

**FNCE 394/894: Managing Fixed-Income Portfolios**  
**Spring 2014**  
**Syllabus**

**Instructor:** Prof. Scott Richard  
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Classroom: 10:30 JMHH F65 / 1:30 SHDH 105

Office hours are 4:30 – 5:30 pm on Tuesday. Please make an appointment by email if you like to meet with me outside of regular office hours.

**Prerequisite: FNCE 235/725 Fixed Income Securities**

**Required Text:** I will distribute a draft of my e-book, Fixed Income Portfolio Management with Models, to all class members free of charge. You will also have access to spreadsheets which contain operational versions of the models presented in class.

**Recommended Texts:**

Bond Markets, Analysis, and Strategies, Latest Edition, by Frank J. Fabozzi. Strong institutional details; all markets covered.

Fixed Income Markets and Their Derivatives, Latest Edition, 2009 by Suresh Sundaresan. Good balance of institutional details and models; all markets covered.

Fixed Income Securities: Valuation, Risk, and Risk Management, 2010, by Pietro Veronesi. Strong analytical presentation; no material on credit.

Quantitative Management of Bond Portfolios, 2007, by Dynkin, Gould, Hyman, Konstantinovskiy, and Phelps. Written for practitioners.

**Course Description:** The goal of this course is to teach you how to manage a real portfolio of Treasury, sovereign, corporate and mortgage bonds. We develop three basic models for the Treasury yield curve, corporate and sovereign credit spreads, and mortgage spreads. We use these models to find value in the bond market. To implement the concepts learned in class, students form teams to manage a paper portfolio using Barclays Point, a state-of-the-art portfolio management system. Your team trades a \$1 billion portfolio of bonds for which your goal is to outperform the Barclays Aggregate Index. You trade real securities at real prices – only the money is fake.

We begin by relating the term structure of interest rates to the market's view of the fundamental macroeconomic states of growth and inflation. To do this we need to understand a multifactor term structure model, which extends the Vasicek model you studied in the prerequisite course.

Any bond other than a Treasury has an embedded option, either to default, prepay, or in some other way reduce the promised payments to bondholders. Robert Merton was the first to recognize

explicitly that any corporate bond can be evaluated by calculating the value of the default option. Merton's model and its extensions are currently the state of the art models used in asset management firms for valuing bonds which have default risk. We apply Merton's model to the valuation of corporate bonds, credit default swaps (CDS), and sovereign debt. Understanding Merton's model allows us to link market forecasts in the credit market (or CDS market) with forecasts in the stock market. If there is a discrepancy in these forecasts, there is usually a profit opportunity.

Next, we turn to the valuation of agency MBS which requires you to learn about Monte Carlo simulation and about homeowner prepayment and default modeling. The agency MBS market is second only to the US Treasury market in size, liquidity and economic importance. Because a government agency guarantees the timely payment of principle and interest, the dominant risk in a MBS is prepayment risk, i.e., that homeowners will choose to prepay when you do not want them to.

Finally, we bring everything together to analyze how to construct portfolios with desirable risk/return profiles. We will emphasize building the cheapest portfolio in which we bear risks that are offering an unusually high expected return.

### **Barclays POINT System:**

Barclays Capital has generously offered Wharton a rare opportunity to use a real-world state-of-the-art bond portfolio system in the classroom. Your investment team will begin with a portfolio that mimics the Barclays Aggregate Index of investment grade US dollar denominated bonds. You will be able to trade this portfolio every day at real world prices. Your goal is to outperform the Barclays Aggregate Index over the semester. You will have the full use of the Barclay analytics to help you analyze potential trades. In a departure from real world money management, you will be graded on your analysis rather than your performance. (Even the best designed portfolio can suffer setbacks in only four months.) This is the key feature of this course so please make sure you attend the training session and become familiar with the POINT system.

**Lectures and Presentations:** The course is a combination of lectures by me and presentations by you. We meet 29 times during this semester, of which 21 are lectures and discussions, and 8 in-class team presentations. Class participation is encouraged and may affect your grade if you are on the cusp of two grades.

FNCE 894 Tu/Th 10:30-11:50 am

FNCE 394 Tu/Th 1:30 -2:50 pm

There is a MANDATORY Tutorial on Barclays POINT system on Friday, January 24, from 9:00 to 12:00.

### **Course Materials**

1. I will make book chapters and spreadsheets available to you electronically before each class.
2. There is no textbook for the course, but I assume that you have covered the material in the textbook for the prerequisite Fixed-Income course, Fixed Income Securities: Valuation, Risk, and Risk Management, 2010, by Pietro Veronesi. If you own any of the recommended text, you

need not buy another book if you have learned the material in the book you own.

### **3. Grades**

There are two team presentations shown on the schedule below. Each presentation will last 30 minutes and will determine 20% of your grade. You are also required to analyze individually two trades of your choosing. Each individual written trade analysis is worth 30% of your grade. I will use class participation to move up or down students who are on the cusp of two grades.

| Class | Date                | Topic   |
|-------|---------------------|---|
| 1     | Jan 16              | Overview of this course.<br>Review of basic fixed income markets.<br>The Barclays Aggregate Index<br>Portfolio Guidelines<br>Organize investment teams. |
| 2     | Jan 21              | Introduction to the Term Structure of Interest Rates (Ch. 1)  |
| 3     | Jan 23              | The Taylor Rule and US Macroeconomic Data (Ch. 2)   |
| 4     | Jan 24 FRIDAY       | MANDATORY Tutorial on Barclays POINT system 9:00 to 12:00 in JMHH 375   |
| 5     | Jan 28              | Review of Initial Portfolios and Guidelines   |
| 6     | Jan 30              | Affine Model of the Term Structure (Ch. 3)  |
| 7     | Feb 4               | A Multifactor Model of the Term Structure with Positive Interest Rates. (Ch.4)  |
| 8     | Feb 6               | Extracting Market Views of Inflation, Unemployment and Growth from the Term Structure   |
| 9     | Feb 11              | Managing Interest Rate Risk in a Portfolio. Optimal Trades to Implement Your Macroeconomic Views. (Ch.5)  |
| 10    | Feb 13              | TIPS(Ch. 6)   |
| 11    | Feb 18              | Stock Index and Corporate Asset Valuation (Ch. 7)   |
| 12    | Feb 20              | Systematic Spread Risks (Ch. 8). New Portfolio Guidelines   |
| 13    | Feb 25              | Team Meetings to Discuss Potential Trades   |
| 14    | Feb 27              | Trade Ideas   |
| 15    | Mar 4               | Team Presentations  |
| 16    | Mar 6               | Team Presentations<br>First Trade Written Analysis Due  |
|       | Mar 11 & 13         | Spring Break  |
| 17    | Mar 18              | Credit: The Merton Model (Ch. 9)  |
| 18    | Mar 20              | Credit: Extensions of the Merton Model; Credit Default Swaps (Ch. 10)   |
| 19    | Mar 25              | Credit Analysis by Industry   |
| 20    | Mar 27              | Sovereign Debt (Ch.11)  |
| 21    | Apr 1               | The US Agency and Mortgage Markets (Ch. 12)   |
| 22    | Apr 3               | Modeling Mortgage Backed Securities (MBS)   |
| 23    | Apr 8               | Mortgage Analysis   |
| 24    | Apr 10              | Risk Management and Performance Attribution (Ch. 13)  |
| 25    | Apr 15              | Portfolio Construction and Optimization (Ch. 14)  |
| 26    | Apr 17              | Team Meetings to Discuss Potential Trades   |
| 27    | Apr 22 (10:30 only) | Guest lecture   |
| 28    | Apr 24              | Team Presentations  |
| 29    | Apr 30              | Team Presentations<br>Second Trade Written Analysis Due   |
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**This schedule is tentative. We will revise it as necessary as the course progresses.**