

Futures and Options (C15.0043-001/2)

SPRING 2018

Professors: Menachem Brenner & Rangarajan K. Sundaram

Course Description: This is a course in derivatives markets: structure, valuation and strategies. It combines theory, empirical findings and practical applications. The main applications include the equities markets, fixed income, foreign exchange and commodities (e.g. oil, gold, silver). The key derivatives instruments discussed include forwards, futures, swaps and options. Readings, cases and examples include the recent Financial Crisis, the 1987 Crash, LTCM, Metallgesellschaft, etc.

The first half of the course, taught by **Professor Brenner**, has two parts. The first part deals with the futures markets, pricing and hedging with such contracts. The second part deals with option market strategies, put call parity and binomial pricing.

The second half, taught by **Professor Sundaram** has **three parts**. The first part will cover advanced options topics including the Black-Scholes model, the option smile, options greeks and exotic options. The second part will cover swaps (mainly interest rate swaps and currency swaps). And the final part will cover credit derivatives.

Prerequisites: All core courses. Some basic knowledge of futures and options is assumed.

Exams and Grading: There will be two exams; one at the end of the 1st part (Prof. Brenner's) and one at the end of the 2nd part (Prof. Sundaram's). The final grade will be based on the two exams and the problem sets given in each part. The problem sets will carry a weight of 20% of the final grade. The grades given in each part of the course will carry equal weight. Class participation may improve your grade. The grade distribution is: A (25%-35%), B (50%-60%); C (5%-15%); D,F (remainder). There are no make-up exams.

Problem Sets: Provided on NYU Classes. There will be 6-8 problem sets (3-4 in the 1st half and 3-4 in the 2nd half). Solutions to the problem sets will be provided after you received your home works back. Additional problems will be presented and discussed in class.

Required Material: You are responsible for the material covered in class, handed out in class and sent to you by e-mail. The problem sets and **all handouts** are part of the class material.

Recommended books:

Rangarajan K Sundaram and Sanjiv R. Das, Derivatives, Principles and Practice. McGraw-Hill/Irwin, Second Edition, 2015.

John Hull (H) Fundamentals of Futures and Options Markets, Prentice Hall, 2017.

Market Tracking: You are expected to follow the markets on a daily basis. In particular, you should pay attention to 'fair value' of Gold futures, SPX futures, and Implied Volatility from index options (e.g. VIX). **Market tracking questions may appear on the exam.**

Your internet 'favorites' should include the exchange sites; CME, CBOE. You are also expected to read the financial press. Pay special attention to the futures and options columns in the **WSJ&FT**.

Class Days and Hours: Tuesday and Thursday; 2:00-3:15 for Section 001
Tuesday and Thursday; 3:30-4:45 for Section 002

The 1st part (Prof. Brenner's) will start on January 23 and end March 8.
The 2nd part (Prof. Sundaram) will start on March 20 and end May 3.

Class Attendance: Students are expected to attend all classes and be on time. No late admittance.

Laptop usage is not allowed in class. Cellphones must be silenced.

Honor Code: You are responsible for observing Stern's Honor Code. See Page 5.

Office Hours: Prof. Brenner: T/Th 5:00-6:00. January 23 – March 8.

Prof. Sundaram: M/W 11-12:00, March 20 - May 3.

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Course Outline

Professor Menachem Brenner

I. Futures Markets

1. Forward and Futures: Overview (H: pp. 1 – 7)
2. The Structure of the Futures Markets (H: Ch. 2)
3. Trading; Clearing and Delivery
4. The Cost of Carry Model
5. Arbitrage Pricing (H: Ch.5)
6. Hedging with Futures (H: Ch.3)

II. Options Markets: Basics

1. Options Strategies and Markets (H: Chs. 9, 11)
2. Options Valuation: Arbitrage Conditions (H: Ch.10; 10.1-10.3, 10.5-10.7)
3. Put-Call Parity (H: 10.4).
4. The Binomial Model (H: Ch.12)

Professor Rangarajan K. Sundaram

III. Option Pricing and Option “Greeks”

- 1. Review of the Binomial Model (Sundaram-Das, Chapter 11)**
- 2. The Black-Scholes Model and Implied Volatility (Sundaram-Das, Chapters 14-15)**
- 3. Sensitivity Analysis - Option Greeks (Sundaram-Das, Chapter 17)**
- 4. Exotic Options (Sundaram-Das, Chapters 18-19)**

IV. Swaps

- 1. Interest-rate Swaps (Sundaram-Das, Chapter 23)**
- 2. Currency swaps (Sundaram-Das, Chapter 25)**

V. Credit Derivatives

- 1. Credit Derivatives (Sundaram-Das, Chapter 31)**

GRADING

At NYU Stern we seek to teach challenging courses that allow students to demonstrate differential mastery of the subject matter. Assigning grades that reward excellence and reflect differences in performance is important to ensuring the integrity of our curriculum.

In general, students in this course can expect a grading distribution similar to that used in our core courses, where:

- 25-35% of students can expect to receive A's for excellent work
- 50-60% of students can expect to receive B's for good or very good work
- 5-15% of students can expect to receive C's or less for adequate or below work

Note that while we will use the above as a guide, the actual distribution for this course and your own grade will depend upon how well each of you actually performs in this course.

ACADEMIC INTEGRITY

Integrity is critical to the learning process and to all that we do here at NYU Stern. All students are expected to abide by the **NYU Stern Student Code of Conduct**. A student's responsibilities include, but are not limited to:

- A duty to acknowledge the work and efforts of others when submitting work as one's own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
- A duty to exercise the utmost integrity when preparing for and completing examinations, including an obligation to report any observed violations.

Please see www.stern.nyu.edu/uc/codeofconduct for more information.

STUDENTS WITH DISABILITIES

Students whose class performance may be affected due to a disability should notify the professor early in the semester so that arrangements can be made, in consultation with the Henry and Lucy Moses Center for Students with Disabilities, to accommodate their needs.

Please see www.nyu.edu/csd for more information.