

Instructor: Fernando Anjos

Location: CBA 4.304

Time: TTH 9:30AM- 11:00AM

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Office hours: Fridays, 2:00PM-4:00PM

TA: Adam Winegar, CBA 5.334N, adam.winegar@phd.mcombs.utexas.edu

TA office hours: TTH 2:00PM-3:00PM

I. Overview

This class presents the fundamental concepts and techniques of risk management. We adopt the perspective of a non-financial corporation and we focus on financial risks; with some emphasis on applications (for example, managing risk associated with fluctuating oil prices). A key mechanism through which companies manage financial risk explicitly is through the use of derivatives (for example, forward contracts or options);¹ and so much of the course will focus on understanding how derivatives are used to manage risk. An integral part of this exercise is to understand how derivatives are valued.

At the end of the course, students should: (i) have a clear understanding of the economic rationale for risk management, and specifically the rationale for managing risk using derivatives; (ii) master the basic techniques for the valuation of forwards, futures, swaps, and vanilla options (calls and puts); (iii) master the basic techniques for engineering hedges using forwards, futures, swaps, and options; (iv) know how to compare different risk-management approaches (for example, deciding between the use of forwards vs. options), based on a clear risk-management output (for example, Value-at-Risk).

Finally, please note that the syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change due to unforeseen contingencies and/or to enhance the class learning opportunity. These changes will be communicated clearly.

¹ Many managerial decisions have consequences for the ultimate level of risk a company is exposed to (for example, capital structure or operational leverage). However, in order to study risk management as a separate discipline this is not a very useful approach (too broad).

Prerequisite: Restricted to students in a business major. Additional prerequisite: Mathematics 408D or 408L, and credit or registration for Finance 367 or 367Q.

II. Lecture guide

The table below describes the material to be covered in each class (with some references when appropriate—also see point V below). Lecture slides will be posted online on Blackboard and distributed in class.

| Class no. | Date | Content |
|-----------|---------------|--|
| 1 | Jan-14, Tues | Class objectives and policies Basic notions of futures and options (1/2) <ul style="list-style-type: none"> Hull, 2008, ch.1 |
| 2 | Jan-16, Thurs | Basic notions of futures and options (2/2) Risk measures and the impact of derivatives |
| 3 | Jan-21, Tues | The economics of risk management (1/3) <ul style="list-style-type: none"> Mainly based on: Froot, Scharfstein, and Stein, (1994); Stulz (1996); Adam, Dasgupta, and Titman (2007) |
| 4 | Jan-23, Thurs | The economics of risk management (2/3) |
| 5 | Jan-28, Tues | The economics of risk management (3/3) |
| 6 | Jan-30, Thurs | CASE 1: Hedging Currency Risks at AIFS |
| 7 | Feb-4, Tues | Mechanics of futures' markets <ul style="list-style-type: none"> Hull, 2008, ch.2 |
| 8 | Feb-6, Thurs | Hedging strategies using futures <ul style="list-style-type: none"> Hull, 2008, ch.3 |
| 9 | Feb-11, Tues | Review session |
| 10 | Feb-13, Thurs | EXAM 1 |
| 11 | Feb-18, Tues | Determination of futures and forwards prices (1/2) <ul style="list-style-type: none"> Hull, 2008, ch.5 |
| 12 | Feb-20, Thurs | Determination of futures and forwards prices (2/2) |
| 13 | Feb-25, Tues | CASE 2: Hedging gone wrong – Metalgesellschaft <ul style="list-style-type: none"> Based on Edwards and Canter (1995) |

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| 14 | Feb-27, Thurs | Interest-rate futures and swaps <ul style="list-style-type: none"> Hull, 2008 (selected parts of chapters 4, 6, 7) |
| 15 | Mar-4, Tues | CASE 3: Liability management at General Motors |
| 16 | Mar-6, Thurs | Additional reading (TBA) |
| 17 | Mar-18, Tues | Option markets, properties of stock options, and option trading strategies (1/2) <ul style="list-style-type: none"> Hull, 2008 (selected parts of chapters 8, 9, 10) |
| 18 | Mar-20, Thurs | Option markets, properties of stock options, and option trading strategies (2/2) |
| 19 | Mar-25, Tues | Review session |
| 20 | Mar-27, Thurs | EXAM 2 |
| 21 | Apr-1, Tues | Valuation of options using binomial trees (1/2) <ul style="list-style-type: none"> Hull, 2008 (selected parts of different chapters) |
| 22 | Apr-3, Thurs | Valuation of options using binomial trees (2/2) |
| 23 | Apr-8, Tues | The Black-Scholes-Merton model (1/2) <ul style="list-style-type: none"> Hull, 2008 (selected parts of different chapters) |
| 24 | Apr-10, Thurs | The Black-Scholes-Merton model (2/2) |
| 25 | Apr-15, Tues | How much to hedge and which instruments to use (1/2) <ul style="list-style-type: none"> Integrate costs and benefits of hedging Dynamic simulation approach Application to Southwest case in-class |
| 26 | Apr-17, Thurs | How much to hedge and which instruments to use (2/2) |
| 27 | Apr-22, Tues | CASE 4: Modeling and managing Southwest's energy risk <ul style="list-style-type: none"> No pre-class reading required. |
| 28 | Apr-24, Thurs | Additional reading (TBA) |
| 29 | Apr-29, Tues | Review session |
| 30 | May-1, Thurs | EXAM 3 |

III. Homework assignments

The table below describes the content of homework assignments and posted/due dates. Case preparation can be conducted in groups of up to 4 students; the remaining homework assignments are to be completed individually.

| HW no. | Date posted / Date due | Description |
|--------|---|---|
| 1 | Jan-16 / Jan-23 (7PM) | Problem set on basic notions of derivatives and risk measures. |
| 2 | Jan-23/ Jan-30 (<u>before class</u>) | Problem set on economics of risk management. Read case and write answers to CASE 1. |
| 3 | Feb-6/ Feb-11 (7PM) | First problem set on futures and forwards. |
| 4 | Feb-20/ Feb-25 (<u>before class</u>) | Second problem set on futures and forwards. Read case and write answers to CASE 2. |
| 5 | Feb-27/Mar-4 (<u>before class</u>) | Problem set on interest rate futures and swaps. Read case and write answers to CASE 3. |
| 6 | Mar-20/Mar-25 (7PM) | First problem set on options (market characterization, trading/hedging strategies) |
| 7 | Apr-3/Apr-10 (7PM) | Second problem set on options (binomial model). |
| 8 | Apr-10/Apr-17 (7PM) | Third problem set on options (Black-Scholes-Merton model). |
| 9 | Apr-17/Apr.24 (7PM) | Problem set on Value-at-Risk and choice of hedging strategy. |

IV. Grading

There will be three 100-point exams, each covering a subsection of the material; and each counting 20% towards the final grade. Failure to attend an exam will result in a grade of zero.

Homework assignments count 35% towards the final grade and are graded on a discrete 0-2 scale, where 0 is assigned if the homework is not handed in or is almost totally incomplete, 1 if it is visible that the student made an effort but the assignment is mostly incorrect, and 2 if most of the assignment is correct. Late assignments are not accepted and will obtain a grade of zero. **Homework assignments will be posted online via Blackboard and are to be handed in also via Blackboard (digital dropbox).**

Class participation, also graded on a discrete 0-2 scale, counts 5% of the final grade and will depend on the effort you put into class discussions. A grade of 2 is reserved for students who consistently contribute to class discussion throughout the semester.

Your final point grade (out of 100 points) is then calculated as follows: $0.6 \times \text{Average Exam Grade} + 0.35 \times \text{Average Homework Grade} + 0.05 \times \text{Participation Grade}$. The passing grade for the course is 60 points. Students with point grades above 60 will be graded on the following curve: A (4.0) → 20%; A- (3.67) → 20%; B+ (3.33) → 20%; B (3.0) → 35%; B- or below → 5%.

Extra or make-up assignments are in general not possible.

V. Materials

This course has no required textbook and the material in the slides plus attending classes is enough to be able to complete the homeworks and do the exams. I will distribute slides and other handouts at the beginning of the class. A significant portion of the course is based on the following book, which you may want to buy if you plan a career path that makes heavy use of derivative securities:

Hull, John C., 2008, "Options, Futures, and Other Derivatives", 7th edition, Pearson

Other material:

- HBS case #9-205-026 – "Hedging Currency Risks at AIFS".
- HBS case #5-293-123 – "Liability Management at General Motors".
- "A Framework for Risk Management", Kenneth Froot, David Scharfstein, and Jeremy Stein, *Journal of Applied Corporate Finance*, vol. 7, no. 3, Fall 1994
- "The Collapse of Metallgesellschaft: Unhedgable Risks, Poor Hedging Strategy, or Just Bad Luck?", Franklin R. Edwards and Michael S. Canter, *Journal of Futures Markets*, vol. 15, no. 3, 1994
- "Rethinking Risk Management", Rene Stulz, *Journal of Applied Corporate Finance*, vol. 9, no. 3, 1996
- "Financial Constraints, Competition, and Hedging in Industry Equilibrium", Tim Adam, Sudipto Dasgupta, and Sheridan Titman, *Journal of Finance*, vol 62, no. 5, October 2007

Students are expected to have a calculator that allows for log/exp functions at all classes; and use of the calculator will be helpful for class participation.

VI. Academic integrity

University of Texas Honor Code:

"The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

Each student in this course is expected to abide by the University of Texas Honor Code. **[See the UT Honor Code above.]** Any work submitted by a student in this course for academic credit will be the student's own work.

You are encouraged to study together and to discuss information and concepts with other students. You can give "consulting" help to or receive "consulting" help from other students taking the same class. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

VII. Students with disabilities

Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities (SSD) at (512) 471-6259 (voice) or 1-866-329-3986 (video phone). Faculty are not required to provide accommodations without an official accommodation letter from SSD.

- Please notify me as quickly as possible if the material being presented in class is not accessible (e.g., instructional videos need captioning, course packets are not readable for proper alternative text conversion, etc.).
- Contact Services for Students with Disabilities at 471-6259 (voice) or 1-866-329-3986 (video phone) or reference SSD's website for more disability-related information:
http://www.utexas.edu/diversity/ddce/ssd/for_cstudents.php

VIII. Conduct

In order for you to get the most out of this class, please consider the following:

- (i) Attend all scheduled classes and arrive on time. Late arrivals and early departures are very disruptive.
- (ii) Please do not schedule other engagements during this class time. I will try to make the class as interesting and informative as possible, but I can't learn the material for you.
- (iii) If you have trouble hearing the lecture or media presentation because of distractions around you, quietly ask those responsible for the distraction to stop. If the distraction continues, please let me know. It is often impossible for me to hear such things from my position in the classroom.
- (iv) Please let me know immediately if you have any problem that is preventing you from performing satisfactorily in this class.