

Prospectus
Adventures in Debentures
Spring Semester, 2001

1.) Course Description.

The objective of this course is to undertake a rigorous study of fixed income securities. The course is quantitatively oriented and requires some background in finance and statistics.

A wide variety of fixed income securities will be discussed. The course will begin with pure discount, default-free, government bonds. As the semester progresses, we will analyze coupon bonds, callable bonds, puttable bonds, sinking fund provisions, floating rate notes, and home mortgages.

We will also talk about some closely related financial instruments. These include forwards and futures on fixed income securities, bond options, options on bond futures, caps, floors, collars, and interest rate swaps. Valuation of fixed income securities as well as interest risk management requires a deep understanding of these important financial claims.

In addition to analyzing specific types of fixed income securities, we will study some tools that are useful in bond portfolio management. These include construction of discount functions (or yield curves), duration and convexity measures for risk management, and models for pricing a variety of fixed income securities.

There are several topics that we will not discuss. These subjects include: the relation between macroeconomic variables and interest rates, tax effects, and multi-factor models of the term structure. Further, our discussion of default risk and mortgage-backed securities will be minimal. These topics are clearly relevant, but time constraints will force us to ignore these subjects.

At the end of the semester, my hope is that students will be more comfortable in

doing three things. First, how to manage interest rate risk. Second, how to value securities with cash flows that are sensitive to movements in interest rates. Third, how to determine the optimal exercise policy for bond options and embedded options in bonds (i.e., when to refinance).

While the perspective of this course is from the viewpoint of a bond investor, a person in corporate finance needs to understand similar material. Evaluating an investment in a fixed income security is the mirror image of the problem faced by a corporation in deciding whether or not to issue a bond.

Lectures will be the primary format of the course. There will be extensive use of problem sets.

2.) Transparencies, Textbooks, and Other Assigned Readings.

Associated with each lecture is a set of transparencies. Each student will receive a copy of these transparencies (hopefully) prior to the lecture. The purpose of these copies is to improve the communication within the classroom. Students should no longer feel the need to take extensive notes, and as a result they should be able to think more about the material as it is being presented. Moreover, students should be spared the pain of trying to decipher transcriptional errors in their notes. To the extent that additional notes are desired, I recommend that the students write the notes directly on these copies.

There will be some lectures where we fail to cover all the relevant transparencies. Unless announced to the contrary, students are not responsible for the material that was not discussed in class.

There is no textbook that is ideal for this course. As a result, I have attempted to make the course self-contained, so a textbook should not be necessary.

There are some students who do find it useful to see the same material presented in different ways, and so I have put several books on reserve at the library. A list of books on reserve is given below.

Wharton Reprographics will sell a bulk pack that contains all the relevant materials. In addition, there will be a handout fee that will be applied to your bursar bill at

the end of the term. I estimate that the number of pages in addition to those in the bulk pack will be around 250 pages. Your bursar bill will reflect the actual cost of the handouts.

Students who miss class are responsible for obtaining copies of any lecture notes, problem sets, and other class handouts. It is recommended that prior arrangements be made to have another student pick up handouts for a class to be missed. Following the lecture, I will place any extra copies of the handouts in the files outside my office (located at 2336 of Steinberg-Dietrich Hall).¹ *However, once these extra copies are gone, it is your responsibility to borrow the relevant material from another student in the class to make a copy.*

3.) *Material Placed on Reserve.*

The following books will be placed on reserve at the library:

Fred D. Arditti. 1996. *Derivatives: A Comprehensive Resource for Options, Futures, Interest Rate Swaps, and Mortgage Securities*. Harvard Business School Press. Boston, Massachusetts.

Richard M. Bookstaber. 1991. *Option Pricing and Investment Strategies*. Third Edition. Probus Publishing Company. Chicago, Illinois.

John C. Cox and Mark Rubinstein. 1985. *Options Markets*. Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Frank J. Fabozzi, editor. 1997. *The Handbook of Fixed Income Securities*, Fifth edition. Irwin Professional Publishing. Chicago, Illinois.

Kenneth D. Garbade. 1996. *Fixed income Analytics*. MIT Press. Cambridge, Massachusetts.

John C. Hull. 1997. *Options, Futures, and Other Derivative Securities*. Third Edition. Prentice-Hall, Inc. Englewood Cliffs, New Jersey

Suresh Sundaresan. 1997. *Fixed Income Markets and Their Derivatives*. South - Western College Publishing. Cincinnati, Ohio.

Bruce Tuckman. 1996. *Fixed Income Securities*. John Wiley & Sons. New York.

¹ I will also try to put the solutions to the problem sets on the Web Homepage for this course. (See below for details about this Web site.) After you download this material, you will need Adobe Acrobat to examine it.

Paul Wilmott, Jeff Dewynne, and Sam Howison. 1993. *Option Pricing: Mathematical Models and Computation*. Oxford Financial Press. Oxford, United Kingdom.

4.) *The Web Homepage for Course.*

There will be a Web homepage for this course. Some of the information that will be posted includes:

- Any announcements relevant to the course.
- Current schedule for lectures, office hours, and review sessions.
- A small subset of the bulk pack which is on sale in reprographics. If you have yet to register for the course, this subset will help you keep up with the course for the first three lectures while you are deciding whether or not to buy the bulk pack.
- Current set of e-mail addresses, office numbers, and phone numbers.
- Posting of any material that might be relevant for review sessions.
- Solutions to problem sets that have been turned in.

The URL for the homepage is:

`http://finance.wharton.upenn.edu/~fixedinc`

By the way, if you wish to use e-mail to discuss a matter regarding the course, you should send your e-mail to:

`fixedinc@finance.wharton.upenn.edu`

5.) *The Lectures.*

The background of each student in the course differs, and I provide a few sessions that may be viewed by some students as review material. For most lectures, I have included a preface which should help guide you as to whether or not you know the material. Your course grade will not be affected by your attendance. If you do not need to attend a particular session, please feel free to miss that lecture.

However, when you come to class, you are expected to attend the section in which you are registered. Please do not attend another time slot without my prior approval.

6.) Class Participation.

During class time I encourage you to ask questions. If time becomes short, I may be forced to delay answering your question until after class.

I will also call on people during class. The main purpose of this is to get some feedback on the pace of the lecture.

To make it easier for me to get to know you, seating will be assigned after the second week in the semester. I would also like you to bring a name plate to class.

If you have an electronic photograph on file with the University,² I will receive your picture from my class list. If for some reason you do not have a electronic photograph on file, you will be required to have your picture taken.

You are expected to attend the section in which you are registered. Please do not attend another time slot without my prior approval.

7.) Problem Sets.

Many problem sets will be assigned during the semester. Late answers will not be accepted. You are to turn in your answers before class begins.

For all the problem sets you may work with other students in the class. This is designed to give each individual the opportunity to maximize his or her learning experience from the course. Of course, there is no reason to believe that an organized group is the best approach for everyone.

A team of people need only submit one copy of their solution for a particular problem set. Every member of a particular group will receive the same grade on a problem set.

² Such a photograph is taken when you get your ID cards.

Students from different sections of this course may be in the same study group. It is also okay for a study group to consist of both undergraduates and MBA students. However, the number of students must be less than or equal to four.

To ease the grading of the problem sets, there are several things that you are expected to do. These include:

- Your course number (either 235 or 725) and section number should appear in the upper right hand corner next to your name. Please be sure this information is legible.
- All pages of your solution should be stapled together.
- Answers should be clearly marked. It is appropriate to put a box around the final answer, underline it, or highlight it.
- Printed copies of spreadsheet output should be kept to a minimum.

Solutions to each problem set will be available after your answers have been turned in. Your graded answers will be returned to a file which is outside my office in 2336 of Steinberg-Dietrich Hall. The problem sets will be graded by giving a “check-plus,” “check,” “check-minus,” or “no credit.” Due to time constraints, most of the questions on the problem sets will not be discussed in class. The help and review sessions will handle questions about the problem sets, and I will be happy to discuss the questions outside the class.

Some questions on the problem sets may require use of micro computers. Knowledge of electronic spreadsheets (e.g., Microsoft Excel) is presumed. Students are expected to have access to personal computers via the University.

8.) Grades.

In assigning the final grade, I anticipate the following distribution. I expect 20% of all registered students to receive either an A or DS, 35% to receive a B or HP, 40 – 45% to receive a C or P, and 0 – 5% will receive a D, F, or NC. For undergraduates I will also attach a plus or minus to some grades. I will adjust this distribution if I think the group of students is unusual.

The undergraduates and MBA students will be pooled together in determining the letter grades for the exams and for the final course grade. After teaching this course for many years, I do not think it is appropriate to maintain separate grade distributions.

MBA students may also receive “qualified credit,” or a QC, as part of their final grade. The QC is awarded to those MBA students in the lowest decile of all registered students.³

9.) Office Hours and Virtual Office Hours.

My office hours will be on Mondays and Wednesdays from 4:45 pm to 5:45 pm. My office is located in 2336 SH-DH, and phone number is 215 – 898 – 1118. You can also talk with me before or after class to arrange another time for an appointment. You may also talk with my administrative assistant, Elaine Thomas, to make an appointment. Elaine is located in 2305 SH-DH. Elaine’s phone number is also 215 – 898 – 1118. You may also contact Elaine by e-mail to make an appointment with me; her e-mail address is:

`emthomas@wharton.upenn.edu`

In addition, the teaching assistants for the course will also provide office hours. These hours will be announced during the lectures.

“Virtual office hours” will also be available by e-mail. You should send all e-mail to:

`fixedinc@finance.wharton.upenn.edu`

Please use only this address for your e-mail. E-mail will be checked every 24 hours during the business week. You should receive some response (although perhaps not a complete answer) within that time frame.

10.) Articles in the Bulk Pack.

Almost all of the material in the bulk pack was written by the instructor. However, I have included a few articles that were written by others.

³ While non-MBA students are included in computing the lowest decile, only MBA students can receive a QC.

The following list is presented in the order that the articles appear in the bulk pack:

Stephen Schaefer. 1977. "The Problem with Redemption Yields." *Financial Analysts Journal*. July/August. Pages 59 – 67. (Appears as Appendix A of *Interpreting Bond Yields*.)

"A Museum of Finance in Wall Street's Shadow." *Baltimore Sun*. January 9, 1994. (Appears as Appendix A of *Vasicek 2: The Term Structure*.)

11.) A Final Caveat.

This prospectus should not be viewed as a binding legal contract; it only describes my intentions as of the beginning of the semester. During the semester, I will feel free to deviate from this prospectus.