QFI – Portfolio Management Exam

Fall 2020/Spring 2021

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.
Syllabus Readings	Readings listed in this syllabus may include study notes, online readings and textbooks. Candidates are responsible for all readings in their entirety, including sections such as Appendices, unless it is stated otherwise in the syllabus.
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.

Recognized by the Canadian Institute of Actuaries

1. **Topic: Fixed Income Portfolio Management**

Learning Objectives

The candidate will understand how to work with the variety of fixed income instruments and evaluate fixed income portfolios.

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 fixed income securities considering underlying risks such as interest rate, credit and event risks

b) Demonstrate an understanding of common techniques to enhance yield and manage liquidity in fixed income portfolios

c) Demonstrate an understanding of the cash flow patterns and risks of whole loan commercial mortgages

d) 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., 8th Edition, 2012
  - Ch. 1: Overview of the Types and Features of Fixed Income Securities (background only)
  - Ch. 2: Risks Associated with Investing in Fixed Income Securities (background only)
  - Ch. 9: U.S. Treasury Securities (background only)
  - Ch. 12: Corporate Bonds
  - Ch. 13: Leveraged Loans
  - Ch. 18: Inflation-Linked Bonds
  - Ch. 21: Fixed Income Exchange Traded Funds
  - Ch. 23: Nonconvertible Preferred Stock
  - Ch. 24: An Overview of Mortgages and the Mortgage Market
  - Ch. 31: Nonagency Residential Mortgage-Backed Securities
  - Ch. 35: Centralized Loan Obligations
  - Ch. 58: Financing Position in the Bond Market
- *Commercial Real Estate Analysis and Investments*, Miller & Geltner, 3rd Edition, 2014
  - Section VI Introduction (background only)
  - Ch. 16: Mortgage Basics I: An Introduction and Overview
  - Ch. 19: Commercial Mortgage Economics and Investment

- Ch. 20: Commercial Mortgage-Backed Securities (excluding Appendix)

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3rd Edition, 2007
  - Ch. 6: Fixed Income Portfolio Management
- QFIP-135-19: High-Yield Bond Market Primer
- QFIP-146-20: Private Debt in an Institutional Portfolio

2. Topic: Quantitative 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.

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 credit risk analysis and models

b) 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

c) Apply both threshold and statistical models of the term structure of defaults to analyze credit risk exposure

d) Demonstrate an understanding of modeling approaches for correlated defaults

e) Demonstrate an understanding of measuring and marking-to-market counterparty credit risk in credit derivatives

f) Understand and apply various approaches for managing credit risk in a portfolio setting

g) Demonstrate an understanding of events and causes of the 2008 global financial crisis (GFC)

Resources

- *Handbook of Credit Risk Management,* Bouteille, Sylvain & Coogan-Pushner, Diane, 2013
  - Ch. 1: Fundamentals of Credit Risk
  - Ch. 4: Measurement of Credit Risk
  - Ch. 5: Dynamic Credit Exposure
  - Ch. 9: Credit Portfolio Management
  - Ch. 16: Credit Derivatives
- *Credit Risk Modelling,* Bolder, David, 2018
  - Ch. 1: Getting Started
  - Ch. 2: A Natural First Step
  - Ch. 3: Mixture or Actuarial Models
  - Ch. 4: Threshold Models

- *The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital*, Gregory, Jon, 3rd Edition, 2015
    - Ch. 1: Introduction
    - Ch. 2: The Global Financial Crisis
    - Ch. 3: Derivative Risks
    - Ch. 4: Counterparty Risk
    - Ch. 12: Default Probabilities, Credit Spreads and Funding Costs (sections 12.1-12.4)
- QFIP-130-19: Default Risk and the Effective Duration of Bonds

3. Topic: Equity and Alternative 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) Demonstrate an understanding of using equity and alternative investments, spanning portfolio design, manager selection, implementation, taxation, and monitoring

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) Explain the basic active equity selection strategies including value, growth and combination approaches, and compare techniques for characterizing investment style of an asset manager

e) Recommend and justify an optimal portfolio allocation in a risk-return framework

f) Demonstrate an understanding of issues related to incorporating Environmental, Social, and Governance (ESG) criteria into the investment process

Resources

- *Managing Investment Portfolios,* Maginn & Tuttle, 3rd Edition, 2007
  - Ch. 7: Equity Portfolio Management
  - Ch. 8: Alternative Investments Portfolio Management
- *Commercial Real Estate Analysis and Investments*, Geltner & Miller, 3rd Edition, 2014
  - Ch. 12: Advanced Micro-Level Valuation (excluding Appendix)

- Ch. 14: After-Tax Investment Analysis & Corporate Real Estate (excluding Appendix)

- QFIP-126-16: Infrastructure as an Asset Class
- QFIP-131-19: Addressing Built-in Biases in Real Estate Investment (including Appendix)
- QFIP-133-19: Environmental, Social, and Governance Criteria: Why Investors Should Care

4. Topic: Liquidity Risk

Learning Objectives

The candidate will understand the nature, measurement and management of liquidity risk in financial institutions.

The global financial crisis brought home the necessity of managing liquidity and counterparty risk. This section prepares candidates to engage in liquidity risk management.

Learning Outcomes

The Candidate will be able to:

a) Demonstrate an understanding of liquidity risk and the threat it represents to financial intermediaries and markets

b) Demonstrate an understanding of various liquidity measurement tools and metrics

c) Demonstrate an understanding of the levels of liquidity available with various asset types and the impact on a company's overall liquidity risk

d) Apply liquidity risk models using scenario analysis with various time horizons

e) Understand and apply techniques to manage stress liquidity risk

f) Create liquidity risk management plans and procedures, including addressing appropriate product design, investment guidelines, and reporting given a desired liquidity risk level

Resources

- 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)
- QFIP-106-20: *Liquidity Risk: Measurement and Management - A Practitioner's Guide to Global Best Practices,* Matz, Leonard & Neu, Peter, 2006, Ch. 2 & 3
- QFIP-117-13: Reflections on Northern Rock: The Bank Run that Heralded the Global Financial Crisis
- QFIP-123-16: Liquidity Risk Management: Best Risk Management Practices. CRO Forum, October 2008
- QFIP-134-19: *Quantitative Credit Portfolio Management,* Ben-Dor, et. al., 2012, Ch. 5, 6

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) Analyze international accounting treatment for insurance liabilities and the investments and hedging that supports them

Resources

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3rd Edition, 2007
  - Ch. 1: The Portfolio Management Process and The Investment Policy Statement
  - Ch. 3: Managing Institutional Investor Portfolios

- 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
- QFIP-148-20: IFRS 17 Insurance Contracts - IFRS Standards Effects Analysis, May 2017, IASB (sections 1, 2, 4, 6.1-2, and 7.1 only)
- QFIP-149-20: PwC In Depth - A Look at current financial reporting issues IFRS 17, Jun 2017
- QFIP-150-20: IFRS 9 For Insurers

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) Develop and critique asset allocation strategies appropriate to underlying liability profiles such as pension plans and long tail insurance liabilities

c) 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

d) Understand and apply the concept of risk factors in the context of asset allocation

Resources

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3rd Edition, 2007
    - Ch. 5: Asset Allocation (sections 1-7, 9 & 10)
    - Ch. 7: Equity Portfolio Management (section 7)
- QFIP-128-18: The Evolution of LDI and the Role of a Completion Manager
- QFIP-139-19: Ch. 13 of *IAA Risk Book*, Asset Liability Management: Techniques and Practices for Insurance Companies, Gilbert
- QFIP-140-19: Ch. 7 of *Modern Investment Management: An Equilibrium Approach*, Litterman
- QFIP-141-19: Liability Driven Investment Explained
- QFIP-142-19: Ch. 10 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
- QFIP-151-20: Ch. 5 of *Asset Liability Management of Financial Institutions*, Tilman, 2003
- QFIP-152-20: How Behavioral Biases Affect Finance Professionals

- QFIP-153-20: Asset Allocation in a Low Yield Environment
- QFIP-154-20: The Evolution of Insurer Portfolio Investment Strategies for Long-term Investing

7. Topic: Performance Measurement and Attribution

Learning Objectives

The candidate will understand the need for and goals of assessing the performance of a portfolio, and the methods and limitations of performance attribution.

Learning Outcomes

The Candidate will be able to:

a) Explain the use of segmented asset portfolios for supporting different investment objectives

b) Apply performance measurement methodologies to various asset portfolios

c) Describe and assess techniques to select or build an asset benchmark for a given investment objective

d) Assess and interpret performance attribution metrics for a given asset or portfolio

Resources

- *Managing Investment Portfolios: A Dynamic Process*, Maginn & Tuttle, 3rd Edition, 2007
    - Ch. 12: Evaluating Portfolio Performance
- QFIP-145-19: Determinants of Portfolio Performance