Simon Fraser University
Beedie School of Business

BUS 411
FIXED INCOME SECURITY ANALYSIS

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Course Outline: This course provides an introduction to institutional, theoretical and practical issues involved in the market valuation of fixed income securities. The course covers three general areas: history of fixed income securities; valuation methods for fixed income securities, including fixed and variable annuities, government and corporate bonds, defined benefit pension plans, bonds with contingencies, fixed income derivative securities; and, fixed income risk management using duration and convexity measures.

Recommended Text:
Geoffrey Poitras, *Security Analysis and Investment Strategy*, Oxford, UK: Blackwell, 2005.
(Relevant readings and notes are available on the class webpage).

Helpful Texts:
F. Fabozzi, *Bond Markets, Analysis and Strategies* (9th ed.), Pearson, 2014.
F. Fabozzi and Mann (ed.), *Handbook of Fixed Income Securities* (9th ed.), McGraw Hill, 2021.
B. Pettit, *Fixed Income Analysis*, CFA Investment Series, 2019.
G. Poitras, *The Early History of Financial Economics, 1478-1776*, Elgar, 2000.
S. Sundaresan, *Fixed Income Markets and Their Derivatives*, Academic Press, 2009.

Some other Supplementary Texts:
Z. Bodie, A. Kane and A. Marcus (et al.), *Investments,* Irwin, 2020 (9th Can. ed.)
J. Hull, *Options, Futures and Other Derivative Securities*, Pearson, 2021 (11th ed.).
C.W. Jordan, *Life Contingencies,* Society of Actuaries, 1952.
S. Kellison, *The Theory of Interest*, McGraw-Hill, 2009 (3rd ed.).
S. Mason, Merton, Perold and Tufano, *Cases in Financial Engineering*, Prentice-Hall, 1995.
R. Michie, *The Global Securities Market: A History,* Oxford UP, 2006
C. O'Malley, *Bonds Without Borders : A History of the Eurobond Market,* Wiley, 2015.
A. Thau, *The Bond Book,* McGraw-Hill, 2000.

Evaluation:

Class Participation	10%	(Fixed Income Pretest and Game)
Assignments	45%	(See class webpage)
Final Exam	45%	(Exam is cumulative)

DETAILED COURSE OUTLINE

NOTE: The textbook is listed as SAIS.

BACKGROUND READING
For students with only a rudimentary knowledge of US financial markets, there are numerous useful sources. One such source is:

Mason, Merton, Perold and Tufano, "The US Government Debt Market and the Structure of Interest Rates", p.87-116.

PART I. History of Fixed Income Securities

Lecture 1. ***Introduction and Overview of Fixed Income Markets (Week 1)***

- Class Organization: Review of Syllabus
- Discussion of Evaluation, Creation of Groups
- What is a Fixed Income Security?
- Overview of Global Fixed Income Markets
- Fixed Income Pretest Review
- Basic Fixed Income Calculations

Reading: SAIS, sec.1.1 and 4.1

Lecture 2. ***Early History of Fixed Income Transactions (Week 2)***

- Ancient Loans and Concepts of Interest
- The Scholastics and the Usury Doctrine
- Medieval Fixed Income Evolution
- The *Monte* of the Italian City States
- Tradeable Fixed Income Securities of Northern Europe

Reading: Course webpage download

Lecture 3. ***Valuation of Life Annuities* (*Week 3)***

- De Witt's Theoretical Solution: Pricing Contingent Claims
- Halley's Life Table Valuation: Using a life table to value a life annuity
- De Moivre's Approximation: Simplifying the Pricing Formula
- Bernoulli's Problem: Contingent claims versus annuities certain

Reading: SAIS, sec. 2.1 and Course webpage download

Lecture 4. ***Fixed Income Markets from the 17th to 21st Centuries (Week 4)***

- The English Financial Revolution
- 19th C. Government and Corporate Finances
- Rise of International Debt Markets
- The Great Depression and the Mortgage Market
- Emergence of the Eurobond Market
- The Evolution of Fixed Income Derivatives
- High Yield Bonds; Leveraged Buyouts
- The Great Recession and Quantitative Easing

Reading: Course webpage downloads

PART II. Fixed Income Valuation

Lecture 5. ***Review of Modern Fixed Income Concepts (Weeks 5 and 6)***

- Differences between US and Canadian Mortgages
- How to calculate spot interest rates
- Theories of the Term Structure of Interest Rates
- Basics of Credit and Default Risk

Reading: SAIS, sec. 4.3 and 4.4

Lecture 6 ***Fixed Income Portfolio Management: Duration and Convexity (Weeks 6 and 7)***

- Introduction to Duration and Convexity
- Classical immunization theory
- Use of Taylor Series Expansions
- Demonstrating the role of convexity

Reading: SAIS sec. 4.2, 5.3

Lecture 7. ***Tradeoff between Time Value and Convexity (Week 8)***

- Series expansion of the bond price function
- Understanding Time Value
- Cost of Convexity
- Time Value, Convexity and Yield Curve Shape

Reading: SAIS, sec. 4.2, 5.1, and 5.3

PART III Fixed Income Derivatives

Lecture 8. ***Introduction to Option Bonds (Week 9)***

- Different Types of Option Bonds
- Overview of US and Canadian Mortgage-Backed Securities;
- Derivation of Duration and Convexity for Callable/Option Bond
- Default Option and Ratings Drift

Readings: SAIS, sec. 4.4, 6.1 and 6.3

Lecture 9. ***Option Adjusted Spread Analysis (OAS) (Week 10)***

- Different Types and Approaches to OAS?
- Theory of Interest Rate Processes
- Use of Monte Carlo to determine the OAS for a callable bond
- Pitfalls in the use of OAS.

Readings: SAIS, sec. 4.4, 6.1 and 6.3

Lecture 10. ***Fixed Income Derivatives (Week 11-12)***

- Futures, Forwards, Swaps and Options
- Interest Rate Futures and Option Contracts

- Modeling the Interest Rate Process
- Prices of CME Bond Options
- Different Bond Option Pricing Formulas

Reading: Course webpage download

Lecture 11. ***Complex Fixed Income Derivatives (Week 12-Last Session)***

- Interest rate Swaps
- Credit Default Swaps
- Collateralized Debt Obligations
- Synthetic Collateralized Debt Obligations
- Pricing Exotic Interest Rate Derivatives
- Final Exam Review

Reading: Course webpage download