

The Wharton School  
Financial Derivatives (206/717)

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Spring 2010

### Financial Derivatives

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|----------------|------------|---------------|
| FNCE [717]-001 | MW 10:30am | Room 265 JMHH |
| FNCE [206]-001 | MW 1:30pm  | Room 255 JMHH |
| FNCE [717]-401 | TTh 1:30pm | Room 270 JMHH |

## 1 Course Description

Here is the standard description that I have employed for this course in the past:

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, credit derivatives, 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 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.

And here are some additional remarks (in the interest of full disclosure!) relevant to this term’s offering of the course:

*The current markets are in turmoil and relative prices and activities in the market do not reflect the past experience in what are now called “normal” times. Those conditions will be reestablished when credit markets return to normal – credit is the lifeblood of both commerce and investing – but the form of the hysteresis is still to unfold. In the meantime, our opportunity this term is to study these markets in extraordinary times and learn from them. In this context, we will focus on the business plans of the principal institutions involved, the market mechanisms, the leverage used, and the incentives in place during the crisis, and what the future of the financial landscape might look like. My goal is to cover the normal analytical content of valuation and hedging of derivatives, but supplement that material with the business context of their applications, and their unraveling in recent times.*

**Pre-requisites:** Basic knowledge of statistics from the core course is expected. 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) MW 10:30am-3:00pm and TuThu 1:30-3pm when I am teaching; and (b) Tu-Thu 3-4:30pm.

*Dial-a-Question:* Call (215) 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:* I have three TAs for this course who will hold Office Hours in the cubicles in the Finance Department (2400 SHDH). Their hours will be posted soon (as soon as their class schedules are fixed). Their times may change: if they do you’ll be notified in my weekly e-mail and on the web-café. They’ll occasionally conduct review sessions over the practice problems.

## 3 Department of Notifications

1. *Weekly Memos.* I send an e-mail late every Thursday night to give guidance: what we’ve covered this week, on what to read for the following week, as well as sample problems, Answers to Frequently Asked Questions regarding the Project, Practice Problems, Reminders and such. These e-mails will have a subject heading that usually 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, even Weekly Memos 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.

## 4 Text

Recommended Text: Hull has a text called *Options, Futures and Other Derivatives* in its seventh edition that you may find useful. It is prohibitively expensive. Students who have a quantitative background and prefer a technical exposition, or those who intend to take Financial Engineering next Spring will find this book useful; on the plus side, it is a complete reference source. Unhappily, it is short on intuition, reading at times like a mobile phone manual. The notes in my coursepack, those handed out in class and posted on the web-café will be adequate coverage.

Here are some other books:

1. Cox, John C and Mark Rubinstein, *Options Markets*, Prentice-Hall, 1985. This is an excellent 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. If you find a remaindered or used copy, buy it (see [www.bookfinder.com](http://www.bookfinder.com)) for yourself or for a friend.
2. 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.
3. Chew, Lilian, *Managing Derivatives Risks*, Wiley, 1996. A practitioner-oriented book; I'll use a chapter I distribute.
4. 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.

Here is a selection from the many books that combine reporting with commentary, and provide illustrative, humorous but sometimes sadly accurate examples from the world of derivatives:

1. Sorkin, Andrew R, *Too Big To Fail*, Viking, 2009. A sobering read.
2. Cohan, William D, *House of Cards*, Doubleday, 2009. On Bear Stearns.
3. Das, Satyajit, *Traders, Guns and Money*, Financial Times/Prentice Hall, 2006. Lighter but very relevant fare.

## 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 futures and 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.<sup>1</sup> — 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 Tuesday, Feb 23, and the second on Tuesday, April 06, 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 — on Friday, May 7 from 6-8pm, fixed by the University 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 29%**

## 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 23      | <i>Mid-Term 1</i> , 6-8pm   | Closed Book, Closed Notes |
| 2. Mar 22 & 23 | <i>Lecture 17: NO CLASS</i> | Group Project Work        |
| 3. Apr 06      | <i>Mid-Term 2</i> , 6-8pm   | Closed Book, Closed Notes |
| 4. Apr 21      | Project Write-up Due        | 4pm, SHDH 2400            |
| 5. May 7       | <i>Final Exam</i> , 6-8pm   | Closed Book               |

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.

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

## 7 Course-packs

Course Pack A It will be available from Wharton Reprographics after Jan 19 – 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 own a copy: the alternative is to remember to print the notes 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 in class); 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 additional handouts. If you miss a lecture, then

1. the *quickest* way to get any in-class hand-out is to get it from a colleague and xerox it; or
2. to look for that handout, whose date will appear in its file-name, in the 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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