Boston University Questrom School of Business

FE829 – Futures, Options and Financial Risk Management
Thursdays, 6:30-9:15, HAR 404

I. Instructor and TAs

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II. Course Description, Learning Goals, Materials

This course intends to be an introduction to financial derivatives, namely options, futures and swaps. It will provide an overview of their main characteristics, as well as the factors that affect their prices and use in practice. The course will cover both pricing and hedging issues, more relevant from the point of view of large companies (financial and otherwise), as well as returns and liquidity, more relevant for small investors. The focus will be on conceptual issues as opposed to the institutional aspects (although the basic institutional aspects will be covered). By all standards this is a quantitative class and a good background in calculus and statistics is highly desirable, if not necessary. For MBA students, FE721 and FE722 are prerequisites.

Learning objectives: At the end of the course you will be able to:
* Describe the main characteristics of the different types of derivatives, as well as their applications both for investments and hedging purposes.
* Calculate the price of the main derivative securities traded in markets, as well as the hedging strategies followed by derivatives traders.
* Identify the right derivatives to use in different risk management scenarios, as well as the appropriate strategy to follow.
* Invest in derivatives yourself and recognize the associated risks.

The course will consist of lectures, supported by slides that I will make available before the lecture.

The reference book for the course is *Options, Futures and Other Derivatives*, 10th ed, by John Hull.

III. Course Evaluation

The grade will be based on class participation, a class project, one midterm exam and one final exam. The grade will be assigned according to a distribution of grades resulting from the higher of the two following possibilities:

A) Class participation: 15%
    Paper: 15%
    Midterm: 25%
    Final: 45%

B) Class participation: 15%
    Paper: 15%
    Final: 70%

Homework will be assigned, and discussed in class, but not collected or graded. However, it will factor into the class participation grade, as explained next.

The class participation grade will be based on questions raised and answered in class, including, especially, those related to homework. Passive class attendance is not class participation.

The paper will consist of an original presentation of no more than three pages (plus graphs and data, if any) of a derivatives related topic. Examples of possible topics will be provided in class. The paper is due by email, before 7 pm of April 30.

Midterm and final are both closed-book, but one page (one-sided for the midterm, double-sided for the final) of formulas, or notes, will be allowed. A calculator will also be allowed.

Exam Dates

Midterm: March 19 during class time

Final: May 7, 6:00 pm – 8:00 pm

IV. Course Policies

Attendance Policy

Attendance will not be directly monitored but will have an effect in your class participation grade, as lack of attendance will prevent you from getting involved in class discussions. If you miss a class for a justified reason, you should give notice as soon as you can.

Academic accommodations for students with special needs

In keeping with University policy, any student with a disability who needs or thinks they need academic accommodations must call the Office of Disability Services at 617-353-3658 or stop by 19 Deerfield Street to arrange a confidential appointment with a Disability Services staff member. Accommodation letters must be delivered to your instructor in a timely fashion (not later than two weeks before any major examination). Please note that accommodations will not be delivered absent an official letter of accommodation.

Academic Integrity Policy

The Questrom School has developed an Academic Conduct Code which will be strictly enforced: (https://www.bu.edu/academics/policies/academic-conduct-code/).

V. Course Outline (Tentative)

INTRODUCTION

Lecture 1: Introduction.
      · Course overview.
      · Financial Risk.
      · Derivatives.

OPTIONS

Lecture 1: Introduction.
      · Different options.
      · Institutional aspects: margins.
      · Payoff diagrams.
      · *H*: **10**.

Lecture 2: Arbitrage Pricing.
· Determinants of prices.
· Put-call parity.
· Price boundaries.
· *H*: **11**.

Lecture 3: Trading Strategies.
· Spreads.
· Combinations.
· Clientele effects.
· *H*: **12**.

Lecture 4: Binomial Pricing Model.
· Single-period.
· Multi-period.
· Pricing of American options.
· *H*: **13**.

Lecture 5: Black and Scholes Formula.
· Mathematical foundations.
· Assumptions of the BS formula.
· VIX.
· *H*: **14-15**.

Lecture 6: Hedging.
· Delta and other "Greeks."
· Implicit volatilities.
· Extensions to the BS formula.
· *H*: **19-20**.

Lecture 7 (I): Midterm.

Lecture 7 (II): Corporate Options 1.
· Equity, debt, and warrants.
· Convertible bonds.
· Risk management.
· *H*: **24**

Lecture 8: Financial Risk.
· Default probabilities.
· Estimation and prediction.
· Bank risk capital.
· *H*: **24**

Lecture 9: Corporate Options 2.
> · Investment rules.
> · Real options.
> · *H*: **36**

FUTURES

Lecture 10: Introduction.
> · Forward and future contracts.
> · Marking to market.
> · Institutional aspects.
> · *H*: **2**.

Lectures 11: Pricing of Futures.
> · Determination of forward price.
> · Normal backwardation and contango.
> · Index arbitrage.
> · *H*: **5**.

Lecture 12: Hedging with Futures.
> · Cross-hedging and hedging ratios.
> · Main futures contracts.
> · Options on futures.
> · *H*: **3, 18**.

SWAPS

Lecture 13: Swaps.
> · Interest rate, "plain vanilla" swaps.
> · Valuation.
> · Credit default swaps.
> · *H*: **7, 25**.