Energy Financial Risk Management
FIN 377.5
Fall 2011

Location: section 03565 → UTC 3.104; section 03570 → CBA 4.332

Time: section 03565 → M-W, 9:30-11:00; section 03570 →M-W, 11:00-12:30

Instructor: Fernando Anjos

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TA office hours: Tuesdays, 2-4

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 an emphasis on energy applications (e.g., managing risk associated with fluctuating oil prices). The main mechanism through which companies manage financial risk is through the use of derivatives (e.g., forward contracts or options), either explicitly or implicitly (as in a long-term supply agreement); 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, since the economic rationale for risk management critically hinges on the price at which risk management can be executed.

At the end of the course, students should: (i) have a clear understanding of the economic rationale for risk management; (ii) master the basic techniques for the valuation of forwards, futures, and vanilla options (calls and puts); (iii) master the basic techniques for engineering hedges using forwards, futures, and options; (iv) understand the specifics of risk management in terms of energy risk.

Finally, I want to 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.

Prerequisite: FIN 367 (Investments).

II. 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.

There will be 6 homework assignments, to be completed individually. Homeworks count 35% towards the final grade and are graded on a discrete 0-2 scale, where 0 is assigned in case 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. Homeworks are due no later than midnight of the day specified in the table under point III below. Late homeworks 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 x Average Exam Grade + 0.35 x Average Homework Grade * 100 / 2 + 0.05 * Participation Grade * 100 / 2. 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.

III. Lecture guide

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

Class no.	Date	Class subject
1	Wed., Aug. 24	Class objectives and policies. Basic notions of futures and options (1/2) *(based on Hull,2008, ch. 1)*

2	Mon., Aug. 29	Basic notions of futures and options (2/2) *(based on Hull, 2008, ch. 1)*. Introduction to Value-at-Risk.
3	Wed., Aug. 31	The economics of risk management: when and how should firms hedge? *(based on Froot, Scharfstein, and Stein, 1994, Journal of Applied Corporate Finance)* .
4	Wed., Sep. 7	Specifics of energy risk management *(based mainly on Davis, 2010)* **HW 1 assigned.**
5	Mon., Sep. 12	Measuring risk: general modeling of spot prices and the Value-at-Risk methodology (1/2)
6	Wed., Sep. 14	Measuring risk: general modeling of spot prices and the Value-at-Risk methodology (2/2) **HW 1 due.** **HW 2 assigned.**
7	Mon., Sep. 19	A closer look at (spot) energy financial risk (1/3): oil *(based mainly on Davis, 2010)*
8	Wed., Sep. 21	A closer look at (spot) energy financial risk (2/3): natural gas *(based mainly on Davis, 2010)* **HW 2 due.**
9	Mon., Sep. 26	A closer look at (spot) energy financial risk (3/3): electricity *(based mainly on Davis, 2010)*
10	Wed., Sep. 28	**EXAM 1**
11	Mon., Oct. 3	Mechanics of futures' markets (based on Hull, 2008, ch.2)
12	Wed., Oct. 5	Outside speakers: Cedric Kouam and Jacob Steubing (Horizon Wind Energy)
13	Mon., Oct. 10	Outside speaker: Vincent Kaminski (Rice University)

14	Wed., Oct. 12	Hedging strategies using futures *(based on Hull, 2008, ch. 3)* **HW 3 assigned.**
15	Mon., Oct. 17	Determination of futures and forwards prices (1/2) *(based on Hull., 2008, ch. 5)*
16	Wed., Oct. 19	Determination of futures and forwards prices (2/2) *(based on Hull., 2008, ch. 5)* **HW 3 due.**
17	Mon., Oct. 24	Hedging gone wrong: the Metalgesellschaft case **HW 4 assigned.**
18	Wed., Oct. 26	Energy futures: markets, pricing, and risk management strategies (1/2)
19	Mon., Oct. 31	Energy futures: markets, pricing, and risk management strategies (2/2) **HW 4 due.**
20	Wed., Nov. 2	**EXAM 2**
21	Mon., Nov. 7	Outside speaker: Rob Jones (Bank of America)
22	Wed., Nov. 9	Mechanics of options markets *(based on Hull, 2008, ch. 8)* Properties of stock options *(based on Hull, 2008, ch. 9)*
23	Mon., Nov. 14	Valuation of options using binomial trees (1/2) *(based on selected parts of different chapters in Hull, 2008)*
24	Wed., Nov. 16	Valuation of options using binomial trees (2/2) *(based on selected parts of different chapters in Hull, 2008)* **HW 5 assigned.**

25	Mon., Nov. 21	The Black-Scholes-Merton model (1/2) *(based on selected parts of different chapters in Hull, 2008)*
26	Wed., Nov. 23	The Black-Scholes-Merton model (1/2) *(based on selected parts of different chapters in Hull, 2008)* **HW 5 due.** **HW 6 assigned.**
27	Mon., Nov. 28	(Advanced) Energy options: markets, pricing, and risk management strategies **HW 6 due.**
28	Wed., Nov. 30	**EXAM 3**

IV. 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 big portion of the course is based on the following book, which you may you 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

There are two other books that I base the lectures on (especially the first; the second is quite technical):

Edwards, Davis W., 2010, "Energy Trading and Investing", McGraw-Hill

Pilipovic, Dragana, 2007, "Energy Risk", 2nd edition, McGraw-Hill

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.

V. 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.

VI. 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

VII. 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.