon payments to mortgage valuation
- Explain default risk in residential mortgages

**3.4.5 Demonstrate knowledge of commercial mortgages in the context of alternative investments.**

*Including:*

- Describe characteristics of commercial mortgages
- Describe the analysis of default risk of commercial mortgages
- Identify and describe financial ratios employed in the analysis of commercial mortgage default

**3.4.6 Demonstrate knowledge of mortgage-backed securities.**

*Including:*

- Describe types of mortgage-backed securities
- Discuss prepayment options within residential mortgages
- Discuss and apply methods of measuring unscheduled prepayment rates such as conditional prepayment rates (CPRs) and the resulting Public Securities Association (PSA) benchmark
- Describe prepayment factors not associated with changing interest rates
- Describe commercial mortgage-backed securities as compared with residential mortgage-backed securities

**3.4.7 Demonstrate knowledge of liquid alternatives: real estate investment trusts (REITs).**

*Including:*

- Define types of real estate investment trusts (REITs)
- List advantages and disadvantages of REITs as an investment

**3.4.8 Demonstrate knowledge of observations regarding historical returns of mortgage REITs**

*Including:*

- Summarize the key observations on historical mortgage REIT returns that are consistent

**Reading 3.5****Real Estate Equity****Keywords**

after-tax discounting approach	net operating income (NOI)
backward induction	net sale proceeds (NSP)
calculation of the returns to the NPI	open-end real estate mutual funds
closed-end real estate mutual fund	operating expenses
commingled real estate funds	potential gross income
comparable sale prices approach	pre-tax discounting approach
cost approach	private equity real estate funds
decision node	profit approach
decision tree	real estate appraisal
depreciation	real estate development projects
discounted cash flow (DCF) method	real estate joint ventures
effective gross income	real estate valuation
equity residual approach	real option
exchange-traded funds (ETFs)	risk premium approach
fixed expenses	stale appraisal effect
FTSE NAREIT US Real Estate Index Series	stale pricing
gearing	syndications
income approach	transaction-based real estate valuation methods
information node	vacancy loss rate
NCREIF Property Index (NPI)	variable expenses
net lease	

**Learning Objectives****3.5.1 Demonstrate knowledge of real estate development in the context of alternative investments.***Including:*

- Understand the development phase of real estate
- Describe real estate development as a string of real options
- Understand how an abandonment option can be factored into a real estate development project
- Describe how real assets can be modeled using decision trees
- Apply a decision tree and backward induction to value a real estate development project

**3.5.2 Demonstrate knowledge of commercial real estate valuation.***Including:*

- Discuss the importance of commercial real estate equity exposures
- Understand the comparable sale prices approach to valuation
- Identify and discuss the profit and cost approaches to real estate valuation
- Calculate cap rates and apply the perpetuity valuation approach to a real estate project

- 
- Discuss the income approach as a major real estate valuation approach
  - Discuss transaction-based methods to real estate valuation
  - Identify two advantages of appraisal-based models over transaction-based models
  - Identify four disadvantages of appraisal-based models over transaction-based models
  - Describe the NCREIF property index as an appraisal-based index

**3.5.3 Demonstrate knowledge of valuation and risks of real estate equity.**

*Including:*

- Apply the discounted cash flow approach (i.e., income approach) to the calculation of net operating income
- Calculate a real estate project's discount rate using the risk premium approach, and use that rate to value the project
- Understand the role of taxes in estimating both the discount rate and the cash flows of a real estate project

**3.5.4 Demonstrate knowledge of the income method of real estate valuation.**

*Including:*

- Calculate the appraised value of an office building using the income approach

**3.5.5 Demonstrate knowledge of alternative real estate investment vehicles.**

*Including:*

- Identify and describe private equity real estate funds
- Identify and describe commingled real estate funds
- Identify and describe syndications
- Identify and describe joint ventures
- Describe limited partnerships, and apply the concepts of gearing and loan-to-value (LTV) ratios
- 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

**3.5.6 Demonstrate knowledge of equity REIT returns.**

*Including:*

- Contrast private and public REITs
- Discuss possible illiquidity premiums in public REITs
- Define the FTSE NAREIT US Real Estate Index Series

**3.5.7 Demonstrate knowledge of historical risks and returns of equity real estate investment trusts (REITs).**

*Including:*

- Summarize the key observations on historical equity REIT returns that are consistent with economic reasoning



## Topic 4: Private Securities

### Reading 4.1

#### Private Equity Assets

#### Keywords

20-bagger	growth equity redemption value
alpha testing	growth equity securities
angel investing	investment structures
beta testing	IPO
buy-and-build strategy	leveraged buyout (LBO)
buy-in management buyout	management buy-in (MBI)
buyout	management buyout (MBO)
buyout of a private company	merchant banking
buyouts	mezzanine venture capital
buyout-to-buyout deal	milestone
cash burn rate	post-money valuation
change in the prudent person standard	pre-money valuation
compound option	promote
conglomerates	protective provisions in growth equity
convertible preferred stock	prudent person standard
de-SPAC transaction	redemptive rights
direct listing	replacement capital
EBITDA	rescue capital
EBITDA multiples	second or late-stage venture capital
efficiency buyouts	secondary buyout or financial merger
EBITDA multiples	seed capital stage
efficiency buyouts	segmentation
enterprise value	special purpose acquisition corporation (SPAC)
entrepreneurship stimulators	springing board remedy
equity kicker	strategic merger
evolution of the buyout market	three common redemption triggers
exit plan	times revenue method
evolution of the buyout market	tontines
exit plan	turnaround strategy
first stage, start-up stage, and early-stage venture capital	two keys to successful VC investing
forced sale remedy	unicorn
four principal considerations in redemption rights	VC exits
golden parachute	venture capital (VC)
growth equity default remedies	venture capital business plan
growth equity redemption sources	venture capital securities
growth equity redemption sources	winner-take-all market

## Learning Objectives

### 4.1.1 Demonstrate knowledge of the terms and background of private equity.

*Including:*

- Discuss private equity as an asset class and private equity securities
- Understand mezzanine debt
- Understand distressed debt
- Understand leveraged loans

### 4.1.2 Demonstrate knowledge of pre-IPO private equity investing.

*Including:*

- Describe early-stage venture capital opportunities
- Describe growth equity opportunities as later-stage financing
- Describe buyouts
- Contrast venture capital, growth equity, and buyouts

### 4.1.3 Demonstrate knowledge of venture capital.

*Including:*

- Define venture capital opportunities and venture capitalists
- Identify securities and goals used in venture capital
- Discuss the option-like payout of venture capital
- Discuss the history of venture capital
- Explain angel investing and other early stages of venture capital
- Explain first stage, start-up, and other early-stage venture capital
- Explain second and later stages of venture capital
- Interpret the j-curve for private equity projects
- Discuss and apply the valuation of VC companies based on operating income
- Understand the economic rationale for the high discount rates used by venture capitalists
- Differentiate between pre-money valuation and post-money valuation
- Discuss venture capital business plans

### 4.1.4 Demonstrate knowledge of venture capital as a compound option.

*Including:*

- Discuss the role of venture capital as a compound option

### 4.1.5 Demonstrate knowledge of growth equity.

*Including:*

- Define growth equity investments and describe growth equity investments
- Discuss protective provisions as a key deal characteristic in growth equity investment
- Discuss redemption rights as a key deal characteristic in growth equity investment
- Explain and calculate the valuation of growth equity based on revenue

### 4.1.6 Demonstrate knowledge of buyouts and leveraged buyouts.

*Including:*

- Define buyout and identify their different types
- Discuss leveraged buyouts
- Identify types of private equity buyouts and resulting new management team
- Identify rescue capital and replacement capital as private equity strategies

### 4.1.7 Demonstrate knowledge of buyouts of private companies.

*Including:*

- Understand buyout objectives
- Discuss capital structure optimization in buyouts
- Discuss operational efficiency in buyouts

**4.1.8 Demonstrate knowledge of leveraged buyouts (LBOs).**

*Including:*

- Discuss the history of leveraged buyouts
- Discuss three key economic and agency issues of buyouts
- Identify five general categories of LBOs that can create value
- Discuss the benefits and appeal of a leveraged buyout to targets
- Calculate projected valuations of an LBO
- Identify benefits of strong corporate governance principles to the public market

**4.1.9 Demonstrate knowledge of merchant banking.**

*Including:*

- Discuss merchant banking practices

**4.1.10 Demonstrate knowledge of the dynamics of private equity opportunities.**

*Including:*

- Identify implications of winter-take-all markets
- Identify implications of longer time horizons to exits
- Identify three potential reasons for the declining number of public firms in the US
- Discuss competition between private and public ownership structures

**4.1.11 Demonstrate knowledge of exit strategies for private equity and venture capital portfolio company investments**

*Including*

- Describe and compare direct listings, special purpose acquisition corporations (SPACs), and initial public offerings (IPOs) including their advantages and disadvantages
- Describe and compare strategic mergers to financial mergers and secondary buyouts
- Explain how and when shares of a SPAC can be described as a default-free convertible bond

**Session 4.2****Private Equity Funds****Keywords**

auction process	key personnel clause
bad-leaver clause	Long-hold buyout funds
blind pool	NAV J-Curve
business development companies (BDCs)	private equity funds
capital calls	private investments in public equity (PIPE)
cash flow J-curve	publicly traded PE firms
clawback escrow agreement	reinvestment provision
club deal	sourcing investments
co-investment	structured PIPEs
commitment risk	subscription lines of credit (SLOC)
committed capital	toxic PIPE
death spiral	traditional PIPEs
dry powder	undrawn commitment
good-leaver clause	VC fund
hurt money	vintage year
in-kind distributions	

**Learning Objectives****4.2.1 Demonstrate knowledge of private equity (PE) funds.***Including:*

- Define PE funds
- Discuss the organization structure of PE funds
- Define PE firms
- Discuss PE portfolio companies
- Understand PE investment by institutional investors

**4.2.2 Demonstrate knowledge of PE funds as intermediaries.***Including:*

- Discuss PE fund intermediation and risk
- Discuss PE fund intermediation around efficient inefficiencies
- Identify the five primary functions of PE funds
- Describe forms of PE fund intermediation
- Discuss the life cycle and stages of development of a VC fund
- Interpret the fund J-curve
- Understand undrawn capital commitments
- Identify the four substantial risks of PE
- Identify the strategies to mitigate substantial risks in PE

**4.2.3 Demonstrate knowledge of the limited partner (LP) and general partner (GP) relationship cycle in private equity**

*Including:*

- Understand the relationship between LPs and GPs in PE
- Discuss the three phases in LP and GP relationships

**4.2.4 Demonstrate knowledge of subscription lines in private equity.**

*Including:*

- Identify the benefits and risks to general partners and limited partners when subscription lines are used
- Apply IRR methodology to determine the change in reported return when subscription lines are used

**4.2.5 Demonstrate knowledge of PE fund fees and terms.**

*Including:*

- Discuss and calculate PE management fees and carried interest
- Understand clawback provisions in PE
- Calculate carried interest and hurdle rates as part of a PE deal
- Explain perverse incentives that can originate from PE hurdle rates
- Explain the GP's contribution to initial PE fund investment
- Explain the key-person provision as part of the LP partnership clause
- Explain termination and divorce of VC funds
- Identify other covenants in VC funds

**4.2.6 Demonstrate knowledge of key determinations of VC fund risks and returns.**

*Including:*

- Discuss access to VC funds as a key to enhanced returns
- Understand diversification as a key to PE risk reduction
- Discuss risk premiums as providing compensation for three main VC risks

**4.2.7 Demonstrate knowledge of three key distinctions of VC and buyout managers.**

*Including:*

- Explain roles and distinctions of buyout managers in VC

**4.2.8 Demonstrate knowledge of leveraged buyout (LBO) funds.**

*Including:*

- Recognize LBO fund structures
- Interpret total number, size, and implications of buyout fund fees
- Discuss agency relationships and their role in LBO firms
- Understand LBO auction markets
- Understand benefits and concerns of club deals in LBOs
- Discuss three factors driving buyout risks relative to VC risks

**4.2.9 Demonstrate knowledge of liquid alternatives in the private equity sector.**

*Including:*

- Describe business development companies (BDCs)

- Calculate the premium (or discount) of closed-end fund prices
- Recognize the effect of illiquidity on closed-end fund pricing
- Discuss the diversification and return-enhancement potential of liquid private equity pools
- Discuss other liquid investments in private equity

**4.2.10 Demonstrate knowledge of private investments in public equity (PIPEs).**

*Including:*

- Identify characteristics and types of securities issues through PIPEs
- Understand motivations of buyers and sellers in PIPEs
- Contrast traditional and structured PIPEs
- Explain toxic PIPEs

**4.2.11 Demonstrate knowledge of secondary markets and structures within the private equity sector.**

*Including:*

- Discuss the secondary market for PE limited partnership interests
- Discuss fee differences between PE and hedge funds
- Understand governance issues within publicly traded PE firms
- Contrast PE governance structures

**4.2.12 Demonstrate knowledge of long-hold buyout funds**

*Including:*

- Identify the types of funds and assets likely to be held for 15 to 20 years
- List the benefits of long-hold buyout funds that may substantially increase after-tax returns

### **Session 4.3**

#### **Private Equity Funds of Funds**

#### **Keywords**

KS-PME  
primary funds of funds  
private equity funds of funds (PE FOFs)  
secondary fund of funds  
return dispersion

#### **Learning Objectives**

##### **4.3.1 Demonstrate knowledge of funds-of-funds in the private equity sector.**

*Including:*

- Understand fees charged by PE funds of funds
- Discuss the value of information and control in PE funds of funds
- Understand diversification and intermediation of PE funds of funds
- Explain access, selection skills, and expertise for PE funds of funds

##### **4.3.2 Demonstrate knowledge of the process of investing in PE Fund of Funds**

*Including:*

- Recognize the varying investment objectives of PE funds of funds (FoF)
- Compare and contrast PE Fund of Funds and Secondary Fund of Funds
- Describe the process for constructing a portfolio of PE funds

##### **4.3.3 Demonstrate knowledge of investing in PE Fund of Funds**

*Including:*

- List the benefits of investing in PE FoF
- List the disadvantages of investing in PE FoF
- Describe the factors driving the PE FoF market

##### **4.3.4 Demonstrate knowledge of observations regarding historical returns of PE Fund of Funds**

*Including:*

- Summarize the key observations on PE fund of fund returns that are consistent with economic reasoning
- Understand the performance of buyout fund of funds managers against portfolios of direct funds
- Understand the performance of VC fund of funds managers against portfolios of direct funds



## **Session 4.4**

### Evolution of Investing in Private Equity

#### **Keywords:**

annex fund  
bridging  
blind pool equity fund  
lock-step provision  
partnership investing  
promote  
Co-investment  
Three alternative co-investing structures  
top-up fund  
Solo investing

#### **Learning Objectives**

##### **4.4.1 Demonstrate knowledge of the trend of LP preference for direct investment**

*Including:*

- Define and understand the different models of direct investment
- Understand the drivers for direct investment
- Identify the most common type of direct investment

##### **4.4.2 Demonstrate knowledge of co-investment**

*Including:*

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

##### **4.4.3 Demonstrate knowledge of the challenges in co-investing**

*Including:*

- Understand the challenges of co-investing from the LP perspective
- Understand the challenges of co-investing from the GP Perspective

##### **4.4.4 Demonstrate knowledge of observations regarding historical returns of co-investment**

*Including:*

- Interpret evidence on the performance track record of co-investment.
- Identify the specific capabilities that investors must develop to be successful co-investment model.
- How does co-investing impact the private equity “J-Curve”

**Session 4.5****Private Credit and Distressed Debt****Keywords**

absolute priority rule	interval funds
acceleration	leveraged loans
affirmative covenants	loan-to-own investment
blanket subordination	maintenance covenants
blocking position	negative covenants
bridge financing	peer-to-peer lending
Chapter 11 bankruptcy	PIK toggle
Chapter 7 bankruptcy	plan of reorganization
covenant-lite loans	recovery rate
cramdown	sponsored lending
credit spread	springing subordination
debtor-in-possession financing	stretch financing
default rate	syndicated
direct lending	takeout provision
drawdown fund	unitranche
credit loss rate	venture debt
fulcrum security	vulture investors
haircut	warrant
incurrence covenants	weighted average cost of capital
indenture	
intercreditor agreement	

**Learning Objectives****4.5.1 Demonstrate knowledge of types of fund private credit vehicles.***Including:*

- ☐ Define private credit and distressed debt
- ☐ Define interval funds
- ☐ Define drawdown funds
- ☐ Discuss funds with a loan-to-own objective
- ☐ Discuss fulcrum securities and reorganization

**4.5.2 Demonstrate knowledge of fixed income analysis.***Including:*

- Describe the three key differences between bonds and loans
- Discuss implications of floating rates vs. fixed rates on interest rate risk
- Discuss and calculate implications of floating vs. fixed rate duration
- Discuss and calculate implications of compounding conventions on modified duration

**4.5.3 Demonstrate knowledge of credit risk analysis and the bankruptcy process.***Including:*

- Understand credit ratings, yields, and financial ratios
- Interpret credit spreads and credit risk
- Discuss credit risk and its relationship to risk of default
- Discuss covenants on debt
- Explain the five ways that covenants can control risk
- Describe capital structure and the priority of payment
- Discuss recovery rates
- Explain distressed debt and how it relates to the bankruptcy process

**4.5.4 Demonstrate knowledge of leveraged loans.***Including:*

- Understand the basics of leveraged loans
- Discuss growth in leveraged loans
- Explain liquidity and how it relates to the demand for leveraged loans

**4.5.5 Demonstrate knowledge of direct lending.***Including:*

- Discuss the process and implications of direct lending

**4.5.6 Demonstrate knowledge of mezzanine debt.***Including:*

- Identify structures of mezzanine debt
- Understand how mezzanine debt can lower the weighted average cost of capital
- Compare mezzanine debt financing to other forms of financing
- Understand basic examples of mezzanine financing
- Discuss major types of investors in mezzanine debt
- Identify characteristics of mezzanine debt

**4.5.7 Demonstrate knowledge of distressed debt.***Including:*

- Understand the basics of distressed debt
- Identify the supply of distressed debt capital
- Identify the demand for distressed debt capital
- Calculate expected default losses and credit spreads on distressed debt
- Discuss four broad strategic categories of distressed debt investment
- Identify risks of investing in distressed debt
- Discuss vulture investing

**4.5.8 Demonstrate knowledge of venture debt***Including:*

- Describe the characteristics of venture debt
- Describe the terms of venture debt
- Explain why a startup firm would issue venture debt in addition to accepting venture capital investments
- Describe the risks and rewards of venture debt

**4.5.9 Demonstrate knowledge of private credit performance and diversification.***Including:*

- Discuss diversification and its relationship to private credit performance

## Topic 5: Hedge Funds

### Reading 5.1

#### Structure of the Hedge Fund Industry

##### Keywords

absolute return strategies	lock-in effect
annuity view of hedge fund fees	managerial coinvesting
asymmetric incentive fees	managing returns
at-the-money incentive fee	massaging returns
approximation	
classification of hedge fund strategies	multistrategy fund
closet indexer	off-balance-sheet risk
consolidation	opportunistic
convergent strategies	optimal contracting
diversified strategies	option view of incentive fees
equity strategies	participation bias
event-driven strategies	perverse incentive
excessive conservatism	pure asset gatherer
fee bias	relative return product
fund mortality	relative value strategies
fund of funds	representativeness
headline risk	safe harbor
hedge fund program	short volatility exposure
high-water mark	single-manager hedge fund
incentive fee option value	strategy definitions
instant history bias or backfill bias	style drift
instability	synthetic hedge funds
liquidation bias	

### Learning Objectives

#### 5.1.1 Demonstrate knowledge of the distinguishing features of hedge funds and their growth and concentration over time.

*Including:*

- Identify and describe the three primary elements of hedge funds
- Recognize the six investment flexibilities offered by hedge funds
- Discuss the reasons for hedge fund industry growth and concentration

#### 5.1.2 Demonstrate knowledge of hedge fund fees.

*Including:*

- Recognize typical hedge fund fee arrangements
- Calculate annual hedge fund fees

- Describe and apply hedge fund fees under different high-water marks (HWMs) and hurdle rates
- Discuss the potential effects of incentive fees on hedge fund manager behavior
- Recognize and apply the annuity view of hedge fund 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

**5.1.3 Demonstrate knowledge of various types of hedge funds.**

*Including:*

- List hedge fund strategies
- Contrast single-manager hedge funds, funds of funds, and multistrategy funds

**5.1.4 Demonstrate knowledge of hedge fund returns and asset allocation.**

*Including:*

- Discuss the process of analyzing a hedge fund program
- Identify strategies grouped by systemic risk
- Discuss equity strategies in hedge funds
- Discuss event-driven and relative value strategies in hedge funds
- Discuss event risk and volatility strategies in hedge funds
- Discuss event risk and insurance-type strategies in hedge funds
- Discuss absolute return strategies in hedge funds
- Discuss diversified fund strategies in hedge funds

**5.1.5 Demonstrate knowledge of the process of evaluating a hedge fund investment program.**

*Including:*

- Identify the program parameters of hedge fund investments
- Discuss various research findings regarding hedge fund performance
- Explain the approach and benchmarks of opportunistic hedge fund investing

**5.1.6 Demonstrate knowledge of research studies on whether hedge funds adversely affect the financial markets.**

*Including:*

- Discuss the evidence regarding the market impact of hedge funds during the Asian currency crisis of 1997
- Discuss the evidence regarding the market impact of quantitative hedge funds during the crisis of 2007

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

*Including:*

- Describe hedge fund indices
- Understand the structure of management and incentive fees on individual hedge funds as well as on hedge fund indices
- Understand managed futures hedge funds
- Contrast asset weighted hedge fund indices and equally weighted hedge fund indices
- Recognize the size of the hedge fund universe
- Understand representativeness and data biases in hedge funds
- Understand and apply strategy definition and style drift
- Discuss index investability of hedge funds

## Reading 5.2

### Macro and Managed Futures Funds

#### Keywords

alpha decay	mean-reverting
black-box model trading	model risk
breakout strategies	momentum
capacity	Mount Lucas Management (MLM) Index
capacity risk	moving average
capital at risk	multistrategy CTAs
Commodity Futures Trading Commission (CFTC)	National Futures Association (NFA)
commodity pool operator (CPO)	natural hedger
commodity pools	out-of-sample data
commodity trading advisers (CTAs)	pattern recognition system
counterparty risk	point value
countertrend strategies	private commodity pools
degradation	public commodity pools
discretionary fund trading	random walk
equal dollar risk allocation	relative strength index (RSI)
equal risk contribution	robustness
event risk	sideways market
exponential moving average	simple moving average
fundamental analysis	slippage
futures contract dollar risk	systematic fund trading
futurization	systematic trading strategies
global macro funds	technical analysis
in-sample data	thematic investing
lack of trends risk	transparency
leverage	transparency risk
liquidity risk	trend-following strategies
managed account	validation
managed futures	volatility targeting
market capacity weighting	weighted moving average
market microstructure	whipsawing
market risk	

#### Learning Objectives

##### 5.2.1 Demonstrate knowledge of macro and managed futures strategies.

*Including:*

- Contrast discretionary and systemic trading
- Contrast and discuss fundamental and technical analysis

**5.2.2 Demonstrate knowledge of global macro.***Including:*

- Define global macro trading strategies
- Understand global macro strategies based on foreign exchange
- Understand global macro strategies based on sovereign bonds
- Understand global macro strategies based on economic policy
- Understand global macro strategies based on thematic investing
- Understand global macro strategies based on both microeconomic and macroeconomic changes
- Identify primary risks of macro investing

**5.2.3 Demonstrate knowledge of managed futures.***Including:*

- Describe futures contracts
- Understand the structure of the managed futures industry
- Define the purpose of the managed futures industry
- Explain the organization and regulation of the managed futures industry
- Discuss three ways to access managed futures

**5.2.4 Demonstrate knowledge of systematic trading.***Including:*

- Understand systematic trading rules
- Identify three key questions in evaluating a systematic trading system
- Understand validation and the potential degradation of systematic trading rules
- Explain various systematic trading strategies
- Calculate simple moving averages in systematic trading strategies
- Calculate weighted and exponential moving averages in systematic trading strategies
- Interpret moving average strategies
- Discuss breakout strategies
- Analyze trend-following strategies as being long volatility
- Analyze non-trend-following strategies as pattern recognition systems
- Discuss relative value strategies and technical analysis

**5.2.5 Demonstrate knowledge of the core dimensions of managed futures investment strategies.***Including:*

- Discuss fundamental and technical data sources as core managed futures strategies
- Discuss systematic and discretionary implementation styles as core managed futures strategies
- Discuss a strategy focus as core managed futures strategies
- Discuss time horizon as core managed futures strategies

**5.2.6 Demonstrate knowledge of systemic futures portfolio construction.***Including:*

- Identify the four core decisions of a futures trading system
- Discuss data processing in futures portfolio construction
- Understand position sizing and calculate the number of futures contracts to hold to meet portfolio objectives
- Explain market allocation in futures portfolio construction
- Discuss trading execution in futures portfolio construction

**5.2.7 Demonstrate knowledge of various core benefits of managed futures for investors.**

*Including:*

- Identify and discuss the eight benefits of managed futures for investors

**5.2.8 Demonstrate knowledge of evidence on managed futures returns.**

*Including:*

- Discuss evidence on alpha generation from managed futures strategies
- Discuss evidence on downside risk protection offered from managed futures strategies
- Explain mechanical managed futures indices
- Discuss why managed futures may provide superior returns
- Discuss six potential risks of managed futures funds
- Understand managed accounts and the platforms of managed futures funds used to create a diversified portfolio of CTAs
- Discuss the structure of multi-manager funds
- Discuss the structure of managed futures products with managed accounts
- Explain the structure of managed futures products with platforms

**5.2.9 Demonstrate knowledge of benefits of managed futures funds.**

*Including:*

- Discuss research examining the benefits of managed futures funds
- Identify sources of return for managed futures funds
- Summarize the key observations on historical macro and systematic diversified fund returns that are consistent with economic reasoning



**Session 5.3****Event-Driven and Relative Value Hedge Funds****Keywords**

activist investment strategy	interlocking boards
agency costs	liquidation process
agency theory	long binary call option
agent compensation scheme	long binary put option
antitrust review	marking-to-market
anticipated volatility	marking-to-model
asset-backed securities	merger arbitrage
bankruptcy process	modified duration
bidding contest	moneyiness
busted convertibles	mortgage-backed securities arbitrage
capital structure arbitrage	net delta
carry trades	one-off transaction
cash-for-stock mergers	option-adjusted spread
classic convertible bond arbitrage trade	parallel shift
classic dispersion trade	portfolio insurance
classic relative value strategy trade	price transparency
complexity premium	pricing risk
components of convertible arbitrage	principal-agent relationship
returns	proxy battle
convergence	realized volatility
convertible bonds	recovery value
corporate event risk	reorganization process
corporate governance	riding the yield curve
correlation risk	rolling down
correlations go to one	selling insurance
delta	shareholder activism
delta-neutral	short correlation
dilution	sovereign debt
distressed debt hedge funds	special situation funds
duration	spin-off
duration-neutral	split-off
dynamic delta hedging	staggered board seats
effective duration	stock-for-stock mergers
equity-like convertible	tail risk
event-driven	theta
event-driven multistrategy funds	toehold
financial market segmentation	traditional merger arbitrage
financing risk	variance notional value
fixed-income arbitrage	variance swaps
Form 13D	

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Form 13F	vega
Form 13G	vega notional value
free rider	vega risk
gamma	volatility arbitrage
hybrid convertibles	volatility risk
implied volatility	volatility swap
intercurve arbitrage positions	wolf pack
intracurve arbitrage positions	yield curve

## Learning Objectives

### 5.3.1 Demonstrate knowledge of the sources of most event strategy returns.

*Including:*

- Define corporate event risk
- Understand event strategies as selling insurance
- Discuss event strategy returns through the lens of binary options
- Understand event strategies as binary call options

### 5.3.2 Demonstrate knowledge of activist investing.

*Including:*

- Understand the relationship between corporate governance and activist investing
- Define proxy battle
- Identify and explain the five dimensions of shareholder activists
- Identify strategies of shareholder activists
- Explain agency theory and why managers are not viewed as maximizing shareholder wealth
- Discuss consequences of misalignment between shareholders and managers
- Understand corporate governance battles
- Discuss the activist agenda including CEOs, compensation, and boards of directors
- Discuss the activist agenda including capital structure and dividend policy issues
- Discuss the activist agenda including mergers and divestitures
- Summarize the key observations on historical activist fund returns that are consistent with economic reasoning

### 5.3.3 Demonstrate knowledge of merger arbitrage.

*Including:*

- Identify the different types of corporate mergers
- Discuss apply a stock-for-stock merger arbitrage deal
- Discuss third-party bidders and bidding wars
- Understand the risks of merger arbitrage
- Identify regulatory risk within the context of mergers
- Identify financing risk within the context of mergers
- Summarize the key observations on merger arbitrage fund returns that are consistent with economic reasoning

### 5.3.4 Demonstrate knowledge of distressed securities hedge funds.

*Including:*

- Define distressed debt hedge funds

- 
- Explain the bankruptcy process
  - Discuss short sales of equity as writing naked call options
  - Discuss the process of searching for distressed undervalued securities
  - Explain the process for estimating returns from undervalued securities
  - Understand activist investors in distressed securities
  - Explain capital structure arbitrage
  - Discuss the process of buying a firm using distressed securities
  - Summarize the key observations on distressed returns that are consistent with economic reasoning

**5.3.5 Demonstrate knowledge of event-driven multistrategy funds.**

*Including:*

- Define event-driven multistrategy funds
- Summarize the key observations on event-driven multi-strategy fund returns that are consistent with economic reasoning

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

*Including:*

- Recognize the relative value strategy and describe the classic relative value strategy trade

**5.3.7 Demonstrate knowledge of convertible bond arbitrage.**

*Including:*

- Define and describe the classic convertible bond arbitrage trade
- Define convertible bonds and apply the unbundling approach for pricing convertible bonds
- Define busted, hybrid, and equity-like convertibles
- Define, describe, and apply the concept of delta, gamma, and theta and how they relate to the convertible arbitrage position
- Explain and determine 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 of a complexity premium to convertible bond arbitrage
- Identify the four reasons that issuers may continue to offer convertible bonds at attractive prices
- Understand the specifics of delta hedging, including the potential profit on a delta-hedged position
- Recognize and discuss return drivers and risks of convertible bond arbitrage
- Summarize the key observations on historical convertible arbitrage returns that are consistent with economic reasoning

**5.3.8 Demonstrate knowledge of volatility arbitrage.***Including:*

- Understand the volatility arbitrage strategies
- Describe the terms volatility and vega
- Explain instruments used by volatility arbitrage funds
- Calculate the payoffs to variance swaps
- Discuss risks contained in over-the-counter traded instruments relative to exchange-traded derivatives
- Discuss volatility arbitrage strategies
- Understand market-neutral volatility funds
- Understand and apply the challenges of estimating dispersion
- Explain tail risk strategies
- Understand the dispersion trade
- Explain profit and loss on dispersion trades
- Summarize the key observations on relative value volatility funds returns that are consistent with economic reasoning

**5.3.9 Demonstrate knowledge of fixed-income arbitrage.***Including:*

- Understand the core of fixed-income arbitrage strategies
- Recognize types and characteristics of fixed-income arbitrage strategies and apply the concept of modified duration to bond returns and volatility
- Recognize the characteristics of asset-backed and mortgage-backed securities strategies
- Discuss and determine the effects of prepayment risk and option-adjusted spreads on asset-backed and mortgage-backed securities strategies
- Analyze the five risks of asset-backed and mortgage-backed securities arbitrage
- Summarize the key observations on fixed-income arbitrage returns that are consistent with economic reasoning

**5.3.10 Demonstrate knowledge of relative value multistrategy funds.***Including:*

- Discuss the rationale of relative value multistrategy funds
- Summarize the key observations on multistrategy fund returns that are consistent with economic reasoning

**Reading 5.4****Equity Hedge Funds****Keywords**

accounting accrual	net stock issuance
asynchronous trading	overreacting
earnings momentum	pairs trading
earnings surprise	post-earnings-announcement drift
equity long/short funds	price momentum
equity market-neutral funds	providing liquidity
illegal insider trading	share buyback program
informationally efficient	short interest
issuance of new stock	short-bias funds
legal insider trading	speculation
limits to arbitrage	standardized unexpected earnings
liquidity	taking liquidity
market anomalies	test of joint hypotheses
market impact	underreacting
market maker	uptick rule
mean neutrality	variance neutrality
multiple-factor scoring models	

**Learning Objectives****5.4.1 Demonstrate knowledge of commonalities between equity hedge funds.***Including:*

- Discuss commonalities of equity hedge funds

**5.4.2 Demonstrate knowledge of sources of return for equity hedge funds.***Including:*

- 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 to enhance returns for equity hedge funds

**5.4.3 Demonstrate knowledge of market anomalies.***Including:*

- Define market anomalies
- 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

**5.4.4 Demonstrate knowledge of implementing anomaly strategies.**

*Including:*

- Understand the process of integrating anomalies using factor models
- Understand the process of integrating anomalies using pairs trading
- Contrast short selling and reducing risk with and increasing alpha
- Discuss the limits to arbitrage

**5.4.5 Demonstrate knowledge of various (three) equity strategies.**

*Including:*

- Define the mechanics of short selling
- Understand the basics of short-bias funds
- Summarize the key observations on historical short bias fund returns that are consistent with economic reasoning
- Understand the basics of equity long/short funds
- Summarize the key observations on historical equity long/short fund returns that are consistent with economic reasoning
- Discuss the basics of equity market-neutral funds
- Summarize the key observations on historical equity market neutral fund returns that are consistent with economic reasoning
- Understand equity hedge fund risks

**Reading 5.5****Funds of Hedge Funds****Keywords**

access	nontraditional bond funds
conservative funds of funds	operational due diligence
diversified funds of funds	seeding funds
fee netting	strategic funds of funds
liquidity facility	unconstrained bond funds
market-defensive funds of funds	

**Learning Objectives****5.5.1 Demonstrate knowledge of the benefits and costs of diversification in hedge fund investing.***Including:*

- Define funds of hedge funds
- Understand the benefits and costs of diversification
- Describe the four functions of fund of funds management
- List the benefits to investing in funds of hedge funds
- List the disadvantages to investing in funds of hedge funds
- Evaluate how fund of fund managers add value
- Discuss and determine 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 a fund of funds

**5.5.2 Demonstrate knowledge of investing in multistrategy funds.***Including:*

- Evaluate and determine 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

**5.5.3 Demonstrate knowledge of the process of investing in funds of hedge funds.***Including:*

- Identify advantages that funds of funds have over direct hedge fund investments
- Understand funds of hedge funds as diversified pools
- 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

**5.5.4 Demonstrate knowledge of building a portfolio of single hedge funds.***Including:*

- Contrast the fees associated with a fund of funds with those of a portfolio of single hedge funds
- Discuss costs associated with hedge fund due diligence and minimum investment sizes

**5.5.5 Demonstrate knowledge of multialternatives and other hedge fund liquid alternatives.**

*Including:*

- Contrast liquid alternatives with more typical private placements
- Understand the UCITS framework for liquid alternative
- Discuss investments restrictions on '40 Act funds
- Describe the availability of liquid alternative strategies
- Understand multialternatives as liquid alternatives
- Summarize the key observations on fund of funds returns that are consistent with economic reasoning

**5.5.6 Demonstrate knowledge of observations regarding historical returns of funds of funds**

*Including:*

- Summarize the key observations on fund of funds returns that are consistent with economic reasoning



## Topic 6: Structured Products

### Readings

#### Reading 6.1

#### Introduction to Structuring

### Keywords

attachment point	interest-only (IO)
bull call spread	inverse floater tranche
bull put spread	lower attachment point
call option view of capital structure	mezzanine tranche
cap	planned amortization class (PAC)
	tranches
caplet	principal-only (PO)
collateralized debt obligation (CDO)	put option view of capital structure
complete market	senior tranche
contraction risk	sequential-pay collateralized
	mortgage obligation
detachment point	state of the world
equity tranche	structural credit risk models
extension risk	structuring
floating-rate tranches	targeted amortization class (TAC)
	tranches
floor	tranche
floorlet	upper attachment point
interest rate floor	

### Learning Objectives

#### 6.1.1 Demonstrate knowledge of the overview of financial structuring.

*Including:*

- Describe the most common structuring of assets within the corporate form

#### 6.1.2 Demonstrate knowledge of the major types of structuring.

*Including:*

- Understand the key elements of a structured product
- Describe hedging with credit derivatives
- Describe structuring with tranches
- Understand how structured products are created

#### 6.1.3 Demonstrate knowledge of the primary economic role of structuring

*Including:*

- Understand the economic role of a structured product
- Describe market completion as an economic role
- Understand the concept of a state of the world within structured products
- Describe how structured products can complete the market

**6.1.4 Demonstrate knowledge of collateralized mortgage obligations.**

*Including:*

- Describe a simplified collateralized mortgage obligation structure
- Describe sequential pay structuring
- Contrast extension risk with contraction risk as it pertains to structuring
- Apply a sequential pay tranche to a collateralized mortgage obligation
- Describe other types of collateralized mortgage obligations through the structuring of their cash flows
- Understand the motivations behind structuring mortgage products
- Understand how prepayment speeds can change the valuation of collateralized mortgage obligations
- Understand how systematic risk can change the valuation of collateralized mortgage obligations
- Describe default risk within commercial collateralized mortgage obligations

**6.1.5 Demonstrate knowledge of the structural model approach to credit risk.**

*Including:*

- Describe Merton's structural model using the option-like nature (both call options and put options) of traditional corporate securities
- Describe the inherent conflict of interest that exists between shareholders and bondholders
- Understand the mechanics of Merton's structural model and apply the model to value the firm's debt as well as put options on the firm's assets
- Calculate the value of risky debt with Black-Scholes option pricing model
- Understand how binomial trees can be used to value structured products

**6.1.6 Demonstrate knowledge of interest rate options.**

*Including:*

- Describe an interest rate cap and calculate cap payments
- Describe interest rate floors and calculate floor payments
- Discuss interest rate options and counter-party risk

**6.1.7 Demonstrate knowledge of collateralized debt obligations.**

*Including:*

- Define a collateralized debt obligation
- Describe the simplified collateralized debt obligation structure and calculate the waterfall of cash flows
- Understand default risk within a collateralized debt obligation and calculate the waterfall of cash flows in the presence of default
- Describe how option collars are similar to the mezzanine tranche of a pool
- Describe mezzanine tranches and option spreads

**Reading 6.2****Credit Risk and Credit Derivatives****Keywords**

American credit options	hazard rate
assignment	interest rate swap
binary options	loss given default
calibrate a model	mark-to-market adjustment
cash settlement	multiname instruments
CDS indices	novation
CDS premium	physical settlement
CDS spread	price revelation
credit default swap (CDS)	probability of default
credit derivatives	reduced-form credit models
credit protection buyer	referenced asset
credit protection seller	risk-neutral approach
credit risk	risk-neutral investor
credit-linked notes (CLNs)	single-name credit derivatives
default risk	standard ISDA agreement
derivatives	swap rate
European credit options	swap rate curve
exposure at default	total return swap
funded credit derivatives	unfunded credit derivatives

**Learning Objectives****6.2.1 Demonstrate knowledge of credit risk.***Including:*

- Explain the underpinnings of credit risk

**6.2.2 Demonstrate knowledge of reduced form modeling of credit risk.***Including:*

- Identify the difference between structural models and reduced-form models
- Define the three factors that determine the expected credit loss of a credit exposure
- Calculate expected credit loss
- Describe two key characteristics of the risk-neutral modeling approach
- Define risk-neutral probability
- Describe and apply the risk-neutral approach to pricing risky debt
- Apply the risk-neutral approach to estimating credit spreads
- Apply the reduced-form model to determine relative prices of securities
- Explain what it means to calibrate a model
- List the advantages and disadvantages of the reduced-form model
- Compare structural and reduced-form credit risk models

**6.2.3 Demonstrate knowledge of credit derivatives markets.***Including:*

- List and discuss the three economic roles of credit derivatives
- Recognize the three major methods for grouping credit derivatives
- Describe the four stages of the evolution of credit derivative activity

**6.2.4 Demonstrate knowledge of interest rate swaps.***Including:*

- Understand simple interest rate swaps
- Identify payers and receivers of interest rate swaps
- Explain how pensions use interest rate swaps
- Understand the mechanics of interest rate swaps
- Describe the initial valuation of an interest rate swap and calculate the expected payments of the swap
- Understand how an existing swap is valued
- Discuss risks in interest rate swaps
- Discuss the global financial crisis of 2007-2009 in the context of swap risk

**6.2.5 Demonstrate knowledge of credit default swaps.***Including:*

- Compare and contrast credit default swaps and total return swaps
- Discuss the standard ISDA agreement as a template for negotiated credit agreements
- Explain and apply the mechanics of credit default swaps
- Explain the mark-to-market adjustment when valuing credit default swap contracts
- 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

**6.2.6 Demonstrate knowledge of credit options and credit-linked notes.***Including:*

- Contrast credit default swaps and credit options
- Recognize the terms of credit call and credit put options
- Explain the credit put option on a bond
- Explain call options on credit default swaps
- Describe credit-linked notes

**6.2.7 Demonstrate knowledge of credit default swap indices.***Including:*

- Describe credit default swap index products

**6.2.8 Demonstrate knowledge of the five key risks of credit derivatives.***Including:*

- Discuss the risks of excessive credit exposure using off-balance-sheet derivatives, pricing risk of over-the-counter derivatives, and liquidity risk of over-the-counter derivatives
- Discuss the counterparty risk of over-the-counter credit default swaps and the basis risk of credit default swaps

**Reading 6.3****CDO Structuring of Credit Risk****Keywords**

amortization period	overcollateralization
arbitrage CDOs	ramp-up period
balance sheet CDOs	reference portfolio
bankruptcy remote	reserve account
cash flow CDO	revolving period
cash-funded CDO	risk shifting
collateralized fund obligation (CFO)	single-tranche CDO
copula approach	sponsor of the trust
distressed debt CDO	subordination
diversity score	synthetic CDO
external credit enhancement	tranche width
financial engineering risk	weighted average rating factor (WARF)
internal credit enhancement	weighted average spread (WAS)
market value CDO	

**Learning Objectives****6.3.1 Demonstrate knowledge of collateralized debt obligations (CDOs).***Including:*

- Describe credit-related motivations for CDOs
- Describe investor motivations for CDOs
- Describe the general structure and life cycle of a CDO
- Explain the terminology and details of CDOs

**6.3.2 Demonstrate knowledge of balance sheet CDOs and arbitrage CDOs.***Including:*

- Describe three goals for issuing balance sheet CDOs and the balance sheet CDO structure
- Discuss the purposes and attributes of arbitrage CDOs

**6.3.3 Demonstrate knowledge of the mechanics of and motivations for arbitrage CDOs.***Including:*

- Describe and apply a typical arbitrage CDO structure
- Analyze the cash flows in a typical arbitrage CDO structure
- Understand the waterfall of an arbitrage CDO
- Identify the three direct financial motivations for a manager of an arbitrage CDO

**6.3.4 Demonstrate knowledge of cash-funded CDOs and synthetic CDOs.***Including:*

- Compare and contrast cash-funded CDOs and synthetic CDOs
- Explain how a cash-funded CDO can be used to reduce required regulatory capital
- Calculate the amount of freed-up regulatory capital by using a CDO trust to securitize and sell a portfolio of commercial loans
- Describe the characteristics of synthetic CDOs

**6.3.5 Demonstrate knowledge of cash flow and market value CDOs.**

*Including:*

- Describe the characteristics of cash flow CDOs
- Describe the characteristics of market value CDOs

**6.3.6 Demonstrate knowledge of credit risk and enhancement of CDOs.**

*Including:*

- Define and discuss subordination as an internal credit enhancement
- Discuss and apply overcollateralization
- Describe excess spread as an internal credit enhancement
- Discuss reserve accounts as a credit enhancement
- Describe external credit enhancements to CDOs

**6.3.7 Demonstrate knowledge of new developments in CDOs.**

*Including:*

- Describe distressed debt CDOs
- Describe hedge fund CDOs
- Describe single-tranche CDOs

**6.3.8 Demonstrate knowledge of the risks of CDOs.**

*Including:*

- Recognize the risk of the underlying collateral
- Recognize the financial engineering risk
- Discuss the implications of high correlations among the underlying assets
- Define risk shifting and discuss its implications for CDOs
- Describe other risks inherent in CDOs
- Describe how CDO credit risk can be modeled

**Reading 6.4****Equity-Linked Structured Products****Keywords**

absolute return structured product	overconfidence bias
active option	partial differential equation approach (PDE approach)
analytical	participation rate
Asian option	participation structured products
barrier option	path-dependent option
boundary condition	payoff diagram level
building blocks approach	payoff diagram shape
capital protection structured products	power reverse dual-currency note
cash-and-call strategy	principal protected absolute return barrier note
dynamic hedging	principal-protected structured product
equity-linked structured products	quanto option
EUSIPA	simple option
EUSIPA Derivative Map	spread option
exotic option	static hedge
Investment products in the EUSIPA Derivative Map	structured product without exotic options
knock-in option	tax deduction
knock-out option	tax deferral
leverage structured products	wrapper
look-back option	yield enhancement structured products
numerical methods for derivative pricing	

**Learning Objectives****6.4.1 Demonstrate knowledge of structured products and types of wrappers.***Including:*

- Describe equity-linked structured products
- Define a wrapper
- Describe the six types of wrappers

**6.4.2 Demonstrate knowledge of potential tax effects of wrappers.***Including:*

- Describe the tax effects of wrappers
- Calculate the pre-tax and after-tax return of fully taxed investments
- Calculate the after-tax return of tax-deferred wrappers
- Calculate the after-tax return on a wrapper that offers both tax deduction and tax deferral

**6.4.3 Demonstrate knowledge of structured products with exotic option features.***Including:*

- Compare and contrast simple options and exotic options
- Understand how simple call and put options can be combined to provide principal protection
- Define the participation rate
- Illustrate how a cash-and-call strategy is related to put-call parity
- Identify path-dependent options and binary options
- Describe and apply barrier, knock-in, and active options
- Describe the characteristics of in versus out and up versus down barrier options
- Define spread options and look-back options
- Define a quanto option

**6.4.4 Demonstrate knowledge of popular structured product types.***Including:*

- Discuss absolute return and principal protected absolute return barrier notes

**6.4.5 Demonstrate knowledge of the EUSIPA classification.***Including:*

- Define EUSIPA and explain its role in the structured products market
- Describe capital protected structured products
- Describe yield enhancement structured products
- Describe participation structured products
- Describe leverage structured products

**6.4.6 Demonstrate knowledge of global structured product cases.***Including:*

- Understand the components within a US-based structured product with multiple kinks
- Understand the components within a German-based structured product with leverage
- Understand the components within a Japan-based structured product based on multiple currencies

**6.4.7 Demonstrate knowledge of structured product valuation.***Including:*

- Understand how a structured product can be valued using dynamic hedging
- Discuss the advantages of the simulation approach over the PDE approach
- Contrast the PDE approach and the building blocks approach
- Explain the two principles of payoff diagram shapes and levels
- Discuss the evidence on structured product prices

**6.4.8 Demonstrate knowledge of motivations of structured products***Including:*

- Identify investor motivation for including structured products in a portfolio
- Discuss tax-related motivations for investors
- Discuss the motivations of issuers of structured products



## 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	<p>George has identified an opportunity for a convertible arbitrage reverse hedge. What risks are associated with this hedge?</p> <ul style="list-style-type: none"> <li>A. The convertible may remain overvalued, causing the positive cash flow to harm the position's return profile.</li> <li>B. The short convertible may be called in and the position must be delivered, forcing the hedge to be unwound at an inopportune time.</li> <li>C. The implied volatility may decrease, lowering the bond's value.</li> <li>D. The implied volatility may increase, lowering the bond's value.</li> </ul>	<p>You have to <b>analyze</b> the positions and factors impacting them.</p> <p>Correct Answer: B</p>
Apply	Make use of	<p>Alicia Weeks, CFA, Real Estate Investment Advisor, works in an Asian country where there are no securities laws or regulations. According to CFA Institute Standard I, Fundamental Responsibilities, Alicia:</p> <ul style="list-style-type: none"> <li>A. must adhere to the standards as defined in a neighboring country that has the strictest laws and regulations.</li> <li>B. need not concern herself with ethics codes and standards.</li> <li>C. must adhere to the CFA Institute's codes and standards.</li> <li>D. must adhere to the standards as defined in a neighboring country that has the least strict laws and regulations.</li> </ul>	<p>You have to <b>apply</b> the CFA Institute Standard I to find the correct answer.</p> <p>Correct Answer: C</p>

Term	Definition	Question Example	Example of Term Use
Compare	Describe similarities and differences	<p>Which of the following least accurately compares the Sharpe and Treynor ratios?</p> <ul style="list-style-type: none"> <li>Both ratios contain excess return in the numerator.</li> <li>Both ratios express a measure of return per unit of some measure of risk.</li> <li>The Sharpe ratio is based on total risk, while the Treynor ratio is based on systematic risk.</li> <li>The Sharpe ratio is the inverse of the Treynor ratio.</li> </ul>	<p>You have to <b>compare</b> the three approaches based on their most important similarities and their most important differences</p> <p>Correct Answer: D</p>
Compare and Contrast	Examine in order to note similarities or differences	<p>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:</p> <ol style="list-style-type: none"> <li>the initial payment will be the same.</li> <li>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.</li> <li>the present value of the payment streams of the two loan types are the same.</li> <li>the constant payment mortgage loan balance exceeds that of the constant amortization mortgage during the first six months of the loan.</li> </ol>	<p>You have to <b>compare</b> indices to arrive at the answer.</p> <p>Correct Answer: C</p>

Term	Definition	Question Example	Example of Term Use
Contrast	Expound on the differences	<p>Which of the following best characterizes a difference between Value at Risk (VaR) and Modified Value at Risk?</p> <ul style="list-style-type: none"> <li>• Modified VaR is expressed as a percent, while VaR is a dollar value.</li> <li>• Modified VaR uses a user defined confidence interval, while VaR uses a 99% interval.</li> <li>• Modified VaR incorporates non-normality, while traditional VaR assumes normality.</li> <li>• Modified VaR is for a single trading period, while traditional VaR is for multiple periods.</li> </ul>	<p>You have to <b>contrast</b> the assumptions of the first model to those of the second model so that the differences are clear.</p> <p>Correct Answer: C</p>
Define	State the precise meaning	<p>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:</p> <ol style="list-style-type: none"> <li>prime rate.</li> <li>discount rate.</li> <li>federal funds rate.</li> <li>call money rate.</li> </ol>	<p>You have to <b>define</b>, in this case, the federal funds rate.</p> <p>Correct Answer: C</p>
Describe	Convey an idea or characterize	<p>Which of the following words best describes expected return?</p> <ol style="list-style-type: none"> <li>Spread</li> <li>Average</li> <li>Spread squared</li> <li>Average squared</li> </ol>	<p>You need to choose the word that best <b>describes</b> the concept from a list.</p> <p>Correct Answer: B</p>
Discuss	Examine or consider a subject	<p>Discuss the limitations of private equity data.</p>	<p>You have to present a <b>discussion</b> of a set of ideas in a list or paragraph.</p>

Term	Definition	Question Example	Example of Term Use
Distinguish	Separate using differences	<p>Which of the following best distinguishes between the covariance and the correlation coefficient?</p> <ul style="list-style-type: none"> <li>A. The covariance indicates the extent to which two assets move together or apart.</li> <li>B. The correlation coefficient is the expected product of the deviations of two variables.</li> <li>C. The covariance is the square root of the correlation coefficient.</li> <li>D. The correlation coefficient is scaled and bounded between +1 and -1.</li> </ul>	<p>You have to <b>distinguish</b> between risk measurement approaches based on their assumptions regarding the distribution of returns.</p> <p>Correct Answer: D</p>
Explain	Illustrate the meaning	<p>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.</p> <p>or</p> <p>2. Which of the following best explains risk from the standpoint of investment?</p> <ul style="list-style-type: none"> <li>A. Investors will lose money.</li> <li>B. Terminal wealth will be less than initial wealth.</li> <li>C. Final wealth will be greater than initial wealth.</li> <li>D. More than one outcome is possible.</li> </ul>	<p>1. You have to place a series of thoughts together as an <b>explanation</b> of a term or issue.</p> <p>2. You need to identify the term that best <b>explains</b> a term or issue.</p> <p>Correct Answer: D</p>
Identify	Establish the identity	<p>The investments that have historically performed best during periods of recession are:</p> <ul style="list-style-type: none"> <li>A. commodities.</li> <li>B. treasury bills.</li> <li>C. stocks and bonds.</li> <li>D. gold.</li> </ul>	<p>You have to <b>identify</b> the term that best meets the criterion of the question.</p> <p>Correct Answer: C</p>

Term	Definition	Question Example	Example of Term Use
Interpret	Explain the meaning	<p>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:</p> <ul style="list-style-type: none"> <li>A. 30-day CD, no matter what you expect interest rates to do in the future.</li> <li>B. 2-year CD, no matter what you expect interest rates to do in the future.</li> <li>C. 30-day CD if you expect that interest rates will fall in the future.</li> <li>D. 2-year CD if you expect that interest rates will fall in the future.</li> </ul>	<p>You have to <b>interpret</b> the features of an investment scenario.</p> <p>Correct Answer: D</p>
List	Create a series of items	List the determinants of real interest rates.	You have to differentiate from a <b>list</b> those items that are consistent with the question.
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 <b>states</b> main ideas.
Understand	Perceive and comprehend nature and significance; grasp meaning	<p>Which of the following would increase the net asset value of a mutual fund share, assuming all other things remain unchanged?</p> <ul style="list-style-type: none"> <li>A. An increase in the number of fund shares outstanding</li> <li>B. An increase in the fund's accounts payable</li> <li>C. A change in the fund's management</li> <li>D. An increase in the value of one of the fund's stocks</li> </ul>	<p>You have to use reasoning to illustrate an <b>understanding</b> of a specific issue.</p> <p>Correct Answer: D</p>

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