Course: B7308 Debt Markets

Instructor: Suresh Sundaresan
Term: Spring 2013

Course Syllabus and Instructor Information
**Bio of Instructor - 1**

**Education** - M.S. and PhD from Carnegie Mellon University.

**Current Position** – Chase Manhattan Bank Professor of Economics and Finance, Columbia University.

**Industry Positions** –
- Currently a board member and senior advisor of Capula Investment Management, London.
Bio of Instructor - 2

Past Policy Positions –
• Resident Scholar at the New York Fed
• Member of Bond Markets Advisory Committee to the US Treasury
• Visiting Scholar at the IMF
• Member of Financial Markets Round Table at the New York Fed.


Current Research –
• Repo auctions, GC repo across collateral classes.
• Liquidity provision by central banks,
• Risk management of hedge funds, share classes in hedge funds.
• Bank contingent capital, liquidity management by corporations.
• Liability structure of corporations.
• Asset allocation for pensions when there is downside risk.
Syllabus and Course Outline

B7308: DEBT MARKETS (syllabus)
Spring 2013
Columbia University

Instructor: Suresh M. Sundaresan
Class Hours: TBA
Office: 401 Uris Hall
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1. Course Description

The purpose of this course is to provide a sound working knowledge of fixed income markets. The course will describe the major players in the market, key institutions, broad empirical regularities, and analytical tools that are used for pricing and risk management.

Some parts of the course will be fairly analytical while others will be largely institutional. Each session will be organized around one or two key topics/chapters. In addition, class notes will be used to supplement and clarify issues. Some selected papers will also be kept in ANGEL.

2. Outline of Key Topics

Overview of Debt Securities: What are debt securities? What are their sources of risk and return?
Historical performance of fixed income securities.
Major players and their functions: United States Treasury, Federal Reserve Banks, Primary Dealers, Inter-Dealer Brokers (IDB), Rating agencies, Sell-side and Buy-side institutions.

Major Institutions: Repo markets, auction methods (single-price and multiple-price auctions), Electronic networks, Voice-based intermediation, etc.

Major stylized facts: a) cyclical behavior (mean-reversion) of interest rates, b) short-term yields are more volatile, c) credit spreads versus business cycles, d) relation between prepayments and swap spreads, e) flight to quality, Treasury yields and financing rates.

Bond mathematics: a) price and yield conventions, b) PVBP, Duration (modified, effective and key-rate), convexity, and negative convexity.

Trade applications: spread trades, and bullet versus barbell positions, basis trades, etc.

Term Structure Theory: Spot rates, forward rates, par yields, modeling interest rates and pricing bonds.

Structural models of default: Modeling credit risk, credit spreads and their behavior, Distance to default, forecasting rating changes, high-yield and investment-grade debt markets.

MBS: Structure of MBS markets, prepayments, Option Adjusted Spreads, Pass-through securities, and REMICS.

Derivatives: Treasury futures, Interest Rate Swaps, and Single-name credit default swaps.
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3. Prerequisites

Students must have completed CAPITAL MARKETS course.

4. Course Material and Evaluation


In addition to the text, for some topics, I will provide lecture notes, as well as a number of papers, which will form the basis for the course.

Participants will be evaluated according to the following scheme.

Problem Sets: 30%.
Mid-Term Examination: 30%
Final Examination: 40%
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Exams will be open book and open notes. About 8 problem sets will be assigned in the course. Groups of 3 students will work on problem sets and hand in one solutions sheet per group. All exams will be individual effort.

5. Detailed Topics Outline

Topic 1: [Overview of Markets and Debt Securities]: an overview of the markets will be provided. We will review the basic terminology used in debt markets. The sources of risk and return of debt securities will be analyzed. Historical performance of return and risk will be presented.

READING MATERIAL: CHAPTER 1 Overview of Fixed Income Markets

Topic 2: [Price and Yield Conventions]: we will introduce the concepts of a) clean price, b) dirty price, c) accrued interest, d) yield to maturity (redemption yields), and e) current yields. EXCEL functions will be introduced to implement these measures for Government debt securities.

READING MATERIAL: CHAPTER 2 Price-Yield Conventions & Repo Markets

Topic 3: [Central Banks, Repo Markets & Funding Securities]: We will review the multiple functions of the central bank in global fixed income markets. Money market instruments will be presented and analyzed. We will review the organization of repo markets. Concepts such as general collateral repo rates, and special repo rates will be presented. The use of repo markets in the funding of dealer’s inventory positions and in the determination of forward prices will be illustrated.
Syllabus and Course Outline

**READING MATERIAL: CHAPTER 3 Federal Reserve (Central Bank) and Fixed Income Markets and CHAPTER 5 Financing Debt Securities: Repurchase (Repo) Agreements**

Topic 4: [Primary Dealers, IDBs and ECNs] The role of intermediation and the structure of OTC markets will be presented. We will explore questions of transparency and efficiency of fixed-income markets. The functions of primary dealers, IDBs and other dealers will be analyzed. The trend towards ECNs and the simultaneous co-existence of voice-based intermediation will be analyzed.

**READING MATERIAL: CHAPTER 4 Organization and Transparency of Fixed Income Markets**

Topic 5: [US Treasury and Ministry of Finance]: The functions of Government in the fixed-income markets will be analyzed. They include: a) Auctions of Treasury securities, b) benchmark issues, c) Nominal versus inflation-indexed debt securities, and d) Security Lender of Last Resort (SLLR).

**READING MATERIAL: CHAPTER 6 Auctions of Treasury Debt Securities.**

Topic 6: [Bond Mathematics-1]: we will develop basic concepts of bond mathematics. The concepts will include: a) PVBP, b) Duration (modified, effective and key-rate), c) Convexity, d) Negative convexity, etc. We will develop hedging applications and trading applications using these concepts. They will include: asset-liability management, spread trades (curve steepening or flattening) and butterfly trades.

**READING MATERIAL: CHAPTER 7 Bond Mathematics: DV01, Duration, and Convexity**
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Topic 7: [Bond Mathematics-2]: we will develop basic concepts of term structure analysis. The concepts will include: a) spot rates, b) forward rates, c) par yields, d) strip yields, and e) extracting zeroes from benchmark coupon securities. Analysis of the term structure of interest rates.

READING MATERIAL: CHAPTER 8 Yield Curve and the Term Structure, and selected pages of CHAPTER 9 Models of Yield Curve and the Term Structure

REVIEW AND MID-TERM EXAMINATION

Topic 8: [Corporate Debt] Description of investment-grade and high-yield debt markets and approaches for their valuation. Concepts of a) credit ratings, b) covenants, c) distance-to-default, d) probability of default, and e) recovery rates will be developed. Simple structural model of default will be presented.

READING MATERIAL: CHAPTER 10 Modeling Credit Risk and Corporate Debt Securities

Topic 9: [Corporate Pension Plans] We will have a guest speaker discussing corporate pension plans, their funding and asset allocation, with an emphasis on fixed-income sector.

Topic 10: [Government & Agency Securities] we will study the debt securities in the government and federal agency markets. We will analyze the agency debt securities and their spreads over benchmark Treasury securities.

READING MATERIAL: CHAPTER 11 Mortgages, Federal Agencies, and Agency Debt
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Topic 11: [Mortgage-Backed Securities] Mortgage contracts: FRMs and ARMs; Process of securitization; Mortgage Servicing Rights (MSR), Structure of MBS; Prepayments and Option Adjusted Spreads (OAS).

READING MATERIAL: CHAPTER 12 Mortgage-Backed Securities

Topic 12: [Interest Rate Swaps & Swaptions] An overview of Eurodollar futures, swap markets; swap pricing, and risk management applications.

READING MATERIAL: CHAPTER 15 Eurodollar Futures Contracts and CHAPTER 16 Interest Rate Swaps.


READING MATERIAL: CHAPTER 17 Treasury Futures Contracts and

Topic 14: [Credit Derivatives] Credit default swaps, buyers and sellers of protection, evolution of documentation covering credit events, cash versus physical settlement, CDX, Collateralized Debt Obligations (CDO), etc.

READING MATERIAL: CHAPTER 18 Credit Default Swaps: Single-Name, Portfolio, and Indexes.
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Topic 15: [TIPS] The Treasury Inflation Protected Securities Markets will be presented. (Time permitting)

READING MATERIAL: CHAPTER 13 Inflation-Linked Debt: Treasury Inflation-Protected Securities

FINAL EXAMINATION (Open book and open notes)