TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

VICTORIA INTERNATIONAL APPLIED FINANCE PROGRAMME

School of Economics and Finance

MMAF514: Derivatives

Trimester Two 2009

COURSE OUTLINE

Your coordinator for MMAF514 - Derivatives is Associate Professor Christine Brown.

Email: christine.brown@unimelb.edu.au
Phone: 613 83445308
http://www.finance.unimelb.edu.au/about/staff/fin_staff_webpage.cfm?StaffNo=99

I will endeavor to answer queries via email. Please give me a few days to get back to you and if I haven't responded to a query then prompt me again.

Trimester Dates
Study Teaching Period: Monday 13 July to Friday 16 October 2009
Final Assignment Due: 9 November 2009

Withdrawal dates: Information available via
http://www.victoria.ac.nz/home/admisenrol/payments/withdrawlsrefunds.aspx

Block Courses
First: Friday 28th August: 9.15am – 5.30 pm
Saturday 29th August: 9.00 am – 5.30 pm
Sunday 30th August: 9.00 am – 12.20 pm

Second: Friday 23rd October: 9.15am – 5.30 pm
Saturday 24h October: 9.00 am – 5.30 pm
Sunday 25th October: 9.00 am – 12.20 pm

Course Content
Welcome to MMAF-514 Derivatives, Semester 2 2009. This subject focuses on the conceptual aspects concerning the mechanics and pricing of the three main categories of derivative securities: forwards/futures, options and interest rate derivatives (for example swaps/caps/floors/collars). Specific topics that will be covered include basic pricing concepts, arbitrage and trading strategies, cost-of-carry, the Binomial model, Black-Scholes analysis, risk management and hedging principles and some regulatory and structural aspects of derivative markets.

This subject is neither an input-output numerically-based course, nor is it a descriptive institutional-background course in specific derivative markets (although we do cover elements of both from time to time). The focus will *not* be on deriving the mathematics underlying the pricing models, rather on understanding the elements of the pricing models and how they are used in practice. In this subject, students are expected to comprehend the nature of derivative instruments as they study various analytical and conceptual aspects of derivative pricing. Students will learn through reading, problem solving (with and without the computer), lectures and cases. To that end, the prescribed textbook contains most of the subject material covered in the course. It is your source of most information and problem sets. The lecture slides for each topic provide a good summary of the coverage and can be used in conjunction with the textbook for your preparation prior to the block teaching, where any problems or misunderstandings will be resolved. Additional readings and other materials may be posted on BlackBoard.

Course Learning Objectives

Course Objectives

On successful completion of this subject students should be able to:

- Establish a link between spot and futures price
- Implement basic hedging with futures contracts
- Explain factors affecting option prices, including dividends.
- Devise option trading strategies
- Understand the implications of arbitrage bound violations
- Understand the pricing principles behind Black Scholes and binomial models
- Incorporate dividends into option pricing
- Extend the pricing principle on currency and index options
- Explain the mechanics, design and pricing of interest rate options
- View hybrids in terms of components parts for pricing purposes
- Identify some commonality across derivatives disasters (optional)

Generic Skills

In this subject you will have the opportunity to develop important generic skills. These include:

- Oral communication;
- Written communication;
- Collaborative learning;
- Problem solving;
- Team work;
- Statistical reasoning;
- Application of theory to practice;
- Interpretation and analysis;
- Critical thinking;
- Synthesis of data and other information;
- Using computer software.

Subject Aims

The overall objective of this subject is to gain insight into pricing derivative securities, and how they can be used for risk management purposes. Ultimately the aim is to get you to understand the models used to price derivatives and the arbitrage relationships that drive them. Some of the concepts may at first appear difficult and it takes some time for them to

gel. It is therefore necessary to do the pre-reading. This is a doing course, and you do gain understanding of these sometimes difficult concepts, through problem solving. I encourage you to do all the problem sets.

Course Delivery
The course will be taught in a block release format.

Course Schedule and Expected Workload

This section provides an estimated timetable for students preparing each of the ten topics. My aim is to cover topics 1 to 5 in the first teaching block: August 28th – 30th, 2009. Topics 6 to 10 will be covered in the second teaching block: October 23rd – 25th 2009. Total average workload is around 200 hours. During the approximately 6 weeks of term prior to each block release, students will need to allow about 14 hours per week for study, research and preparation of assignments for this course. The two block courses each involve approximately 16 hours of work.

Topic Number	Topic no. & short title	Estimated time to be spent on reading, problem solving and assignment preparation prior to the block release
1	Introduction to futures; Futures markets and trading	12 hours
2	Forward and futures pricing	14 hours
3	Hedging with futures	14 hours
4	Introduction to options; Option trading strategies	16 hours
5	Binomial option pricing	15 hours
6	Black-Scholes-Merton I	16 hours
7	Black-Scholes-Merton II	16 hours
8	Volatility and hedge parameters	13 hours
9	Interest rate derivatives I	15 hours
10	Interest rate derivatives II	15 hours

Readings
Prescribed text (*) and other references

- *John C Hull. *Fundamentals of Futures and Options Markets (6th edition).* Prentice Hall, New Jersey, 2007.

- Don M. Chance and Robert Brooks, *An Introduction to Derivatives and Risk Management,* 7th ed, Thomson South-Western, Mason OH 2007.

- Jarrow, R. and S. Turnbull, *Derivative Securities*, 2nd ed, South-Western, 2000.
- John C Hull. *Options Futures and Other Derivatives* (7th edition). Prentice Hall, New Jersey, 2007.

- Stulz, R. M., *Risk Management and Derivatives*, 1st edition, 2003, South-Western.
- Salih N. Neftci, *An Introduction to the Mathematics of Financial Derivatives*, 2nd edition, Academic Press, 2000.

- Paul Wilmott on Quantitative Finance, Wiley, (3 volume set).

Lecture slides will be distributed prior to each teaching block time. The lecture slides can be used in conjunction with the text-book. The text book coverage as listed below constitutes what you need to know from the course. The text book is not very mathematical in nature. If you want a slightly more in depth mathematical treatment then the second Hull textbook listed above provides it. Otherwise the book by Neftci listed above gives a good treatment for the quantitative lay person. Paul Wilmott has written numerous books on quantitative finance and derivatives.

At the end of each topic I will have a list of what you need to know from the lecture/workshop/case study discussion. Also there will be "examination type" questions given in each of the problem sets so that you will have a good idea of the difficulty level and type of question required of you in the exams. Electronic copies of most materials will be available from the LMS subject webpage: blackboard.vuw.ac.nz

Reading List

Topic 1 *Futures markets and trading*
Contractual specifications; institutional features; the role of the clearinghouse
Reading: Hull, J., Chapters 1 and 2

Topic 2 *Forward, futures and spot prices*
Forwards versus futures; spot and futures prices; cost of carry arguments
Reading: Hull, J., Chapters 4 and 5

Topic 3 *Hedging with futures*
Principles of hedging; basis risk; minimum variance hedge ratio
Reading: Hull, J., Chapter 3

Topic 4 *Options, bounds and trading strategies*
Arbitrage bounds; put-call parity, option portfolios (spreads and combinations)
Reading: Hull, J., Chapters 9 & 10

Topic 5 *Binomial pricing*
Risk neutral valuation; early exercise premium in a multi-period binomial model
Reading: Hull, J., Chapter 11

Topic 6 *Black-Scholes analysis I*
Continuous compounding; core of the model: put-call parity; no-arbitrage argument; input parameters; technical aspects of the model
Reading: Hull, J., Chapter 12

Topic 7 *Black-Scholes analysis II*
Extending Black Scholes pricing concept to handle options on dividend paying stocks; early exercise conditions; currency, index and futures options
Reading: Hull, J., Chapters 13 and 14

Topic 8 *Hedge parameters; Volatility*
Delta and gamma hedging, other hedge parameters, volatility input, volatility smiles
Reading: Hull, J., Chapters 15, 17

Topic 9 *FRAs, caps, floors and collar, options on interest rate futures*
Forward rate agreements (FRAs), OTC interest rate options, exchange traded interest rate options
Reading: Hull, J., Chapters 4 and 19

Topic 10 *Binomial Trees in Practice*
Non-dividend paying stocks, dividend paying stocks, binomial trees for options with continuous dividend yield, monte carlo simulation
Reading: Hull, J., Chapter 16

Materials and Equipment

A calculator will be essential for the tests.

Assessment Requirements

Assessment in this subject is as follows:

Number	Type	Due Date	Weight
1	One test at each block release session based on reading assigned for period leading up to the block release and material presented at the block release. These are worth 35% each. Please bring your calculator.		70%
2	Major assignment 1	4pm September 14, 2009	15%
2	Major assignment 2	4pm November 9, 2009	15%
			100%

Note that students must attain an overall mark of 50% in order to achieve a passing grade.

Note: Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning objectives as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

Assignment Submission

Assignments must be submitted in hard copy to the VIAF office. Posted assignments will be dated according to the postmark on the envelope. All assignments are due at 4pm on the due date. Students are responsible for ensuring their name and student ID appears on each page of all submitted work.

Penalties

Each of the assignments will be marked out of a maximum that diminishes by 5% for every day late, with a weekend counting as one day. The date of submission shall be taken as the date of delivery or the day of postmark, if by post. There will be a final cut off date, one week after the due date for each assignment, after which no assignment can be accepted.
The assignments will each carry a specified word limit. If an assignment exceeds the word limit, credit will be given only from the beginning of the assignment up to the word limit. No credit will be given for the portion of work extending beyond the word limit.

Mandatory Course Requirements
To pass, a student must: (i) attend all sessions of both block release courses; (ii) obtain an average mark of at least 50% over the two tests.

Communication of Additional Information
Additional information including assignment questions, details of the block course schedule, feedback on course assessments, etc will be provided online via Blackboard. Students are responsible for logging onto Blackboard regularly to check for any updates or announcements, and for ensuring that the VIAF Senior Administrator, has their up to date email and postal addresses. Viaf-programme@vuw.ac.nz
If you have, or become aware of, any health condition that could prevent you attending a VIAF compulsory block release, then you should notify the Programme Director immediately, preferably by email, dawn.lorimer@vuw.ac.nz .

Use of Turnitin
Student work provided for assessment in this course may be checked for academic intergrity by the electronic search engine<http://www.turnitin.com> Turnitin is an on-line plagiarism prevention tool which compares submitted work with a very large database of existing material. At the discretion of the Head of School, handwritten work may be copy-typed by the School and subject to checking by Turnitin. Turnitin will retain a copy of submitted materials on behalf of the University for dection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

For the following important information follow the links provided:

Academic Integrity and Plagiarism
http://www.victoria.ac.nz/home/study/plagiarism.aspx

General University Policies and Statutes
http://www.victoria.ac.nz/home/about/policy/academic.aspx

Faculty of Commerce and Administration Offices
http://www.victoria.ac.nz/fca/studenthelp/Contactus.aspx

Manaaki Pihipihinga Programme
http://www.victoria.ac.nz/st_services/mentoring/