Derivative Securities
Finance B40.3335
Summer 2004

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Course Objective: To learn how to price and trade derivative products to achieve a variety of financial goals.

Textbook: *Options, Futures, and Other Derivative Securities*, by John C. Hull, Prentice Hall, 5th edition, 2003, ISBN 0-13-009056-5.

Materials Coverage:

07/03 Course Introduction, Hull C11 and S10.1, 10.2, 18.6
Black & Scholes, Hull C12

07/10 Black & Scholes, Hull C13 and S15.1-15.5
BOPM, Hull C10 and S18.1-18.5
Problem Set 1 Due

07/17 Dealer Hedging, Hull C14
Option Applications
Problem Set 2 Due

07/24 Interest Rate Options, Hull C22
Forwards & Futures, Hull C2-4
Problem Set 3 Due
Project Phase-1 Due

07/31 Futures Applications
Swaps, Hull C5
Problem Set 4 Due

08/07 Swap Applications
Credit Derivatives, Hull C27
Problem Set 5 Due
Project Phase-2 Due

Note: Problem Set 6 Due on 8/14 via e-mail attachment.

Grading: There are six problem sets and each set is worth 10% of the final letter grade. In addition, there is a two-phase project where each phase is worth 20% of the final letter grade. Students may work in a group of up to three when completing the problem sets and project phases. Group members must be identified on each problem set and project phase. A group should stay intact throughout the duration of the term.

Other Information: You will need to download Hull's software. You will need to access course documents at www.stern.nyu.edu/~atucker. During summer terms it is best to reach me at 215-378-3651 or at tucker@mtaglobal.com. Please set cellular phones to vibrate during class time.

About the Instructor: Go to www.mtaglobal.com and follow the links.

Project Phase-1: Price an Asian-style option with arithmetic averaging and equal weighting. Use a Monte Carlo simulation with geometric Brownian motion in a discrete time and risk-neutral economy. The parameter values are $S = X = 50$, $r = .015$, and $\sigma = .40$. The underlying asset is zero-leakage. The option's payoff is $MAX[0,S_{ave} - X]$. The option has a forty trading-day maturity. Use a one-day time increment, a 252-day year, and 10,000 trials. Report the option price, its standard error, and any ten underlying stock price paths.

Project Phase-2: Extend your project to accommodate two correlated state variables. Specifically, introduce a second asset with $S = 48$ and $\sigma = .35$. The correlation between the two assets is 0.70. Now price a spread option with payoff $MAX[0,S_{1,T} - S_{2,T}]$. Again use a forty trading-day maturity, a 252-day year, 10,000 trials and a one trading-day time increment. Report the option price, its standard error, and any ten side-by-side underlying stock price paths.