Debt Markets
Syllabus for B8308
Spring 2018

Professor Brian P. Lancaster
Office hours: By appointment
Email: blancaster.nyc@gmail.com

Teaching Assistant: TBD
Email: TBD
Phone: TBD

Phone: 860-898-0436
Classroom: Warren 208
Classes: Mondays 9:00AM – 12:15PM

Preliminary Course Description

The purpose of this course is to teach students to analyze and understand the largest and most important fixed income bond instruments and markets (coupon Treasury’s, Treasury zeroes, forward markets, floating rate securities, repurchase agreements, mortgage backed, asset backed and collateralized loan obligations), as well as key associated derivatives, such as interest swaps, futures, options and credit default swaps. It will enable students to understand and use the key tools and concepts of institutional investors and portfolio managers to value these securities including yield, various durations, convexity, Z-spreads, option adjusted spread, total rate of return, stress testing, roll-down, breakeven analysis and Monte Carlo simulations. In addition, the hedging of interest rate risk and portfolio optimization will be covered. In the course of class discussions on these topics, the roles of various key players, such as the Federal Reserve, US Treasury, and trade clearing houses will be covered. Leveraging the 25 years of the professor’s Wall Street background, the course will cover both the theory of these instruments and markets as well as the “reality” (trading strategies, such as barbells and bullets, curve trades, squeezes, fail penalties, etc.).

While all who are interested in learning about these largest asset markets in the world are welcome to take the course, the course is particularly recommended for those wishing to pursue careers in fixed income trading, sales, research, risk, buyside portfolio investment/management or regulation.

The course has a fair amount of math (e.g. first and second derivatives are used to discuss interest risk and hedging, simultaneous equations in discussing portfolio optimization) but nothing that business school students are not familiar with. There will likely be one guest lecture (a senior fixed income buyside portfolio manager).

During class students will be asked to solve problems to help them understand and apply what is discussed in class. These problems may be done in small teams of two or three.

Mid term and final exams which are to be taken individually will be based on take home problem sets (which will be done as teams) to give students ample time to practice their newly learned skills and knowledge and prepare for the mid term and final. Powerpoints of lectures will be sent to
students before classes so students may prepare beforehand. All classes will be recorded and made available to students on request. Because the classes meet only once per week for three hours, two lectures will typically be covered at each class meeting.

Course Materials

Required

- Lecture notes and problem sets

Course Requirements

Grades will be based on the following.

- Class Participation (10%)
- Problem Sets (10%)
- Midterm (40%)
- Final (40%)

Class and Exams

Please bring a financial calculator.

Problem Sets

Because the material is technical and new concepts build on old ones, it will be essential to do the problem sets in order to follow the lectures and do well on the exams. To facilitate learning, help students use their time most efficiently in a fast paced course and recreate a professional work situation, students will work together in teams on these problem sets. Groups of students working together should submit just one assignment. All students in the same group will get the same grade.

Schedule of Lectures

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic(s)</th>
<th>Required Pre-Readings</th>
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<tbody>
<tr>
<td>01/29/2018 (M)</td>
<td>Course Overview, Coupon bonds and Zeroses</td>
<td>Readings: Session 1 Zero Updated Lecture; Session 2 Yield Lecture; Tuckman, An Overview of Global Fixed Income Markets; Ch. 1, Prices Discount Factors, Arbitrage; Ch. 2 Spot, Forward and Par Rates or Veronesi, Ch. 2 (thru p. 60) Basics of Fixed Income Securities, Discount Factors, Interest Rates, Term Structure of Interest Rates</td>
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<td></td>
<td>Overview of Debt Markets, Coupon Bonds and Treasury Zeroses – size of markets, types of markets, why fixed income, the players (banks, insurance companies, money managers, hedge funds; Treasury Zeroses, the basic building blocks of the debt markets.</td>
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<td>Yield to Maturity – Yield to maturity of bonds, coupon effects, par rates, internal rate of return, term structure of interest rates, yield curves.</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Readings</td>
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<td>02/05/2018</td>
<td>Yield to maturity, Duration, Immunization</td>
<td>Readings: Session 3 Duration Lecture; Session 4 Portfolio Immunization Lecture Tuckman, Ch. 3; p. 119 - Ch. 4, Ch. 5, 6 or Veronesi, Ch. 3, Basics of Interest Rate Risk Management – Duration</td>
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<td><strong>Duration</strong> – Interest rate sensitivity, dollar duration, duration;</td>
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<td><strong>Immunization</strong> – Asset liability management, portfolio management at banks and insurance companies, dedication, immunization.</td>
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<td>02/12/2018</td>
<td>Convexity, Rate of Return</td>
<td>Readings: Session 5 Convexity Lecture; Session 6 Rate of Return Lecture; Tuckman, Ch. 2, 3, 16; Veronesi, Ch. 4 Basic Refinements in Interest Rate Risk Management – Convexity Ch. 5 and 7;</td>
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<td><strong>Convexity</strong> – Dollar convexity, curvature, Taylor series, barbell and bullet trade strategies.</td>
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<td><strong>Total Rate of Return</strong> - Rate of return over a holding period, how to value terminal prices, impact of reinvestment rates, roll down effects, stress testing, break even portfolio manager trade strategies.</td>
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<tr>
<td>02/19/2018</td>
<td>Rate of Return (cont’d), Forward Contracts</td>
<td>Readings: Session 6 Rate of Return Lecture; Session 7 Forward Rates Lecture; Tuckman, Ch. 12, 15, 18; Veronesi, Ch. 1; Acharya and Oncu (2012) article on CANVAS</td>
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<td><strong>Total Rate of Return</strong> - Rate of return over a holding period, how to value terminal price, impact of reinvestment rates, roll down effects, stress testing, break even portfolio manager trade strategies.</td>
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<td><strong>Forward Contracts</strong> - Forward contracts, forward prices, forward rates – what they tell us and what they don’t, expectations theory, settlement dates, delivery, term premiums</td>
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<td>02/26/2018</td>
<td>Repurchase Agreements, Floating Rate Notes</td>
<td>Session 8 REPO; Session 9 Floaters; Veronesi, Ch 5, 9; Tuckman, Ch. 9; Schoenholtz and White, Taking the L-I-E Out of LIBOR</td>
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<td><strong>Repurchase Agreements</strong> – Repurchase agreements, reverse REPO, uses of REPOs in practice, REPO, systemic crisis and the recent crash, haircuts, margin.</td>
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<td><strong>Floating Rate Instruments</strong> – Valuation of floating rate notes, duration, convexity, interest rate sensitivity</td>
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<td>03/19/2018</td>
<td>Midterm, Guest Lecture</td>
<td>Readings: Session 9 Floaters lecture; Session 10 Swaps lecture; Tuckman, Ch. 12, 15, 18; Veronesi, Ch. 1; Acharya and Oncu (2012) article on CANVAS; Schoenholtz and White, Taking the L-I-E Out of LIBOR</td>
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<td>03/26/2018</td>
<td>Floating Rate Instruments (cont’d), Interest Rate Swaps</td>
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<td><strong>Interest Rate Swaps</strong> – Swaps, swap spreads, credit risk of swaps, swap spreads versus</td>
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credit spreads, counterparty plain vanilla swaps, synthetic duration, swaps – one of the portfolio managers best friends; making the complex simple.

**04/02/2018 (M)**  **Interest Rate Swaps (continued); Hedging, Options**  
*Interest Rate Swaps* – swaps, swap spreads, credit risk of swaps, swap spreads versus credit spreads, counterparty plain vanilla swaps, synthetic duration, use of swaps in portfolio management.  
*Options* – put-call parity, puts, calls, volatility effects, European and American options  
Readings: Session 10 Swaps Lecture; Session 11 Options Lecture; Schoenholtz and White, Taking the L-I-E Out of LIBOR; Veronesi, Ch. 6; Tuckman, Ch. 18

**04/09/2018 (M)**  **Options (cont’d); US Securitized Products (MBS, CMBS, ABS, CLOs)**  
*Options* – put-call parity, puts, calls, volatility effects, European and American options  
*US Securitized Products (I)* -agency and non-agency securitization techniques, residential mortgage backed securities, commercial mortgage backed securities,  
Readings: Session 11 Options Lecture; Session 12 Securitization Part 1(revised) lecture; Veronesi, Ch. 6; Tuckman, Ch. 18  
Additional Readings as posted on CANVAS.

**04/16/2018 (M)**  **US Securitized Products (cont’d) (MBS, CMBS, ABS, CLOs)**  
*US Securitized Products (II)* How to be a bond trader - let’s manipulate and undermine what we’ve learned in the course. Permutations and combinations of durations and convexities. Disruptive derivatives. The fallacy of diversification and “Tragedy of the Commons”, securitization creator and destroyer of economies.  
Readings: Session 13 Securitization Part 2 Lecture; Tuckman: Ch. 19, Additional readings as posted on CANVAS

**04/23/2018**  **Final Exam**

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**Academic Integrity**

Integrity is critical to the learning process and to all that we do. All students are expected to abide by the Columbia Business School Student Code of Conduct. A student’s responsibilities include, but are not limited to:

- A duty to acknowledge the work and efforts of others when submitting work as one’s own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
- A duty to exercise the utmost integrity when preparing for and completing examinations, including an obligation to report any observed violations.
Students with Disabilities
Students whose class performance may be affected due to a disability should notify the professor early in the semester so that arrangements can be made, in consultation with the Office of Student Affairs, to accommodate their needs.