

**DEBT MARKETS FALL 2020**

INSTRUCTOR: Suresh Sundaresan

Office Location: 401 Uris Hall

Office Phone: 212-854-4423

Fax: 212-316-9180

E-mail: ms122@columbia.edu

Office Hours: Mondays 3.00 to 4.00 TEACHING ASSISTANT: TBA

**REQUIRED COURSE MATERIAL**

o Copies of slides/course readings/articles that will be distributed in class and posted in Canvas.

**RECOMMENDED COURSE MATERIAL**

o “Fixed-Income Markets and Their Derivatives”, Academic press, Third Edition, by Suresh Sundaresan.

o Fixed Income Securities: Valuation, Risk, and Risk Management by Pietro Veronesi

**REQUIRED PREREQUISITES AND CONNECTION TO THE CORE**

The learning in this course will utilize, build on and extend concepts covered in the following courses: Students will be expected to have mastered these concepts and be able to apply them in the course.

|  |  |
| --- | --- |
| **Core Course**  | **Connection with Core**  |
| Corporate Finance  | 1. Time value of money 2. Risk3. CAPM  |
| Capital Markets page1image30675072 | 1. Basics of Fixed Income. 2. Basics of Options.3. Basics of Investments.  |



**COURSE DESCRIPTION**

The course will describe the major players in Debt Capital Markets, key institutions, broad empirical regularities, and analytical tools that are used for pricing and risk management. Some parts of the course will be analytical while others will be largely institutional. Each session will be organized around one or two key topics. In addition, class notes will be used to supplement and clarify issues. Some selected papers will also be kept in Canvas to serve as background reading for class discussions.

**TOPICS:**

o **Major Players and Their Functions:** United States Treasury, Federal Reserve Banks, Primary Dealers, Inter-Dealer Brokers (IDB), Banks, Rating agencies, and Buy-side institutions [Pension funds/sponsors, Insurance companies].

 **TREASURY/SOVEREIGN DEBT:** Fiscal policy, government auctions of debt securities, (Discriminatory and Dutch auctions, Winner’s curse, Composition of Government Debt (Nominal bonds, TIPS, maturity structure [T-bills, T-notes and T-bonds], reopening, etc.)

 **Federal Reserve/Central Banks:** Monetary policy and its objectives (Dual versus Single mandates – Fed/ECB), Tools of monetary policy: repo auctions, Discount window, Target (Policy/short) rates, Quantitative easing (Long rates), etc. Actions taken by the central banks in the aftermath of credit crisis.

 **Corporations:** Borrowing strategies: short-term debt such as commercial paper, medium term notes, etc. Long-term debt. Design of corporate debt – callability, convertibility, ability of investors to put, etc.

 **Primary Dealers:** Who are primary dealers in fixed income markets? What are their functions? Risks and rewards of primary dealers. Market making, bidding in auctions, participating in Fed’s transactions, repo financing.

 **Inter-Dealer Brokers:** Enabling proprietary (anonymous) transactions, aggregation of bids, offers, and potential live quotes. Electronic Communication Networks (ECN), pre-trade and post-trade transparency of bond markets. Declining liquidity and risk capital in corporate bond markets. Impact of Dodd-Frank Bill and Basle III capital adequacy standards.

 **Credit Rating Agencies (CRA):** Rating conventions, Approaches to credit rating, Loss given default, probability of default, bond covenants, rating through cycles, Incentives of CRAs, and the effects of Dodd-Frank bill.



 **Banks:** What is unique about banks? Bank capital requirements. Basel III norms – capital and liquidity standards. Loss-absorbing capital. Bank resolution. Dodd-Frank Act.

 **“Buy side” institutions: Pension funds** (public sector and private sector), defined benefits (DB) plans, defined contribution (DC) plans, magnitude of under-funding of pensions, accounting and regulatory standards for valuing and reporting pension assets and liabilities. Asset allocation policies – mean-variance approaches, exposure to factors, liability driven investments (LDI), etc.

 **Insurance and Re-insurance companies:** funding annuities and other products, the crucial role of fixed income assets, property & casualty insurance companies, the role of re-insurance, Catastrophe (CAT) bonds.

o **Shadow Banking and Macro-Finance:** Credit channels in the economy –banking system and non-bank system: differences between US credit channels and the rest of the world. Elements of “shadow banking” system:

 **Repo markets:** secured lending and borrowing of cash and securities. “Safe-harbor” rights, and super-priority rights to lenders of cash in this market. Money markets mutual funds. Possibility of “creditor run” with systemic risk implications.

 **Commercial paper (CP) markets:** unsecured lending, CP rating conventions, back-up letters of credit/lines of credit, CP spreads over T-bills across different rating categories, etc.

 **Asset-Backed Securities (ABS):** securitization of assets – a) accounts receivables, credit card receivables, student loans, home equity, auto receivables, etc. – consumer ABS. Residential and commercial mortgage backed securities. Steps in securitization: underwriting loans, origination and aggregation of a loan portfolio, “true sale” of loan portfolio to a special purpose vehicle (SPV), credit and liquidity enhancements (over-collateralization, subordination, “waterfalls”, etc., rating and issuance of rated ABS to institutional buyers.

 **Wholesale funding markets:** inter-bank lending and borrowing, LIBOR, its trials and tribulations, alternatives to LIBOR such as Overnight Index Swap (OIS) rates, GCF repo rates, etc.

o **Stylized facts and empirical evidence:**



 **Money market spreads:** spreads between repo rates, CP rates, OIS, LIBOR and T-bill rates. Do money market spreads contain information about the potential for a crisis?

 **Term premium & slope of yield curve:** Upward sloping yield curve, and inverted yield curve – information about expansions and recessions? Determinants of term spreads.

 **Credit spreads over business cycles:** measuring credit spreads (AAA versus BBB, CDS spreads, etc.), impact of recessions on loss given default, determinants of credit spreads - leverage, business risk, macroeconomic conditions, covenants, seniority, security, etc.

 **Mortgage prepayments:** what factors determine prepayments – a) refinancing rates, b) housing prices, c) seasonality (school year versus non-school year), d) seasoning (new versus seasoned loans), e) premium burnout, etc. Evidence from US residential mortgage markets.

 **Swaps:** Use of swaps by corporations, pension funds and insurance companies. What are swap spreads? Determinants of swap spreads – a) repo rates, b) LIBOR, c) risk premium, d) mortgage prepayments, etc.). How should we understand 30-year swaps spreads turning negative after the Lehman bankruptcy?

o **Bond Mathematics:**

 **Price and yield conventions:** money market yield (actual/360), bond yields (actual/actual), clean price, dirty price, accrued interest, quoting conventions, etc. Can yield to maturity (YTM) be used to assess returns? Effect of reinvestment assumptions on returns.

 **Risk of Fixed Income Securities:** Price Value of a Basis Point (PVBP), Duration (modified, and effective), and convexity. Special risks associated with callable securities and MBS: negative convexity. Spot rates, forward rates, par yields, modeling interest rates and pricing bonds.

 **Portfolio and Trade applications:** duration-neutral spread trades, bullet versus barbell positions which are duration neutral but provide a play on convexity, basis trades (between bonds and futures), etc.

 **Pension/Insurance Asset Allocation:** Liability-driven investment strategies, Surplus management strategies, CAT-bonds, etc. Managing in low interest rate regimes.



 **Modeling Mortgages and MBS:** Recognizing the link between interest rates (which we use to discount cash flows) and the cash flows (prepayments) of mortgages and MBS. The concept of Option Adjusted Spreads (OAS), and its behavior in the MBS markets.

o **Derivatives:**

 **Eurodollar futures contracts.**

 **Interest Rate Swaps (IRS):** how do companies use interest rate swaps? How are they priced?

Counter-party credit risk, collateral, and marking to market. Migration of IRS from dealer markets to centrally cleared exchanges.

 **Credit default swaps/INDEX (CDS/CDX):** How do CDS work? CDS basis – funded and unfunded positions. Credit crisis and negative basis. Applications of CDS. Index products such as CDX and some structured credit products.

 **RECOMMENDED TEXT:**

o “Fixed-Income Markets and Their Derivatives”, Academic press, Third Edition, by Suresh Sundaresan.

**COURSE OBJECTIVES**

The purpose of this course is to provide a sound and comprehensive working knowledge of fixed income markets and their institutions. In addition to providing the students with a clear knowledge of institutions, pricing relationship, applications and analytics, the course will help the students to think through major issues facing investors, market makers, issuers, and regulators. *The impact of COVID-19 on global debt markets, and the actions taken by the central banks and governments around the world to deal with the crisis will be fully explored in the course.*

**ASSIGNMENTS**

• There will be three quizzes, which will be assigned as follows:

o At the end of session 6.

o At the end of session12.



o At the end of session18.

Each quiz will last for 30 minutes, and carry questions testing your understanding of the material covered in the previous sessions. Quizzes are closed book and closed notes. You can bring one page of notes. Each quiz will carry 15% weight. The quizzes will be administered during the final 30 minutes of the respective sessions.

Students will be expected to participate responsibly in class. Class participation, punctual attendance and responsible conduct in the course will carry 15% weight.

There will be a final examination, which is closed book and closed notes. You can bring one page of notes. The final exam (cumulative) will carry 40% weight.

**METHOD OF EVALUATION**

|  |  |
| --- | --- |
| Attendance & Class participation  | 15%  |
| Quiz 1  | 15%  |
| Quiz 2  | 15%  |
| Quiz 3  | 15%  |
| Final Exam (during the last class).  | 40%  |

**CLASSROOM NORMS AND EXPECTATIONS**

* Attendance is mandatory for each class session. The TA will record student attendance at the commencement of class; students who arrive 5 minutes after the scheduled commencement time will not be recorded as having attended the session. In addition, informed class participation is expected. Together, as mentioned earlier, they carry 15% of the course grade.
* Students who have a medical or other emergency reason for not attending class should contact the professor in advance of the session. Once in the classroom, students are expected not to leave the room until the session is completed.
* There will be a seating chart. Students must bring their name cards and occupy the same seat in each class.
* **I would expect you NOT to use mobile phones or laptops or digital aids during class hours.**