

# QFI – Portfolio Management Exam

Fall 2019/Spring 2020

## Important Exam Information:

### [Exam Registration](#)

Candidates may register online or with an application.

### [Order Study Notes](#)

Study notes are part of the required syllabus and are not available electronically but may be purchased through the online store.

### [Introductory Study Note](#)

The Introductory Study Note has a complete listing of all study notes as well as errata and other important information.

### Case Study

A case study will not be provided for this examination.

### [Past Exams](#)

Past Exams from 2000-present are available on SOA website.

### Updates

Candidates should be sure to check the Updates page on the exam home page periodically for additional corrections or notices.

### Formula Package

A Formula Package will be provided with the exam. Please see the Introductory Study Note for more information.

### Table

A Cumulative normal distribution table will be provided with the exam.

## 1. Topic: Fixed Income Portfolio Management

### Learning Objectives

The candidate will understand how to work with the variety of fixed income instruments available for portfolio construction.

*This section deals with fixed income securities. As the name implies the cash flow is often predictable, however there are various risks that affect cash flows of these instruments. In general, candidates should be able to identify the cash flow pattern and the factors affecting cash flow for commonly available fixed income securities. Candidates should be comfortable using various interest rate risk quantification measures in the valuation and managing of investment portfolios.*

### Learning Outcomes

The Candidate will be able to:

- a) Describe the cash flow of various corporate and sovereign bonds considering underlying risks such as interest rate, credit and event risks
- b) Demonstrate an understanding of the characteristics of leveraged loans
- c) Demonstrate an understanding of cash flow patterns and underlying drivers and risks of non-agency mortgage-backed securities and commercial mortgage-backed securities
- d) Demonstrate an understanding of the characteristics and mechanics of fixed income ETFs
- e) Demonstrate an understanding of repurchase agreements and securities lending
- f) Demonstrate an understanding of the cash flow patterns and risks of whole loan commercial mortgages
- g) Demonstrate an understanding of commercial mortgage backed securities
- h) Construct and manage portfolios of fixed income securities using the following broad categories:
  - Managing funds against a target return
  - Managing funds against liabilities

### Resources

- *Handbook of Fixed Income Securities*, Fabozzi, F.J., 8<sup>th</sup> Edition, 2012
  - Ch. 1, 2, and 9 (background only)
  - Ch. 12, 13, 18, 21, 23, 24, 31, 35 & 58
- QFIP-135-19: High-Yield Bond Market Primer
- *Commercial Real Estate Analysis and Investments*, Miller & Geltner, 3<sup>rd</sup> Edition, 2014
  - Section IV Introduction (background only)
  - Ch. 16, 19 & 20
- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3<sup>rd</sup> Edition, 2007
  - Ch. 6: Fixed Income Portfolio Management

## 2. Topic: Credit Risk Management and Rating Agency Framework

### Learning Objectives

The candidate will understand:

- The credit risk of fixed income portfolios, securities, and sectors and be able to apply a variety of credit risk theories and models.
- How rating agencies rate corporate and sovereign bonds and securitized credit.

*In many sectors financial institutions primarily invest in corporate bonds, commercial mortgages, mortgage-backed securities, and other fixed income securities. The additional yield received above that of similar maturity government bonds comes with the risk of default and loss of principal. This default or credit risk varies by rating, sector, and with macroeconomic and political cycles, and the investment actuary must understand, be able to model, and inform stakeholders about these return and risk dynamics.*

### Learning Outcomes

The Candidate will be able to:

- a) Demonstrate an understanding of the basic concepts of credit risk modeling such as probability of default, loss given default, exposure at default, and expected loss
- b) Demonstrate an understanding of modeling approaches for correlated defaults
- c) Demonstrate an understanding of credit valuation models
- d) Demonstrate an understanding of Merton (structural) asset valuation models in the context of credit risk
- e) Demonstrate an understanding of the term structure of default probability
- f) Demonstrate an understanding of and be able to apply the concept of Duration Times Spread (DTS)
- g) Demonstrate an understanding of credit default swaps (CDS), including the use of CDS in a portfolio context
- h) Demonstrate an understanding of measuring and marking-to-market counterparty credit risk in credit derivatives
- i) Understand and apply various approaches for managing credit risk in a portfolio setting
- j) Demonstrate an understanding of mortgage default models in the valuation of residential MBS
- k) Demonstrate an understanding of the rationale, markets and risks of structured finance
- l) Explain the role of rating agencies, both in fixed income markets and for financial institutions
- m) Demonstrate an understanding of events and causes of the 2008 global financial crisis (GFC)
- n) Explain the role of rating agencies in the GFC

### Resources

- *Introduction to Credit Risk Modeling*, Bluhm, Christian, 2<sup>nd</sup> Edition, 2010
  - Ch. 1
  - Ch. 2 (sections 2.1-2.7)

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- Ch. 3
- Ch. 6
- *Handbook of Fixed Income Securities*, Fabozzi, F.J., 8<sup>th</sup> Edition, 2012
  - Ch. 55, 66 & 67
- *The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital*, Gregory, Jon, 3<sup>rd</sup> Edition, 2015
  - Ch. 1, 2, 3, 4 & 12
- QFIP-100-13: Modeling of Mortgage Defaults, Jan 22, 2008, pp. 5- 38 (pp. 13-25 background only)
- QFIP-130-19: Default Risk and the Effective Duration of Bonds

### 3. Topic: Equity Investments

#### Learning Objectives

The candidate will understand the variety and assess the role of equities in investment portfolios.

The candidate will demonstrate an understanding of the distinguishing investment characteristics and potential contributions to investment portfolios of the following major asset groups:

- Real Estate
- Public Equity
- Private Equity
- Infrastructure
- Commodities
- Hedge Funds

*\* Fixed income securities typically work well to defease fixed liabilities. The above assets add growth to long term portfolios. Interest rates in US markets generally declined from the early 1980s to the late 2010s. This secular trend pressured financial institutions to expand into public equity and alternative asset classes and eventually to build product offerings around them. Alternative asset classes now are a source of differentiation and competitive advantage for many financial institutions.*

#### Learning Outcomes

The Candidate will be able to:

- a) Understand how the behavioral characteristics of individuals and firms influence the dynamics of equity markets
- b) Demonstrate an understanding of the types of equity investments available for an investor's growth allocation and their most important differences
- c) Demonstrate an understanding of the investment strategies and portfolio roles that are characteristic of each equity investment
- d) Demonstrate an understanding of the due diligence process for different types of equity investments
- e) Demonstrate an understanding of the basic concepts surrounding passive, active, and semi-active investing
- f) Demonstrate an understanding of smart beta and target volatility funds and their impact on option costs
- g) Explain the basic active equity selection strategies including value, growth and combination approaches, and compare techniques for characterizing investment style of an asset manager
- h) Demonstrate an understanding of equity indices and their construction, including distinguishing among the weighting schemes and their biases
- i) Recommend and justify, in a risk-return framework, the optimal portfolio allocations to a group of investment managers
- j) Describe the core-satellite approach to portfolio construction with a completeness fund to control overall risk exposures

- k) Describe the issues with and process for identifying, selecting, and contracting with equity managers
- l) Demonstrate an understanding of issues related to incorporating Environmental, Social, and Governance (ESG) criteria into the investment process

#### Resources

- *Managing Investment Portfolios*, Maginn & Tuttle, 3<sup>rd</sup> Edition, 2007
  - Ch. 7 & 8
- *Commercial Real Estate Analysis and Investments*, Miller & Geltner, 3<sup>rd</sup> Edition, 2014
  - Ch. 12
- QFIP-113-13: Secular and Cyclic Determinants of Capitalization Rates: The Role of Property Fundamentals, Macroeconomic Factors and “Structural Changes”
- QFIP-126-16: Infrastructure as an Asset Class
- QFIP-131-19: Addressing Built-in Biases in Real Estate Investment (including Appendix)
- QFIP-132-19: What is an Index
- QFIP-133-19: Environmental, Social, and Governance Criteria: Why Investors Should Care

<b>4. Topic: Liquidity Risk</b>
<b>Learning Objectives</b>
<p>The candidate will understand the nature, measurement and management of liquidity risk in financial institutions.</p> <p><i>The global financial crisis brought home the necessity of managing liquidity and counterparty risk. This section prepares candidates to engage in liquidity risk management.</i></p>
<b>Learning Outcomes</b>
<p>The Candidate will be able to:</p> <ol style="list-style-type: none"><li>Demonstrate an understanding of the concept of liquidity risk and the threat it represents to financial intermediaries and markets</li><li>Measure and monitor liquidity risk, using various liquidity measurement tools and ratios</li><li>Demonstrate an understanding of the levels of liquidity available with various asset types and the impact on a company's overall liquidity risk</li><li>Demonstrate an understanding of liability termination provisions such as book-value surrender and the impact on a company's overall liquidity risk</li><li>Apply liquidity risk models, including modeling cash flow of various types of assets (e.g. indeterminate maturity assets) and liabilities</li><li>Apply liquidity scenario analysis with various time horizons</li><li>Understand and apply techniques to manage stress liquidity risk</li><li>Create liquidity risk management plans and procedures, including addressing appropriate product design, investment guidelines, and reporting given a desired liquidity risk level</li></ol>
<b>Resources</b>
<ul style="list-style-type: none"><li>QFIP-105-13: Report of the Life Liquidity Work Group of the American Academy of Actuaries to the Life Liquidity Risk Working Group of the NAIC (final)</li><li>QFIP-106-13: <i>Liquidity Risk: Measurement and Management - A Practitioner's Guide to Global Best Practices</i>, Matz, Leonard &amp; Neu, Peter, 2006, Ch. 3</li><li>QFIP-117-13: Reflections on Northern Rock: The Bank Run that Heralded the Global Financial Crisis</li><li>QFIP-123-16: Liquidity Risk Management: Best Risk Management Practices. CRO Forum, October 2008</li><li>QFIP-134-19: <i>Quantitative Credit Portfolio Management</i>, Ben-Dor, et. al., 2012, Ch. 5, 6</li></ul>

## 5. Topic: Investment Policy and Regulatory Framework

### Learning Objectives

The candidate will:

- Demonstrate an understanding of regulatory and accounting frameworks around investment governance.
- Understand how to develop an investment policy including governance for institutional investors and financial intermediaries within regulatory and accounting constraints.
- Understand how rating agency frameworks affect portfolio construction and management.

*Institutional asset portfolio governance and management are often done in the context of rating agency oversight; even private asset managers deal with rating agency effects on fixed income security values and trading. This section acquaints the investment actuary with some of these issues.*

### Learning Outcomes

The Candidate will be able to:

- a) Describe the regulatory and rating agency contexts in which various institutions operate and how those contexts affect portfolio strategy
- b) Explain how investment policies and strategies can manage risk and create value
- c) Identify a fiduciary's obligations and explain how they apply in managing portfolios
- d) Determine how a client's objectives, needs and constraints affect investment strategy and portfolio construction. Considerations and constraints include:
  - Capital and expected return on allocated capital
  - Risk appetite and risk-return trade-off
  - Tax
  - Accounting
  - Regulators
  - Rating agencies
  - Liquidity
- e) Incorporate financial and non-financial risk into an investment policy, including currency, credit, spread, liquidity, interest rate, equity, insurance product, operational, technology, legal, political, reputational, and environmental, social, and governance (ESG) risks
- f) Identify and apply the concepts of behavioral finance with respect to individual investors, institutional investors, portfolio managers, fiduciaries, and corporate managers

### Resources

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3<sup>rd</sup> Edition, 2007
  - Ch. 1 & 3
- QFIP-136-19: Elements of an Investment Policy Statement for Institutional Investors



- QFIP-137-19: Managing your Advisor: A Guide to Getting the Most Out of the Portfolio Management Process

## 6. Topic: Asset Liability Management and Asset Allocation

### Learning Objectives

The candidate will understand:

- Investment dimensions of designing product offerings and managing inforce product liabilities.
- Managing investment portfolios in the context of financial institution liabilities (asset liability management).
- The theory and techniques of portfolio asset allocation.

*Investment portfolios must be tuned to behave in similar ways to the liabilities they support as capital markets move and time passes. Otherwise the difference between the accounting value or market value of assets will move differently than the liabilities, directly affecting capital, funding ratios, and solvency. The institution must remain solvent in the short term or else economic value in the long term is moot.*

### Learning Outcomes

The Candidate will be able to:

- a) Demonstrate an understanding of how the behavioral characteristics of individuals and firms influence liability design, management, and ALM
- b) Demonstrate an understanding of risks associated with guarantee riders including: market, insurance, policyholder behavior, basis, and credit
- c) Demonstrate an understanding of liability driven investing (LDI) for pension plans
- d) Propose asset allocation strategies and explain the impact of asset allocation relative to various investor goals and constraints
- e) Develop and critique asset allocation strategies appropriate to underlying liability profiles
- f) Evaluate the difficulties of investing for long tail liabilities (i.e. beyond 30 years) such as inflation indexed pension plans and secondary guarantee universal life insurance
- g) Understand and apply the concept of risk factors in the context of asset allocation
- h) Explain how behavioral characteristics of individuals or firms affect investment management processes

### Resources

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3<sup>rd</sup> Edition, 2007
  - Ch. 5.1-5.7, 5.9, 5.10
  - Ch. 7.7
- QFIP-115-13: IAA, Stochastic Modeling, Theory and Reality from an Actuarial Perspective., Section IV.A.1-8
- QFIP-128-18: The Evolution of LDI and the Role of a Completion Manager
- QFIP-129-18: Equity Indexed Annuities - Downside Protection, But at What Cost?
- QFIP-139-19: Ch. 13 of *IAA Risk Book*, Asset Liability Management: Techniques and Practices for Insurance Companies, Gilbert

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- QFIP-140-19: Ch. 10 of *Modern Investment Management: An Equilibrium Approach*, Litterman
- QFIP-141-19: Liability Driven Investment Explained
- QFIP-142-19: Ch. 7 of *Modern Investment Management: An Equilibrium Approach*, Litterman
- QFIP-143-19: Risk Factors as Building Blocks for Portfolio Diversification: The Chemistry of Asset Allocation
- QFIP-144-19: Risk Parity is All About Balance, Bridgewater Associates

<b>7. Topic: Performance Measurement and Attribution</b>
<b>Learning Objectives</b>
The candidate will understand the need for and goals of attributing the performance of a portfolio to various factors, evaluating this attribution against a benchmark, and recommending adjustments to portfolio strategy.
<b>Learning Outcomes</b>
The Candidate will be able to: <ul style="list-style-type: none"><li>a) Describe and assess performance measurement methodologies for assets portfolios</li><li>b) Describe and assess techniques that can be used to select or build a benchmark for a given asset, portfolio</li><li>c) Recommend a benchmark for a given asset or portfolio</li><li>d) Calculate and interpret performance attribution metrics for a given asset or portfolio</li><li>e) Explain the limitations of attribution techniques</li></ul>
<b>Resources</b>
<ul style="list-style-type: none"><li>• <i>Managing Investment Portfolios</i>, Maginn &amp; Tuttle, 3<sup>rd</sup> Edition, 2007<ul style="list-style-type: none"><li>○ Ch. 12</li></ul></li><li>• QFIP-145-19: Determinants of Portfolio Performance</li></ul>