

The Wharton School
Financial Derivatives (206/717)

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Financial Derivatives

FNCE [717]-001: TuThu 9am, JMHH F95
FNCE [206]-001: TuThu 1:30pm, JMHH 365

1 Course Description

The phenomenal growth in the global markets for exchange-traded Options and Futures contracts on financial assets (foreign exchange, fixed income and equity securities, and stock indices) and on commodities has been accompanied by the growth in Over-the-Counter markets for swaps, related options, and other structured products. The exchange-traded products are traded by individuals and institutional investors, but the structured products are tailored to institutions. These *derivative securities* are used to meet a variety of objectives. For example, the markets in options on stock indices and in futures contracts on Treasury securities allow managers to control the risk of their portfolios and alter the distribution of the returns on their portfolios. And options and futures contracts on interest rates, currencies and commodities permit corporate treasurers to manage risk. These markets also permit individuals as well as hedge funds to speculate on price movements and relative price relationships among assets and commodities.

Most features of the “newer” financial contracts are almost always equivalent to bundled portfolios of options, futures and their underlying securities. A solid grasp of options and futures helps us to understand these (more complex) objects with relative ease.

While the techniques for the valuation of options and futures might at first glance appear advanced and difficult, they are easily and conceptually digestible. And in the process of learning these valuation techniques we uncover many practical aspects of the use of options and futures.

The current markets are in turmoil and relative prices and activities in the market do not reflect the recent experience of what are now called “normal” times. Those normal conditions will surely be reestablished when credit markets return to normal – credit is the lifeblood of both commerce and investing – because global markets and institutions have already absorbed the benefits of their use and both risk management and speculation are not spent forces. In the meantime, our opportunity this term is to study these markets in extraordinary times and learn from them.

The purpose of this course is to provide the student with the necessary skills to value and to employ options, futures, and related financial contracts. In order to provide a useful treatment of these topics in an environment that is changing rather rapidly, it is necessary to stress the fundamentals and to study some important applications. The topics to be covered are

- Futures Markets & Their Applications, including the pricing and use of futures contracts on stock indices, on commodities, and Treasury instruments;
- Options Markets & Their Applications, covering the valuation and use of options, including a discussion of the empirical evidence and dynamic asset allocation strategies;
- Swaps, Complex Derivatives, Structured Securities including several cases, and the use (and misuse) of derivatives in the context corporate applications.

I expect that a third of the course to be devoted to options, slightly less than a third to futures, and the remainder to more complex derivatives — although many applications are included in the coverage of options and futures markets, the final part of the course employs several cases.

Pre-requisites: Basic knowledge of statistics from the core course is expected. I recommend that you should have had Core finance; but if you're willing to put in the hours to learn the relevant ideas of risk and return and the minimum understanding of institutional arrangements necessary to follow the class, you can enroll in the course without my permission. **Auditors** need to check with me on the first day of class.

2 Office Hours

Office: 3259 SHDH; 'phone 898-6206.

Office Hours: My posted hours are on

Tuesdays	11am-12pm
Fridays	1:30-3pm

I'll *always* be in (I may have stepped out but only for 5 mins) at these times. I have an open door policy on Fridays from 10am on, but it's wise to call (215 898 6206) just before if you intend to come by.

Please note that I am *unavailable* (a) TuThu 9:00am-10:30am, and 1:30-3pm when I am teaching you all; (b) all day Wednesday, and (c) Tu-Thu 3-4:30pm.

Dial-a-Question: Call 898-6206 for answers to brief questions: I might be able to save you some time in making a trip in to campus.

Weekly TA Office Hours: Lucy Jin and Zhang Chenying are the designated TAs for this course; their office hours to be posted soon; they occasionally conduct review sessions over the practice problems.

Locations and time-slots for the TAs office hours are announced in the second week of class, and included each week in the Weekly Memo (see below) you'll receive as an e-mail every Thursday.

3 Department of Notifications

1. *Weekly Memos.* I send e-mail late each Thursday night to give directions on what to read for the following week, as well as sample problems, Answers to Frequently Asked Questions regarding the Projects, Reminders and such. These e-mails will have a subject heading that begins with "FINDERIVS!!" Please read them carefully.
2. *Web Café:* I make pretty extensive use of the web-Café. All handouts (other than the coursepack), project descriptions, Sample Problem Sets and Exams, Examples I worked out in class, and other class-related material are posted here.
3. *E-Mails:* When sending me e-mail, please use

krishna@wharton.upenn.edu

and do avoid hitting the Reply to All button to a general e-mail that I have sent to all students, for obvious reasons.

You should be on the class e-mail list-server very shortly after you register. If you drop the course, please send me an e-mail so you can be dropped from the list and shielded from the dreadful stuff I send your former classmates: that may take a few days, so please be patient.

4. *Non-Whartonites*: If you're not from Wharton, then please do let me know your e-mail address so I can get you on the list-server asap.
5. *Seating Plan* : After the first class, stick to the seat you choose for the remainder of the semester. And please do plant your name-cards on your desk, at least for the first few weeks.

4 Text

Required Text: MacDonald, Robert, *Derivatives Markets*, Prentice Hall. This is the book I'll follow, its explanations are better than other texts, but the organisation of the book is haphazard. I'll ask the Reserve desk to keep a copy for you to look at – or you can borrow one from me – but you are not required to buy it.

There are a couple of other books that you may find useful as references, although I may distribute copies of certain chapters from these books. They are:

1. Hull, John, *Fundamentals of Futures & Options Markets*, Prentice-Hall. It covers both futures and options and their applications. On the plus side, all the topics that I cover are discussed here, and it is a decent reference source. However, it is very weak on intuition, and its treatment of markets and derivative strategies is not deep.
Please note that Hull has a more advanced text called *Options, Futures and Other Derivatives*. It is also published by Prentice-Hall. Students who have a quantitative background and prefer a technical exposition, or those who intend to take Financial Engineering next Spring may find this book useful; on the plus side, it is a complete reference source, but unhappily, it is even shorter on intuition than the "Fundamentals" version. I recommend this book for the Financial Engineering Seminar.
2. Cox, John C and Mark Rubinstein, *Options Markets*, Prentice-Hall, 1985. This is an excellent but expensive book, around which the treatment of options in this course is designed. A well-thumbed copy belongs on every finance major's bookshelf. It doesn't have chapter-ending problems. But it does have the most useful treatment of the basic ideas of finance — corporate finance, even — that you will find anywhere.
3. Rubinstein, Mark, *Derivatives: A PowerPlus Picture Book*, a CD-ROM based, PowerPoint-employing, hyperlinked, spreadsheet-firing book which covers almost everything we'll do in the first two-thirds of the course. It is available directly from the author from www.in-the-money.com, where you can examine a few pages. Mark's book provides excellent intuition (as does his book co-authored with John Cox) and it is quite thorough. If you're keen on the subject, if you'd like a slightly more technical exposition from a very knowledgeable author, and if you like to work through a CD-ROM workbook, this is a fine source.
4. Siegel, Daniel R and Diane F Siegel, *Futures Markets*, The Dryden Press, 1990. I have placed several copies on Lippincott reserve, and interested students can come by my office to borrow a copy. Very dated but an excellent book which I would recommend to anyone who goes into the futures business. My notes will draw on some material from this book.
5. Chew, Lilian, *Managing Derivatives Risks*, Wiley, 1996. A practitioner-oriented book; I'll use a chapter I distribute.
6. Epstein, Richard, *The Theory of Gambling and Statistical Logic*, Academic Press, 1977. Feel it's all gambling and speculation and connected to Vegas, and want a complete, fun and strongly analytical treatment of every game of chance? See this one.

5 Course Requirements

The course grade will be based on

1. One *Group Project*, which will be distributed in parts dealing with the valuation and use of options contracts. The project is to be done in groups of no more than 3 people: *there will be no exception to this rule.*

Descriptions of project requirements and the data will be distributed later. It involves some data collection — why not start now, form your group to follow the options on a stock of your choice, even taking the step of printing out the put and call prices on that stock, from the web-site of the exchange where they trade, or Yahoo!finance.¹ — but you can use the software package provided with Hull's book (or you can use the computer programmes I place in the web-Café) to assist your analysis. These routines are canned — no expertise in programming is necessary.

Weight, 20%

2. Two mid-terms exam — the first on the Futures material on Thursday, Feb 26, and the second on Options material on Tuesday, April 14, both closed-book and closed notes, but you may bring a single sheet of $8\frac{1}{2} \times 11$ " paper with one side left blank — each for two hours, from 6 to 8pm.

Total Weight, 50%

3. One final exam — in the exam period on the date set by the registrar — very basic and conceptual questions on all the material, some true false and the rest multiple choice; designed so that in calmly reviewing your material it you will solidify your understanding. It can only help improve your grade if you clear this certification hurdle!

Weight 20%

4. Two case write-ups, which are to be done in groups and turned in before the class in which the case is to be discussed. You can come by the TA's office hours or my hours for help or clarification, but you CANNOT consult across groups.

Weight, 5% each

6 Mark Your Calendars/Organizers

Please mark the following important dates into your schedule for the term: these dates are lapidary *i.e.*, *written in stone.*

Date	Event	Remarks
1. Feb 26	<i>Mid-Term 1</i>	Closed Book, Closed Notes
2. Apr 1	<i>NO CLASS: Group Project Work</i>	
3. Apr 14	<i>Mid-Term 2</i>	Closed Book, Closed Notes
4. Apr 21	Project Write-up Due	4pm, SHDH 2300
5. TBA	Final Exam	Closed Book

¹This will save you time in negotiating the labyrinth of Bloomberg when you begin working on the project in early April.

All exam-related absences must now receive **prior approval** from the Grad Division for MBAs; or from the UG advisors and me, for UGs. All requests for regrades — even discussions of the grading — should be directed to me a week after the graded item is returned, in my Office Hours, and *not* to my TAs.

7 Course-packs

Course Pack A The first course-pack will be available from Wharton Reprographics on Monday Jan 19 — after and if they sell out they need a day's notice to run one off for you. It contains a copy of my class-notes, as well as additional readings, problem sets and so on. I urge you to order it: the alternative is to remember to print this from the PDF file off the web-café and remember to bring the relevant part to class! (Optional for purchase — available on web-café.)

Course Pack B This is a required separate course pack **to be made available after Spring Break** — it contains the copyrighted Harvard Cases and a charge for the additional pages which I distribute in class. (Required: everyone must buy).

Your bursar's bill will be charged automatically for the actual cost of reproducing in-class handouts. My current estimate is that the total cost won't exceed that for 550 pages.

8 Review Sessions for Doubt-Clearing

Weekly review sessions are so sparsely attended that I've decided that the TA and I will hold them only just prior to the mid-terms and the final. So please use our office hours and call me with any questions you have. The TAs and I will hold Office Hours throughout each week, so you should have ample opportunities for doubt-clearing. And we will help you work through problems posted (with solutions) in the course down-load area.

9 Readings

As indicated in the first class, one must get more technical here than in the average Finance course if one is to provide a useful and correct treatment. Your approach to the readings, therefore, is very important. You should read with a view to grasping the concepts being discussed, and make every attempt to follow the mathematical treatment.

My Weekly Memo will direct you to do the readings and work at some problems. In general, it is best to skim the text once *before* you see the material in the lecture, and afterwards review the material and the text carefully and try the problems.

I make a distinction between *Week-by-week Lecture Notes* that are in Course Pack A and on the web cafe (these I project to accompany my lectures); and *Notes to these Lectures with Problems* (which I post weekly to the web cafe!) You should have a copy of the Lecture Notes in front of you in class. And occasionally I will distribute some class handouts.

If you miss a lecture, then

1. the *quickest* way to get any in-class hand-out that class is to get it from a colleague and xerox it; or

2. the next best way is to look for that handout, whose date will appear in its file-name, in the course web-Café. Whenever possible, I will create a PDF version that you can double-click on and print;
or
3. you can drop by during my office hours and pick up a copy. If I've run out of copies, I'll print one for you.

E & O E

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