THE UNIVERSITY OF WESTERN AUSTRALIA
Achieve International Excellence

Unit Outline*

FINA3306

Derivatives: Investment Strategies

Semester 2, 2011
Crawley Campus

Unit Coordinator: Dr Yihui Lan

EQUIS ACCREDITED

Business School

www.business.uwa.edu.au

* This Unit Outline should be read in conjunction with the Business School **Unit Outline Supplement** available on the Current Students web site http://www.business.uwa.edu.au/students .

FINA3306/Crawley/YL/15.07.11.

UNIT DESCRIPTION

Introduction

Welcome to FINA3306 Derivatives Investment Strategies (DS2). This unit builds on the Level 2 units FINA2204 Derivatives Markets and Products (DS1) and FINA2205 Quantitative Methods for Finance to provide students with a moderately in-depth treatment of a variety of derivatives used in practice, the principles of pricing them, and their applications in the modern financial world. The unit develops the theoretical frameworks -- financial, probabilistic, and statistical -- essential to the understanding of the modern theory and practice of derivative pricing, but most of the emphasis is on the applications of the techniques to, for example, portfolio insurance, dynamic hedging strategies and risk management. The Black-Scholes-Merton pricing formulae, and the various extensions of them, are developed and explored in some detail.

This third year unit covers most aspects of pricing and hedging of derivative at an intermediate level. Further topics on option pricing theory, stochastic processes and portfolio theory are provided in the postgraduate units FINA7463 Current Developments in Derivative Securities, and FINA7481 Advanced Investments.

Unit content

This unit provides a detailed study of the framework -- financial, probabilistic, and statistical -- essential to the understanding of the modern theory and practice of derivative pricing. A revision of basic concepts -- definitions of forward and futures contracts and their pricing under a constant interest-rate assumption, European and American call and put options, put-call parity and upper and lower bounds for their prices, option strategies, the binomial option pricing model, swaps and their pricing will be given. The main components of the unit will then be selected from: the pricing of options using arbitrage arguments and risk-neutral valuation ideas; the Brownian Motion process; elements of stochastic calculus and stochastic differential equations; modeling stock prices using geometric Brownian Motion; a derivation of the Black-Scholes-Merton pricing formula and its properties; extensions to basic options such as stock index options, currency options and futures options; applications, such as to portfolio insurance, dynamic hedging strategies, financial engineering, and credit risk management; general approaches to pricing derivatives; credit derivatives and the roles they played in the financial crisis of 2007-2010. Some practical experience using packages such as DerivaGem and EXCEL will be required.

The goal of the unit

The broad goals of the unit are:

- to develop an understanding of derivatives investment decisions;
- to develop familiarity with the analytical techniques useful in making these decisions;
- to appreciate alternative approaches to the pricing, valuation and investment strategies of derivative securities;
- to develop more effective communication skills through small-group and online discussions of derivatives problems;
- to be able to critically evaluate the roles played by derivative securities in the financial crisis of 2007-2010; and
- to excite your interest in the study of derivative securities.

Learning outcomes

On completion of this unit, you should be able to:

- value derivative contracts like futures, forwards, interest rate futures and swaps;
- detect arbitrage opportunities;
- apply risk-neutral valuation as a generic methodology for various setups including pricing of standard options (calls and puts), and other derivatives;
- understand the derivation of the Black-Scholes-Merton option pricing model based on the Brownian motion and Ito calculus;
- hedge and manage option portfolios utilizing the Black-Scholes-Merton Greeks (sensitivities of the option price);
- price derivative contracts in the presence of volatility smiles and other anomalies;
- evaluate credit risk and distinguish different types of credit derivatives; and
- be able to discuss intelligently the roles played by derivative securities in the financial crisis of 2007-2010.

Educational principles and graduate attributes

In this unit, you will be encouraged and facilitated to develop the ability and desire to:

- critically evaluate and solve problems on the pricing, valuation and investment strategies of derivative securities;
- demonstrate self-management and independent learning skills through the completion of the prescribed weekly exercises;
- develop more effective communication skills through team-based case studies;
- relate to the underlying concepts of option pricing in the Black-Scholes-Merton setup, namely non-arbitrage and risk-neutral valuation;
- apply software packages like DerivaGem and Excel as tools for solving numerical problems; and
- understand the limitations that are inherent when using a theoretical derivatives model for approximating real world dynamics of derivatives securities.

TEACHING AND LEARNING RESPONSIBILITIES

Teaching and learning strategies

The unit is based on a mixture of teaching and learning strategies, including lectures, case studies, tutorials, self-study and online discussions. It is strongly recommended that students fully prepare for each week's lecture material by downloading the lecture notes, reading the relevant chapters and obtaining background information of the assigned case studies before attending lectures. Students are encouraged to work in groups for case study discussions and weekly tutorial assignments.

Teaching staff members will strive to create a conducive teaching and learning environment. Students are expected to understand all lecture material, tutorial questions and issues discussed in business snapshots. It is advised that you actively seek help from teaching staff members and fellow students should problems arise.

Teaching and learning evaluation

You may be asked to complete two evaluations during this unit. The Student Perception of Teaching (SPOT) and the Students' Unit Reflective Feedback (SURF). The SPOT is optional and is an evaluation of the lecturer and the unit. The SURF is completed online and is a university wide survey and deals only with the unit. You will receive an email from the SURF office inviting you to complete the SURF when it is activated. We encourage you to complete the forms as your feedback is extremely important and can be used to make changes to the unit or lecturing style when appropriate.

Units are periodically evaluated and the feedback from students taken into account when the unit is updated. For example, in previous years tutorial preparation was assessed by random checking of the weekly tutorial assignments. In this semester, students are required to participate in the online discussions at least once each week. Discussion topics can be either tutorial questions or other teaching material. For details, see Assessment item 1 on page 9.

Attendance

Participation in class, whether it be listening to a lecture or getting involved in other activities, is an important part of the learning process, therefore it is important that you attend classes. More formally, the University regulations state that 'to complete a course or unit students shall attend prescribed classes, lectures, seminars and tutorials'.

CONTACT DETAILS

We strongly advise students to regularly access their student email accounts. Important information regarding the unit is often communicated by email and will not be automatically forwarded to private email addresses.

Unit coordinator/lecturer	
Name:	Dr Yihui Lan
Email:	yihui.lan@uwa.edu.au
Phone:	6488 2464
Consultation hours:	"Open office" consultation will be scheduled prior to the mid-exam and final exam, which will be posted on WebCT. Other consultation times are strictly by appointment.
Lecture times:	9am-11am Tuesdays
Lecture venue:	Engineering Lecture Theatre 1 (ENCM:ELT1)

Tutor	
Name:	Heidi Liu
Email:	Haiyan.liu@uwa.edu.au
Consultation hours:	To be advised

Tutorial registration

Tutorials commence in Week 2 and contribute toward your grade in the unit. Marks will be awarded for your preparation and participation in the tutorial.

To register for a tutorial, you need to use the On-Line Class Registration (OLCR) system (http://www.olcr.uwa.edu.au/) to submit preferences for a tutorial time. If you are unsure of the OLCR process, please view the on-line version on the OLCR web site. Based on your preferences, you will be assigned to a tutorial class.

Tutorial allocations will be made available via the OLCR. Please ensure you check your allocation as soon as possible in order to know which tutorial to attend in Week 2.

If you need to change your allocated tutorial time or have not yet been allocated a tutorial, you can select a new time in a tutorial that has vacancies by following the links within the OLCR system.

TEXTBOOK(S) AND RESOURCES

Unit website

Unit support materials are available in WebCT: http://webct.uwa.edu.au. To login to WebCT, you need to supply a valid Person ID and password. Your Person ID is your student number (8 digits) and your password is your PHEME password.

If you are having trouble using WebCT please read the list of Frequently Asked Questions (FAQs), accessible at http://www.catl.uwa.edu.au/student, which describes common login errors and who to contact for further help.

Recommended/required text(s)

John C. Hull, *Options, Futures and Other Derivatives*, Global Edition, 8th Ed., Pearson, 2011.

This book is known as "the Bible" in classrooms and trading rooms throughout the world because of its ability to constantly bring the most recent topics from theory and practice together in one clear and authoritative source.

Note that **using the 7th edition is acceptable,** but students are recommended to refer to the new edition for end-of-chapter questions and updated chapters.

Additional resources and reading material

Books:

R. K. Sundaram and S. R. Das (2010). "Derivatives: Principles and Practice." McGraw-Hill/Irwin. ISBN 978-07-294931-5.
R. E. Whaley (2006). Derivatives: Markets, Valuation, and Risk Management. Wiley. ISBN 0-471-78632-2.
D. A. Dubofsky and T. W. Miller Jr (2003). Derivatives Valuations and Risk Management. Oxford University Press. ISBN 0-19-511470-1.
K. Cuthbertson and D. Nitzsche (2001). Financial Engineering: Derivatives and Risk Management. Wiley. ISBN 0-471-49584-0.

Journals

Risk. The world's leading financial risk management magazine. (Reid library call no. P 658.15 P4). The website www.risk.net is a complement to the Risk magazine.
Derivatives Use, Trading & Regulation. It explores emerging trends in the use of derivatives and other hedging instruments and the latest investment strategies, products and regulatory developments.

Software requirements

The CD-ROM accompanied the textbook, DerivaGem, and MS EXCEL will be used.

Calculators

The UWA Business School has decided to adopt the list of approved calculators employed by the Faculty of Engineering, Computing and mathematics, details of which can be found at: http://www.ecm.uwa.edu.au/students/exams/calculators.

Most continuing students will already have an approved calculator that has an appropriate label affixed. If your calculator does not already have the requisite label, you must take your calculator (one from the approved list) to the reception at the UWA Business School Postgraduate Student Centre. Once the calculator is verified as being one from the approved list, a label indicating this will be affixed to the calculator and you are then allowed to use the calculator in exams for any Business School unit.

Please note that ONLY approved calculators with an affixed label are allowed to be used in official examinations. If your calculator does not have the appropriate label affixed you will NOT be allowed to use the calculator.

UNIT SCHEDULE

Week #	Week beginning	Topic Lecture	Case Study (Business Snapshot)	Readings
1	01/08/11	Introduction, futures markets	Long-term capital management (BS2.2)	**Hull** Chs. 1, 2
2	08/08/11	Futures hedging strategies, Interest rates	The risk free rate (BS4.1)	**Hull**: Chs. 3, 4 (part 1)
3	15/08/11	Interest rates (cont.), Forward and futures prices	Index arbitrage in Oct. 1987 (BS5.4)	**Hull**: Chs. 4 (part 2), 5
4	22/08/11	Interest rate futures	Day counts can be deceptive (BS6.1)	**Hull**: Ch. 6
5	29/08/11	Swaps	The Hammersmith and Fulham story (BS7.2)	**Hull**: Ch. 7
6	05/09/11	Securitization and the credit crisis	Basel: I, II and III (BS8.1)	**Hull**: Ch. 8
7	12/09/11	Review of options, Stochastic processes	--	**Hull**: Chs. 9-12, 13 (part 1)
8	19/09/11	***Mid-exam,***		
	26/09/11	Study break, no lecturers /tutorials this week		
9	03/10/11	Wiener processes and Ito's lemma	--	**Hull:** Ch. 13 (part 2)
10	10/10/11	The Black-Scholes-Merton model	Mutual fund returns (BS14.1)	**Hull:** Ch. 14
11	17/10/11	Options on stock indices, currencies and futures	Stocks or bonds in the long run (BS16.1)	**Hull:** Chs. 16 and 17
12	24/10/11	Greeks	Portfolio insurance and the "Black Monday" (BS18.2)	**Hull**: Ch. 18
13	31/10/11	Volatility smiles, Revision	Crashophobia (BS19.2)	**Hull:** Ch. 19

ASSESSMENT MECHANISM

The purpose of assessment

There are a number of reasons for having assessable tasks as part of an academic program. The assessable tasks are designed to encourage you to explore and understand the subject more fully. The fact that we grade your work provides you an indication of how much you have achieved. Providing feedback on your work also serves as part of the learning process.

Assessment mechanism summary

Item	Weight	Due date	Remarks
Tute preparation/ participation, online discussions	10%	Tute times for written work, or 10am Friday for online discussions, starting from week 2	To be assessed in tutorials and/or vi online discussions of teaching material and tutorial questions.
Mid-semester exam	40%	Tuesday 20th Sept 2011	Covers material in chapters 1 to 8.
Final exam	50%	As advised by the Examinations Office	Covers material in chapters 13-19 (excluding 15) but relies on your background knowledge in the unit.

Note 1: Results may be subject to scaling and standardisation under faculty policy and are not necessarily the sum of the component parts.

Note 2: Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning outcomes as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the unit.

Assessment components

Assessment item 1. Tutorial preparation/participation, online discussions (10%)

Tutorial questions provide students with an opportunity of applying theoretical concepts to practical situations. Tutorial preparation and participation are designed to develop independent study skills, inter-personal skills and presentation skills. Prior to tutorials, students are assumed to make their best efforts to attempt tutorial questions. Your preparation/participation for each of the 10 tutorials to be evaluated will contribute to one percent of your final mark. This one percent can be obtained through attending tutorials and/or participating in online discussions in WebCT on a weekly basis.

There are two types of discussion topics for each week: one type is the lecturer-specified tutorial questions, the other is the student-initiated topics, such as your ideas or queries related to the weekly topic, business snapshot and other end-of-chapter questions. Please note that

(i) Students are encouraged to not only ask but also answer each other's questions.
(ii) You will be awarded one mark for one discussion entry that is considered substantial and of sufficient quality. Otherwise, a partial mark will be awarded. And
(iii) The deadline for posting discussion entries for a particular week is 10am Friday. You can find on WebCT the due time for that week under the weekly discussion heading.

Assessment item 2. Mid-Semester Exam (40%)

The mid-semester exam is to be carried out on Tuesday 20th September 2011 in week 8. It covers material from weeks 1 to 6 and consists of multiple choice questions, calculations and discussion-type questions. The exam will be closed-book and of the duration of 90 minutes in total. Formulas will be provided in the exam. There will be a revision in week 6.

Assessment item 3. Final Exam (50%)

Final exam is for you to demonstrate your ability to discuss, analyse, interpret and explain the topics covered in the unit. It relies on all topics of the unit, but with particular emphasis on weeks 7, 9-13. The exam will be a closed-book exam and be of two hours and ten minutes duration. Formulas will be provided. There will be a revision in week 13.

Given the weights placed on the exams, students are advised to prepare a study schedule as early as possible. It is strongly recommended that you review the teaching and learning material on a weekly basis.

Student Guild

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Charter of Student Rights and Responsibilities

The Charter of Student Rights and Responsibilities outlines the fundamental rights and responsibilities of students who undertake their education at UWA (refer http://handbooks.uwa.edu.au/undergraduate/poliproc/policies/StudentRights).

Appeals against academic assessment

The University provides the opportunity for students to lodge an appeal against assessment results and/or progress status (refer http://www.secretariat.uwa.edu.au/home/policies/appeals).