FINA529 Derivative Analysis

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Instructor

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Course Description

This course provides practical working knowledge of various derivatives and the markets in which they trade. It aims at "demystifying" key derivatives products, including forwards and futures, options, and swaps. At the end of the course, the students will acquire an understanding of how these derivatives are traded, what are the payoffs for the investors, and how to value them. Examples will be provided of applying these models and principles to complex problems in the real world. Where possible, recent innovations in financial markets will be discussed in class.

Prerequisites

Basic knowledge of bonds, stocks, CAPM, market efficiency.
Some knowledge of calculus, statistics or econometrics.
Some knowledge of Microsoft Excel

Course Materials

John C. Hull: *Options, Futures, & Other Derivatives*, Prentice Hall
(Required, available at University Bookstore). The seventh edition (2008) is the most recent and will be the book available from the bookstore. However, earlier editions may also be used.
Articles, cases, homework, etc. (Will be made available during classes and/or on the LMES system)

Course Work

- Class Participation 10%.
- Exercises: Questions in the textbook (not graded) and class trading games. Class Cooperation encouraged.
- Group work: 40% of the course grade. Students will be randomly allocated to groups (maximum of 5 or 6 members). The group will then be required to trade and hedge (using derivatives) a small portfolio of stocks.
- Additional reading of Chapter 34 and material placed in the LMES system will be required
- Final Exam: 50% of the course grade (2-hour exam will be held week 8 on the Friday 27th March during the lecture class time).

Topics and Textbook Reading

Topics (Textbook references based on the 7th Edition of Hull)
Topic 1: Introductions to derivatives and basic trading strategies 1.3-1.10 (+ 2, 3, 10, 34)
Topic 2: Forwards and futures 5.2-8
Topic 3: Swaps 7.1-9
Topic 4: Options contracts and restrictions to option prices 9.1-9.7 (8.1-12 and 16)
Topic 5: Models of stock prices 13.1-13.4
Topic 6: Binomial tree option-pricing models 11.1-2
Topic 7: The Black-Scholes option-pricing model 13.5 13.8-13.9

GROUP PROJECT FINA 529

Please refer to the spreadsheet of the prices from February 4th 2007 to February 4th 2009 of 10 US stocks that comprise part of the Dow Jones Index.

Please refer to the correlation matrix below and the risk properties of each stock measured by simple standard deviation and the coefficient of variation (price levels). Note that the correlation of price levels to the DJIA and to each stock varies considerably.

	DJIA	**AXP**	**BA**	**CAT**	**DIS**	**GE**	**HD**	**IBM**
AXP	0.953							
BA	0.963	0.978						
CAT	0.920	0.811	0.829					
DIS	0.928	0.913	0.888	0.886				
GE	0.976	0.953	0.961	0.855	0.887			
HD	0.715	0.854	0.814	0.561	0.756	0.730		
IBM	0.579	0.378	0.409	0.783	0.602	0.481	0.081	
JNJ	0.418	0.249	0.215	0.502	0.481	0.339	-0.036	0.706
KO	0.703	0.496	0.553	0.703	0.535	0.674	0.076	0.628
PG	0.471	0.296	0.304	0.424	0.393	0.463	-0.070	0.489

	JNJ	**KO**
KO	0.598	
PG	0.753	0.795

Groups of a maximum of 5-6 students are required to form portfolios of 5 stocks from these 10 stocks in the DJIA. Once groups decide which stocks they have selected they should email their stocks and the stock weighting in the portfolio plus the group members to Wang Zheng. This email must be received before the opening of US markets on Monday 9th February.

The group project has a twofold objective:

(a) Identify a portfolio of 5 stocks that will outperform the DJIA over the next 6 weeks (to 13th March). This portfolio can be weighted from a minimum of 10% in one stock to a maximum of 30% in one stock. Up to 10% of the portfolio can be invested in US T-Bills that will earn the 3 month cash rate, which for convenience can be the rate quoted on http://finance.yahoo.com/bonds.

(b) Identify an optimal strategy using futures and options to fully hedge this portfolio (using DJIA or other futures contracts or options).

The success of the group will be measured by

(a) The groups excess return over the index. For convenience assume a portfolio of US$10,000,000. Each group must revalue their portfolio using the closing prices on Friday night (ie Saturday morning HK time) and record the new portfolio value. The group can then rebalance the stock weighting over the weekend using the Friday closing prices. The value of the portfolio and any change in the weighting should be emailed to Wang Zhen.

(b) The ability to identify a perfect hedge. Using any index futures/options contract decide on the best hedge strategy (eg short 200 DJIA futures or 100 puts on the DJIA etc). The Group may under-hedge or over-hedge based on the ratio of the notional contract value to the portfolio value. These long stock-short hedge portfolios must be revalued as at the close of each Friday night and any discrepancies noted. The Groups may also rebalance or reweight the hedges based on the changes in the combined portfolio value. The cash-flow consequences from any potential margin calls should be noted and sufficient cash kept aside (uninvested) for this purpose.

The Group (on the 7th class 20th March) will make a 5-minute presentation explaining the trading strategy that was followed and the profit/loss consequence of each of their actions. A group report should then be emailed by the 23rd March.

The report will:

(i) Explain the original decision to invest in the 5-stock portfolio (10 marks);

(ii) Summarise the excess return from (a) and the difference in the hedge value from (b) over the 6 weeks. (20-marks). The best performing groups in (a) and (b) will automatically receive the maximum of 10 marks for each section;

(iii) Explain how their hedging and trading strategy could have been improved (other than by buying better performing stocks!) (10 marks).