

FINA529 Derivative Analysis

Spring 2010

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 and 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%. Note that students will be randomly asked to answer homework as well as concept questions in class.
- Exercises: Questions in the textbook (not graded), homework questions and class trading games (optimal participation).
- Group work: 40% of the course grade. Students will be randomly allocated to groups by the MBA office (maximum of 5 or 6 members). The group will then be required to buy and then hedge (using derivatives) a small portfolio of stocks.
- Final Exam: 50% of the course grade (2-hour exam will be held week 8 on the Friday 9th April 2010 during the lecture class time). The 2-hour exam will be based entirely on class and set material. It will comprise a short essay based on class discussion questions (10 marks = 30 minutes) and then a series of short problems and concept questions (30 multiple choice = 90 minutes). Exam essay questions will be based entirely on those discussed in class. You will be expected to take your own notes on these discussions.

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, 10 and 16) and Models of stock prices 13.1-13.4

Topic 5: The Black-Scholes option-pricing model

Topic 6: An introduction to option “Greeks” 13.5-13.9

GROUP PROJECT FINA 529

Groups of a maximum of 5-6 students are required to form portfolios of 5 stocks from these 10 any of the 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 Wade Ho. This email must be received before the opening of US markets on Monday 15th February.

Note that the correlation of individual stocks to the DJIA varies. For example: from February 4th 2007 to February 4th 2009 the correlation matrix of returns for 10 stocks was.

	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						

The group project has a twofold objective:

- Assume you have US\$10 million to invest in US blue-chips and cash. You need to identify an investment portfolio of 5 DJIA stocks that will outperform the DJIA over the period to Friday 12th March 2010. The DJIA is the benchmark –your investment portfolio is a buy-hold (buy now and then sell on the 12th March). The “performance” of the DJIA will be calculated as if the DJIA was a price. This portfolio can be weighted from a minimum of 10% in one stock to a maximum of 30% in one stock. Note that the relationship between stocks and the index and each other is dynamic (thus the above static correlation of 10-stocks is a rough guide). Up to 30% of the portfolio can also 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>. You would hold more cash (and therefore lower the risk of your portfolio) if you expect the DJIA to fall.
- Identify a strategy using futures (e.g. DJIA futures contracts if your 5-stock portfolio beta is identical to the DJIA) and options to fully hedge this portfolio (using DJIA or other futures contracts or options).

The success of the group will be measured by

- The groups’ 5-stock portfolio excess return over the DJIA index (that is your ability to pick winners) and
- the group’s ability to achieve a risk free portfolio (long stock plus

short hedge) over the trading period (your ability to rebalance a hedge portfolio). Each group must revalue their portfolio using the closing prices on Friday night (i.e. Saturday morning HK time) and record the new portfolio value AND mark to market their hedge portfolio. The group can then rebalance the stock/futures hedge over the weekend using the Friday closing prices. The value of the portfolio and any change in the hedge portfolio (e.g. perhaps you decide to increase the number of futures or options contracts) should be emailed to Wade Ho.

Note that the cash-flow consequences from any potential margin calls should be noted and sufficient cash kept aside (uninvested) for this purpose.

Each group will make a 5 minute presentation on the on the Friday 19th March explaining the investment strategy that was followed and the profit/loss consequence of each of their actions. A group report should then be emailed by the 26th March 2010.

The 40-mark report will:

- (i) Explain the original decision to invest in the 5-stock portfolio (10 marks);
- (ii) Summarise the excess return from the DJIA benchmark portfolio (a) and the difference in the hedge value from (b) over trading period. (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!- that is how could you have rebalanced better) (10 marks).