

Derivative Pricing

Course: Derivative Pricing	Term: Fall 2009
Professor: Bahattin Buyuksahin	e-mail: bbuyuks1@jhu.edu
Course Number and Location: BU.756.750, DC Campus Room:208	Phone: (202) 4360202
Meeting time: W 7:45 – 9:45, Aug 26 –Dec 09	Office Hour: by appointment only

COURSE OBJECTIVES

Course Description

The aim of the course is to offer a broad overview on forwards, futures, swaps and options. This course will cover both the actual working of derivatives and some of the analytical tools needed to effectively understand derivatives. In fact, the course balances theory and application. The overall emphasis is on how to price derivatives.

OVERVIEW

The course is divided into three main parts. The first part is very standard and is devoted to Forwards, Futures and Swaps and Options (1st part).

Part 1: Pricing of Forwards, Futures and Swaps and Options

- a) Pricing Forwards and Futures;
- b) Hedging using Forwards and Futures;
- c) Swaps.
- d) Trading strategies with options
- e) Option pricing;

Part 2: More advanced topic in derivative pricing

- f) Credit Derivatives
- g) Exotic Options Pricing
- h) Interest Rate Derivatives

Part 3: Financial Econometrics

- i) How to compute volatility and covariance/correlation.
The latest techniques in computing volatility (risk) and correlation will be discussed.

Learning Outcome

By the end of this course students will learn how to

- i) price futures and forwards;
- ii) hedge risk exposure using derivatives;
- iii) design swaps;
- iv) trade options;
- v) price options.

Derivatives have become extremely important in financial markets. In fact, derivative securities are very versatile and can be used for hedging, speculation or arbitrage activity. Students attending this course will learn how to price and use derivatives. The emphasis is on both theory and practice.

Prerequisites

Corporate Finance (BU.756.701) course is prerequisite for this course.

Homework and Exams

Discussion and exams will reward those who prepare in advance. The exams will draw heavily on the homework assignments given throughout the semester. Grading will be based on homework (30 percent), a midterm exam (35 percent) and a cumulative final exam (35 percent). Exams are taken without the aid of textbooks or of notes of any kind. All homework should be typed and submitted to me by e-mail not later than specified due date (homework sent in late will not be accepted). For programming assignments, you should submit a working program file. For analytic and algebraic exercises, I prefer to receive them as a LaTeX format but also accept PDF files.

We will use the Eviews programming language in this course. Although Eviews is not available on campus, there is a student version Eviews that you can use at home. You will need to download it.

This class uses Blackboard web-based system. Most class documents will be uploaded to this site. Students should have an account on Blackboard to access the class web-site and to obtain class handouts. To get an account, go to Blackboard login page, <http://bb.carey.jhu.edu> and follow the instructions.

Required Texts

We will use only parts of the following text.

- John Hull (2008), *Options, Futures and Other Derivatives*, 7th Edition, Prentice Hall (hereafter, JH).
- Robert McDonald (2006), *Derivatives Markets*, 2nd Edition, Addison Wesley. (hereafter, RM)

Recommended Texts

- Peter Christoffersen (2003), *Elements of Financial Risk Management*, Academic Press (hereafter, PC).
- Justin London (2006), *Modeling Derivatives Applications in Matlab, C++, and Excel*, FT Press. (hereafter JL)

Topics and Readings

Exams will not presume knowledge of the optional articles, except to the extent that they have been explicitly discussed in class. New articles may be added to the list during the course. The following is a tentative outline. Circumstances may arise which result in more or less material being covered.

Week 1

Introduction to Financial Derivatives

Req. JH ch. 1, 2 and 3

Rec. RM ch 1

Week 2

Interest Rates and Determination of Forward and Futures Prices

Req. JH Ch 4 and 5

Rec. RM ch 2 and ch. 5

Week 3
Financial Forwards and Futures

Req. JH ch 6
Rec. RM ch 5 and 7

Week 4
Commodity Forwards and Futures

Req. JH ch 6
Rec. RM ch 6

Week 5
Swaps

Req. JH ch 7
Rec. RM ch 8

Week 6
Options

Req. JH Ch 8, 9 and 10
Rec. RM 9

Week 7
Binomial Option Pricing and Black Scholes Formula

Req. JH Ch 11, 12 and 13
Rec. RM Ch. 10 11,12 and 20

Week 8
Monte Carlo Valuation of Option

Req. JH ch 19
Rec. RM Ch. 19

Week 9
Midterm Exam
Guest Speaker TBA

Week 10
Credit Derivatives

Req. JH Ch. 23
Rec.

Week 11
Exotic options and their valuation

Req. JH. Ch 24 and Sections 26.4 to 26.7
Rec. RM Ch 14

Week 12
Interest rate derivatives

Req. JH ch 28-31
Rec.

Week 13
Financial Econometrics

Req. PC Ch 2-4
Rec.

Week 14
Course Review

Req. JH Ch 34
Rec.

Attendance Policy

Attendance and participation are part of your course grade. Full attendance and active participation are required for you to succeed in this course. Two classes, both excused and unexcused, may be missed without penalty. Beyond those two absences, your participation grade will be dropped ten points for each absence. Six absences, whether excused or not, result in a failing grade for the course. For an absence to be excused, you must have contacted the instructor prior to the class meeting, and you must provide a valid, legitimate, substantiated excuse at the next class session.

Academic Integrity and Ethical Conduct

Carey Business School students assume an obligation to conduct themselves in a manner appropriate to The Johns Hopkins University's mission as an institution of higher education and with accepted standards of ethical and professional conduct. Students must demonstrate personal integrity and honesty at all times in completing classroom assignments and examinations, in carrying out their fieldwork or other applied learning activities, and in their interactions with others. Students are obligated to refrain from acts they know or, under the circumstances, have reason to know will impair their integrity or the integrity of the university. Violations of academic integrity and ethical conduct include but are not limited to cheating, plagiarism, unapproved multiple submissions, knowingly furnishing false or incomplete information to any agent of the university for inclusion in academic records, violation of the rights of human and animal subjects in research, and falsification, forgery, alteration, destruction, or misuse of official university documents or seal. Students are also expected to abide by the Student Code of Conduct (see pages 40-42).

<http://carey.jhu.edu/catalog/academic-policies/academic-standards/>

Disability Services

If you are a student with a documented disability who requires an academic adjustment, auxiliary aid, or other accommodations, please contact Jennifer Smith in the Disability Services office at least **four weeks** prior to the beginning of the first class meeting:

- Phone: 410/516-9728;
- Fax: 410/516-9748; or
- E-mail: onestop.disability@jhu.edu

Statement of Diversity and Inclusion

Johns Hopkins University is a community committed to sharing values of diversity and inclusion in order to achieve and sustain excellence. We believe excellence is best promoted by being a diverse group of students, faculty and staff who are committed to creating a climate of mutual respect that is supportive of one another's success.

Testing Center

The Testing Center provides testing-related services including:

- Administration of make-up exams
- Accommodation for special testing needs due to a documented disability through Disability Services
- Referrals for tutoring

Contact the center by phone at 410/516-9750 or email: onestop.testing@jhu.edu to inquire about testing needs.