Professor R.K. Sundaram
B40.3335: Futures and Options
MW 8:30–9:50pm & TR 5:30–6:50pm
Spring 2000

Course Outline: Futures & Options

Course Description This course introduces students to the field of derivative securities, focussing in particular on futures, forwards, and options. The objective is to understand (a) the role that can be played by these securities in the management of risk, and (b) the general principles underlying the pricing and hedging of derivative securities. A more detailed list of topics may be found below.

Course Prerequisites The course is essentially self-contained. No background knowledge of derivative securities is required.

Textbooks and Notes Class notes for the course are available through the bookstore. The lectures will follow these notes very closely. In addition, it is strongly recommended that students have a copy of John Hull's *Futures, Options, and Other Derivatives* (Fourth Edition, Prentice–Hall, 1999).

For the segment of the course dealing with futures, a very good reference is Darrell Duffie's *Futures Markets* (Prentice Hall, 1989); unfortunately, I believe this book is now out of print. For the part dealing with options, *Financial Options* (Irwin, 1990) edited by S. Figlewski, W. Silber, and M.G. Subrahmanyam; *Options Markets* by J. Cox and M. Rubinstein (Prentice–Hall, 1985); and *Option Pricing* by R. Jarrow and A. Rudd (Irwin, 1983), are all recommended as additional reading.

Several other books also do a commendable job of covering the relevant material for this course. *Mathematics of Financial Derivatives: A Student Introduction* by P. Wilmot, et al (Cambridge University Press) is an excellent and relatively non-technical introduction to a wide variety of issues in derivatives pricing and usage. John Hull's *An Introduction to Futures and Options Markets* (Prentice–Hall, 1998) is a less technical and more readable version of his other book; however, it does not cover as many topics. *Derivative Securities* by R. Jarrow and S. Turnbull (South-Western, 1994) and *An Introduction to Derivatives* by D. Chance (4th Edition, Dryden, 1994) are other excellent choices.

Examinations and Grading Grades for the course will be based on two in-term examinations and a final examination. The better of the two in-term exams will be taken towards 40% of the course grade, with the final accounting for the remaining 60%.

Exam Dates The dates for the in-term and final exams are as follows:

1. For the section that meets MW 8:30–9:50pm:

    (a) The first in-term examination will be held on Wednesday, February 23, 2000, and will include material covered upto and including February 16, 1999.

    (b) The second in-term examination will be held on Monday, April 3, 2000, and will include material covered upto and including Wednesday, March 29, 2000.

    (c) The final examination will be held on Tuesday, May 9, 2000, from 5:25–7:25pm in Room 2-70, KMEC.

2. For the section that meets TR 5:30–6:50pm:

    (a) The first in-term examination will be held on Tuesday, February 22, 2000, and will include material covered upto and including February 15, 1999.

    (b) The second in-term examination will be held on Tuesday, April 4, 2000, and will include material covered upto and including Tuesday, March 28, 2000.

    (c) The final examination will be held on Tuesday, May 2, 2000, from 5:25–7:25pm in Room 3-50, KMEC.

Office Hours & Contact Information I will hold office hours from 3:00–5:00pm on Mondays, and from 3:00–5:00 pm on Thursdays. Except where conflicts with classes and seminars arise, I am also available at other times by appointment.

Contact Information My office is located at Room 9–92 K-MEC. My office telephone number is 998-0308. I can also be reached via e-mail at rsundara@stern.nyu.edu. My secretary, Ms. Barbara Jordan, can be reached at 998-0303.

Course Outline and Schedule The order in which classes will proceed is the following:

1. Overview.
   Readings: (i) From the notes: Chapter 1. (ii) From Hull: Chapter 1.

2. Futures markets.
   Readings: (i) From the notes: Chapter 2. (ii) From Hull: Chapter 2 (pp. 19–33).

3. Pricing forwards and futures.
   Readings: (i) From the notes: Chapter 3. (ii) From Hull: Chapter 3 and Appendix 3A.

4. Hedging using futures: Basis risk & minimum-variance hedging.
   Readings: (i) From the notes: Chapter 4. (ii) From Hull: Chapter 2 (pp. 35–42).

5. Options: Introduction; payoff diagrams; spreads and combinations.
   Readings: (i) From the notes: Chapter 5. (ii) From Hull: Chapter 8.

6. Arbitrage-based restrictions on option pricing.
   Readings: (i) From the notes: Chapter 6. (ii) From Hull: Chapter 7 (pp. 168–174).

7. The early-exercise feature of American options.
   Readings: (i) From the notes: Chapter 7, (pp. 81–89). (ii) From Hull: Chapter 7 (pp. 175–179).

8. Put–Call Parity.
   Readings: (i) From the notes: Chapter 7 (pp. 89–94). (ii) From Hull: Chapter 7 (pp. 174–175 and 180).

9. European option pricing in the Binomial model.
   Readings: (i) From the notes: Chapters 8–10. (ii) From Hull: Chapter 9 (pp. 201–210).

10. The Black–Scholes model
    Readings: (i) From the notes: Chapter 11. (ii) From Hull: Chapter 11 (pp. 237–252).

11. American option pricing.
    Readings: (i) From the notes: Chapter 12. (ii) From Hull: Chapter 9 (pp. 210–211).

12. Exotic Options.
    Readings: (i) From the notes: Chapters 13 and 14. (ii) From Hull: Chapter 18.