

UNIVERSITY OF VIRGINIA
McIntire School of Commerce

Commerce 4730
Advanced Investments

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Objectives

This course focuses on fixed income and derivative security markets. We will build off of the topics covered in Quantitative Finance and Intermediate Investments as well as introduce new topics such as credit derivatives, mortgage backed securities, CMOs, and no-arbitrage term structure modeling.

Emphasis will be placed both on recent developments in the fixed income and derivatives markets that are being adopted by major banks as well as advanced theoretical concepts such as risk neutral valuation.

Course Materials

I am sensitive to the fact that textbooks are expensive. This course draws from the materials listed below and the books are available at the library. If you wish to purchase any of the books, the previous editions of each text covers 95% of the same material and you can probably get by with that one. If anyone requests it, I can also put a copy of each book on 2-hour reserve in Clemons.

- Required course materials:
 - Lecture notes contained in the coursepack at the bookstore.
 - *The Wall Street Journal* (The *Economist* is also excellent).
 - A calculator that can find logarithms, anti-logarithms, and powers. You will not be allowed to use the calculator function on your phone during exams: They are to be turned off and stowed away.
- Supplementary course materials:
 - John Hull, *Options, Futures, and Other Derivatives*, 10th edition, Prentice-Hall, 2018. ISBN: 013447208X.
 - Sundaram & Das, *Derivatives - Principals and Practice*, 1st edition, McGraw-Hill, 2013. ISBN: 1259097099.
 - Frank Fabozzi, *Bond Markets, Analysis and Strategies*, 9th edition, Prentice-Hall, 2015. ISBN: 0133796779.

Prerequisites

This is a quantitative course. An understanding of accounting, economics, calculus, statistics and EXCEL is a must. A basic knowledge of option mechanics pricing (Black-Scholes and binomial) is also required. Students who feel weak in any of these areas may require additional preparation time for class and to complete assignments.

Course Goals

The student will gain an understanding of:

- The principles of bond valuation and risk.
- The types, uses, and valuation of basic derivatives such as futures, forwards, swaps and options.
- The difference and applications of securitization (e.g. mortgage backed securities) and structuring (e.g. collateralized mortgage obligations (CMO) and collateralized debt obligations (CDO)).
- The risk-reallocation purpose of CMOs and CDOs.
- The conceptual framework, uses and valuation methodology for credit derivatives.
- No-arbitrage term structure modeling & bond option valuation.
- Hedging using derivatives.

Honor Code

The McIntire School of Commerce relies upon and cherishes its community of trust. We firmly endorse, uphold, and embrace the University's Honor principle that students will not lie, cheat, or steal, nor shall they tolerate those who do. We recognize that even one honor infraction can destroy an exemplary reputation that has taken years to build. Acting in a manner consistent with the principles of honor will benefit every member of the community both while enrolled in the McIntire School and in the future. Students should report all suspected honor violations to an honor representative immediately, and faculty will report all suspected honor violations immediately to an honor representative. If you have questions about your Honor System or would like to report your suspicions of a Honor offense, please contact your honor representatives.

Homework: I consider copying homework assignments to be a honor code violation. You are free to discuss the issues behind the problem in groups, but you **must** arrive at the solution yourself.

Cell Phones: Please turn your cell phone off before class begins. Cell phones are not allowed during exams.

Laptops: Laptops are permitted when we are doing Excel-based exercises, but are to remain closed at all other times.

Grade Determination

Homework Assignments: Problems will be assigned for most topics and you are expected to do all assigned problems. We will typically go over the problems in class and I will usually cold call students the day the assignment is due and have the lucky student explain the solution to the class. Not being prepared to explain the solution will hurt your class participation grade.

Quizzes: I reserve the right to give an occasional pop quiz, particularly on days when class attendance appears to be low.

Attendance: I expect you to attend every class. If you have a legitimate excuse, please let me know **before** class by sending me an e-mail.

In the final analysis, grades in this course are judgment calls by the instructor. The following weights will be employed in grade determination:

| Description | Weight if you take final | Weight if you don't take final |
|-------------------------------------|-----------------------------|-----------------------------------|
| Exam I, Wednesday, 10/9, 6-9 p.m. | 30% | 45% |
| Exam II, Monday, 11/25, 6-9 p.m. | 30% | 45% |
| Final Exam, Friday, 12/9, 9-12 p.m. | 30% | 0% |
| Participation, quizzes & attitude | 10% | 10% |
| Total: | 100% | 100% |

- All exams will be closed book, closed notes.
- If you do not take an exam at the specified time and have not cleared the absence with me prior to the start of the exam, you will receive a zero for that exam.
- The final exam will be cumulative and optional. Since 90% of the course grade comes from the exams, the weight on each exam will be 30-30-30 if you take the final, or 45-45-0 if you do not take the final.

Rescheduling of Exams

- Please take careful note of the above examination and other due dates. These dates are fixed and non-negotiable.
- If you currently have a conflict with one of the dates (sports schedule, etc.) let me know in writing (or e-mail) no later than Friday, September 6, 2019. If you do not notify me of a conflict by then, I will expect you to show up for the exam as scheduled. Failure to show up for a scheduled exam will result in a **zero** for that exam.
- The exams **will not** be offered at times other than scheduled ones.

Instructor and Availability

Office: Robertson Hall, 354

Office phone: 924-4050, E-mail: pjd9v@virginia.edu.

Office hours: 12:30-1:30 Tuesday and Thursday and by appointment.

Internet Access for Course Materials

Class materials in addition to the course-pack will be distributed through COLLAB.

Schedule

Specific topics and their approximate schedule appear in the table below. While we may deviate slightly from this schedule, it provides the structure for the course. Some of the assignments will require use of Microsoft EXCEL.

| Topic | Chapters in Sundaram & Das | Chapters in Hull 10th Ed. |
|--|-------------------------------------|------------------------------------|
| Fixed Income | | |
| Introduction | | |
| Bond valuation | 26 | 4 |
| Bond yields | 26 | |
| The term structure | 26 | |
| Interest rate risk | | 4 |
| Securitization and application to MBSs | | |
| Structuring and application to CMOs | | |
| Derivatives | | |
| Corporates and default risk | 32 | |
| Credit risk and credit derivatives | 31 | 24, 25 |
| Futures and forward contracts | 2, 3, 4 | 1, 2, 5 |
| Hedging with futures | 5 | 3 |
| Bond futures and forwards | 6 | 6 |
| Interest rate swaps | 23 | 7 |
| Foreign exchange swaps | 25 | 7 |
| Stochastic term structure models | 29-30 | |
| Hedging with options | 17 | 19 |
| Value at risk | 20 | 22 |