629A: Fixed Income Securities

Stevens Institute Business School

Dr. Suman Banerjee

January 18 - May 3, 2017

Venue & Time

Group 1: Hoboken Campus, Wednesday, 3:00 p.m. to 5:45 p.m.

Focus

Fixed-income securities include bonds that promise a fixed income stream and by extension all securities whose valuation and hedging are related to interest rates. Quantitative tools are especially important for understanding fixed-income securities: Their cash flows are contractually specified which makes it relatively easy to quantify the payoffs, yet the subtleties of interest rate movements and variations in credit risk ensure that quantitative analysis is useful.

This course is focused on the concepts and tools that are useful to corporate managers as well as fund managers who want to use fixed income securities, whether for investing, hedging, market-making, or speculating. Some of the topics to be covered are term structure modeling, option-embedded bond analysis, pooling and tranching of cash flows, asset-liability management, hedging with interest rate derivatives, mortgage-backed securities (MBS), and collateralized debt obligations (CDOs).

Broad Learning Objectives

After successfully completing this course in fixed income asset valuation, the student should have improved competencies in the following areas of:

- **Creative and Critical Thinking**
  - Critical look at the capital market and determine if what they are following the “best” practices.
  - Determine alternate methods of enhancing “investors’ wealth” in fixed income markets.

- **Creation of Value**
  - Keeping the primary objective (shareholders’ wealth maximization) clear, how can the firm add value to other stakeholders like debtholders, suppliers and customers?
• **Field Specific Knowledge and Experience**
  
  – Look at the traditional methods of how firms determine the way they finance themselves and apply concepts learned from this course to make changes to the status quo.

• **Some Statistical Data Analysis and Computer Skill**
  
  – The ability to take interest rate-related data and process through statistical procedures using MS Excel and take the results and communicate those results in a understandable way using MS Words.

• **Ethical & Professional Judgment**
  
  – Utilize ethical frameworks to analyze organizational decision-making as it relates to fixed income markets.

**At the frontier**

This area has had a lot of important developments in recent years. Students should leave NBS familiar with traditional Bond analytic as well as recent innovations in capital market. I will also devote one lecture on the current sub-prime crises and meltdown of established financial institutions.

**Prerequisites**

Financial Management is the only formal prerequisite for this class. As in most quantitative courses, students with the strongest statistics & mathematics backgrounds will breeze through most easily. This course places more quantitative demands on students than is typical of our other finance courses, but less than financial modeling.

**Course-related Learning Objectives**

By the end of this course, students should be able to:

• Bond valuation

• Calculate and use effective annual rates (EAR or EAY) appropriately when discounting

• Understand term structure, and how to calculate forward rates and estimate future spot rates

• Calculate and derive bon-duration and bond-convexity and understand their uses
• Value a mortgages with emphasis on MBS
• Use foreign exchange spot rates and forward rates to calculate Covered Interest Parity
• Understand interest rate futures, forwards, and options and their payoffs
• Determine the interest rate risk of a bank or financial institution
• Derive/Calculate the number of interest rate futures a bank needs to buy/sell to dynamically hedge its asset/liability interest rate exposure due to its duration gap

Organization of the course

The course will be in a traditional lecture format, with focus on concept, framework and applications related to capital markets.

Texts

• **Required**: Fixed Income Mathematics, 4E: Analytical & Statistical Techniques by Frank J. Fabozzi.


• **Reference**: Financial Market Rates And Flows 5/e by James C. Van Horne

Recommended Study Materials

• Wall Street Journal and/or Financial Times
• Bloomberg (I believe, two terminals are available in the business school)
• BA II Plus business calculator by Texas Instruments (TI)

About the Project

It is a group project, with each person in the group picking one security to value. This project is designed to apply the bond valuation techniques we learn in class on securities in the real world. I will provide more details about the project in early second week of February only after I hear from you about your group. I will suggest to form five groups of four students each. The entire project report is due by 5:00 pm on the exam day (May XX tentatively).
Transparencies

The lectures will be based on powerpoint that are available on Blackboard. You will probably want to print a paper copy of the transparency before each class for cross-reference during class, for study, and for taking notes on. The slides are available from the course page on http://canvas.stevens.edu. The materials are still under revision; be sure to use reload on your browser to get the most current version. I also invite you to visit my home page and research page, http://.

Grade Policy

There will be three (3) 15/20 minutes in-class quizzes. Two (2) best quiz scores out of the possible three will count and will account for 5% of your final course grade. I will announce these quizzes only one lecture in advance. There are two in-class midterm exams. Each midterm exams are worth 15% of the class grade. I will provide more information on the content of these exams close to the actual dates. Also, there is a final exam. Final exam is worth 30% of the class grade. I will post two/three homework assignments. Each homework will consist of about 8/10 problems. All homework will be graded and I post detailed solution after the due date. Homework assignments account for 10% of the final grade and graded mainly on perceived effort. Attendance, interaction and aptitude will account for 5% of the final grade.

In order to be eligible to receive a final grade in this course, you have to take all three exams. Under special circumstance, I will arrange for make-up exams, but each one of you are eligible to take only one make-up. You have to go through proper channel (student services office) and provide me with documents supporting (e.g., medical certificates) your reasons for absence. I will give +/- grades for this course.

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<tr>
<th>Evaluation methods</th>
<th>Weights</th>
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<tr>
<td>Two In-class quizzes</td>
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<td>Two midterm exams</td>
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<td>Homework assignments</td>
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<td>One final exam</td>
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<td>Short project</td>
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<td>Class participation</td>
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NOTE: I reserve the right to change any aspect at any time, including, but not limited to, assignments, grading methods or relative grading weights, assignment or exam dates, or the course schedule. However, FINAL EXAM may not be rescheduled.
Student’s Responsibilities

Cheating will not be tolerated under any circumstances. Possession of any unauthorized material and/or colluding with anyone during the tests are few (but not all) instances of cheating. Anyone involved in these activities will receive an ‘F’ grade in the course.

Understandably, job/internship search or other obligations may occasionally conflict with class. It is your responsibility to find out from your classmates what you miss when you are absent.

Special needs

Any student with a disability and in need of special accommodations during the course or examination should request accommodations in advance. Please do this as soon as possible.

Office hours

I will be in my office XXXX to meet with you every Tuesday from 3:00 p.m. – 5:00 p.m. You do not need an appointment to come by then. If you need to meet with me at a different time, I will be glad to help you but I will ask that you contact me via email (sbanerj2@stevens.edu) first to make sure that I will be in and available.

About you

In addition to enrolling through the proper authorities, please send me an e-mail with the following information:

- Name:
- Educational Background:
- Job Experience:
- Telephone number(s)

Feedback

Feedback is especially important to me. Written feedback by email is especially useful.

Summary

I invite you to join me in exploring the exciting field of fixed income investments! Good luck!
## Tentative Truncated Class Schedule

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Jan 18</td>
<td>Introduction &amp; Overview</td>
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<tr>
<td>Jan 25</td>
<td>Bond Valuation (BV) 1</td>
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<tr>
<td>Feb 1</td>
<td>Bond Valuation (BV) 2</td>
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<td>Feb 8</td>
<td>Term Structure of Interest Rates</td>
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<tr>
<td>Feb 15</td>
<td>Treasury Spot Curve &amp; Bootstrapping</td>
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<tr>
<td><strong>Feb 22</strong></td>
<td><strong>Exam 1</strong></td>
<td><em>Comprehensive</em></td>
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<tr>
<td>March 1</td>
<td>Bond Volatility &amp; Risk (BVol) 1</td>
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<tr>
<td>March 8</td>
<td>Bond Volatility &amp; Risk (BVol) 2</td>
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<tr>
<td><strong>March 15</strong></td>
<td><strong>Spring-break</strong></td>
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<tr>
<td>March 22</td>
<td>Scenario and Sensitivity Analysis</td>
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<tr>
<td><strong>March 29</strong></td>
<td><strong>Exam 2</strong></td>
<td><em>Comprehensive</em></td>
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