FE620: Pricing and Hedging

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Course Description

This course deals with basic financial derivatives theory, arbitrage, hedging, and risk. Risk neutral pricing models using the Black-Scholes formulae and binomial trees are discussed in detail. The course covers derivative instruments and underlines including stocks, bonds, forwards, futures, swaps, and options. By the end of the course, students will have good knowledge of how these products work, how they are used, how they are priced, and how financial institutions hedge their risks when they trade the products. Incorrect pricing of an instrument will create arbitrage opportunities. Students are required to discover these arbitrage opportunities and enter simulated trades in an Interactive Broker paper trading account that will be created for each student at the beginning of the semester.

Prerequisite: Multivariable Calculus, FE 610, and programming in C, C++, or Java.

Text Books

John Hull. *Options, Futures, and Other Derivatives*. 2009. Seventh Edition. Prentice Hall. ISBN: 0136015867

Grading: Please submit files in PDF format (using PrimoPDF, or deskPDF)

Homework Assignments (40%) Total of 8 assignments (see Schedule), each assignment worth 5 points. Submit previous session's homework before the session start (deadline), solution will be discussed in class and published after the deadline.

IB Arbitrage Assignments (60%) Three arbitrage trades entered through IB paper account, each worth 20 points. You are allowed to use the following types of instrument (stock, bonds, warrants, ETF, options, futures, forex, forwards, swaps) to construct 3 trades (each with 2 legs), please do not use one type of instrument more than two times. Trades entered can be left open or be closed by summary submission time. You are allowed to repeatedly manipulate positions once the trade is entered (open, increase, decrease, close, or reverse your positions, the repeating sequence is considered as one trade). You will have a chance to discuss your trade through Session 11-14. Trading summary to be submitted at the end of week 14. Please discuss 1) the reason you enter the trade, 2) what worked, 3) what did not work, 4) how to improve. Start to experiment with your trades early will allow you 1) to deploy capital ($1 million) more effectively; 2) to have more time to monitor performance; 3) to test more ideas for the final write up.

Schedule

Week 1:	Introduction; Chapters 1	Assignments
Week 2	Futures markets, Chapter 2	Hull 2.26
Week 3:	Hedging Strategies Using Futures, Chapter 3	Hull 3.25
Week 4:	Interest Rates, Chapter 4	Hull 4.27
Week 5:	Determination of Forward and Futures Prices, Chapter 5	Hull 5.25
Week 6:	Interest Rate Futures, Chapter 6	Hull 6.25
Week 7:	Swaps, Chapter 7	Hull 7.21
Week 8:	Properties of Options, Chapters 8 and 9	Hull 8.25
Week 9:	Trading Strategies and Binomial Trees, Chapter 10 and 11	Hull 11.20
Week 10:	The Black-Scholes-Merton model, Chapter 13 (excl Section 13.6)	IBA 1
Week 11:	Options on Stock Indices, Currencies, and Futures, Chapters 15 & 16	IBA 2, trades discussion
Week 12:	The Greeks, Chapters 17	IBA 3, trades discussion
Week 13:	Volatility Smiles, VIX index, Chapter 18	Trades discussion
Week 14	Derivative Mishaps, Chapter 34 (not included in final)	Summary report submission