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ACST828

Options, Futures and Derivatives

S2 Day 2017

Dept of Applied Finance and Actuarial Studies

Contents

Disclaimer

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General Information

Unit convenor and teaching staff
Unit Convenor
Colin Zhang
colin.zhang@mq.edu.au
E4A 208
Weekly Discussion Board or By appointment.

Credit points
4

Prerequisites
ACST603 or (admission to MActPrac post 2014)

Corequisites

Co-badged status

Unit description
This unit aims to provide students with a knowledge and understanding of the principles and techniques underlying the theory and practice of derivative Markets. You will learn about different valuation/modelling techniques and will need to understand the usefulness and shortcomings of these techniques when applied in practice. It primarily aims to give you the tools for quantitative analysis of transactions and securities including valuation and risk management for capital projects and securities. This includes computer-based numerical implementation using spreadsheet software. This unit is enables students to gain an understanding of the theoretical and practical skills necessary to understand financial derivatives.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

To be able to demonstrate knowledge and understanding of the main features and uses of the standard derivative securities. To be able to explain the concepts of replication and the law of one price and how it relates to pricing for derivative securities.

Understand the risk neutral discounted expectation approach to derivative pricing and be

able to apply it to deriving analytic formulae for some of the standard derivative securities and simpler exotic securities.

Develop expertise in using excel spreadsheet software to apply numerical methods for the valuation of derivative contracts and financial decision making.

Be able to apply the knowledge of derivative contracts and the theory of derivative valuation to various hypothetical financial scenarios including hedging, speculation, valuation of securities, valuation of incentives and financial decision making.

Be able to explain the concepts covered in the course in a clear and concise manner and be able to communicate it to others effectively.

General Assessment Information

GradeBook

Assignment and class test mark are available on GradeBook. It is the responsibility of students to view their marks for each within session assessment on iLearn within 20 working days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment marks (not including the final exam mark) will not be addressed."

Feedback Prior to the Census Date

Self-assessment exercise question(s) will be released in Week 3 for feedback prior to the census date. Its answer will be also provided before the census date in Week 4.

Assessment criteria for all assessment tasks will be provided on the unit iLearn site.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment	20%	No	Wednesday 13 September 4:00pm
Class Test	20%	No	Wednesday 25 October 9:00am
Final Examination	60%	No	Examination period

Assignment

Due: **Wednesday 13 September 4:00pm**
Weighting: **20%**

Submission

Essay type responses and Excel spreadsheet solutions via both on iLearn and ACST828 Assignment Box in BESS.

Individual work:

These assignments are individual work, not group work.

Extension

No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for disruption of studies is made and approved. No submission will be accepted after solutions have been posted.

On successful completion you will be able to:
- To be able to demonstrate knowledge and understanding of the main features and uses of the standard derivative securities. To be able to explain the concepts of replication and the law of one price and how it relates to pricing for derivative securities.
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Class Test
Due: **Wednesday 25 October 9:00am**
Weighting: **20%**

Length

Ninety (90) minutes

Submission

This will be an in class test, answers must be written in an exam booklet and handed in at the end of the test period

Extension

No extensions will be granted. Students who have not sat the exam / test will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved

On successful completion you will be able to:

- To be able to demonstrate knowledge and understanding of the main features and uses of the standard derivative securities. To be able to explain the concepts of replication and the law of one price and how it relates to pricing for derivative securities.
- Understand the risk neutral discounted expectation approach to derivative pricing and be able to apply it to deriving analytic formulae for some of the standard derivative securities and simpler exotic securities.
- Be able to apply the knowledge of derivative contracts and the theory of derivative valuation to various hypothetical financial scenarios including hedging, speculation, valuation of securities, valuation of incentives and financial decision making.
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Final Examination

Due: **Examination period**
Weighting: **60%**

Length

Two (2) hours and thirty (30) minutes plus ten (10) minutes reading time

Submission

The exam will be an open book exam and it will be conducted in a computer laboratory. Students may use excel during the exam. The exam will include essay type questions, mathematical / theory type questions and numerical questions.

Extension

No extensions will be granted. Students who have not sat the exam / test will be awarded a mark of 0 for the task, except for cases in which an application for disruption of studies is made and approved

On successful completion you will be able to:

- To be able to demonstrate knowledge and understanding of the main features and uses

of the standard derivative securities. To be able to explain the concepts of replication and the law of one price and how it relates to pricing for derivative securities.

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Delivery and Resources

Classes

A 2-hour lecture will be held each week at E4B 208 on Thursday from 8am to 10am.

A 1-hour tutorial / computer laboratory session will be held each week at E4B 208 on Friday from 10am to 11am.

All lecture and tutorial exercises and solutions will be available on iLearn.

The timetable for classes can be found on the University web site at:http://www.timetables.mq.edu.au/

Required and Recommended Texts and/or Materials

Textbooks:

There are no prescribed textbooks. Lecture notes will be provided..

Reference Books:

Beninga Principles of Finance with Excel, Oxford (ISBN 978 0 19 975547 9)

This book may be used to by students to learn about using excel for the various financial calculations involved in the course, during the tutorial / computer lab sessions.

Options Futures and Other Derivatives (6th Edition) by John Hull & Solutions Manual to

Options Futures and Other Derivatives (6th Edition) by John Hull

OR

Options Futures and Other Derivatives (7th Edition) by John Hull & Solutions Manual to

Options Futures and Other Derivatives (7th Edition) by John Hull

OR

Options Futures and Other Derivatives (8th Edition) by John Hull & Solutions Manual to

Options Futures and Other Derivatives (8th Edition) by John Hull

Technology Used and Required

- Students will require access to the internet to download lecture slides and tutorial solutions.
- The assignment and most tutorial exercises will require the use of word processing and/or spreadsheet programs.
- In most weeks we will be using excel spreadsheets for the various financial calculations needed. Our classes are held in a computer laboratory and all students will have access to a computer with the required software installed on it.
- Students will be instructed in how to use excel for the purposes of the unit

Unit Web Page

Course material is available on the learning management system (iLearn)

The web page for this unit can be found at: http://ilearn.mq.edu.au/course/view.php?id=17757

Teaching and Learning Activities

- The unit is taught via lectures, tutorial exercises and the use of spreadsheet software for implementing models and calculations for the purpose of financial decision making
- Each lecture is self-contained and structured according to the summary provided in the "weekly curriculum" section below. Students are expected to read the relevant material prior to the lecture, so that they are familiar with the material to be covered. This will greatly enhance your learning experience.
- Dealing with advanced material in our subject area requires a range of generic skills. This unit aims at developing such skills. The lectures and in particular the assignments and tutorial exercises are tailored to enhance critical analysis, problem-solving and creative thinking, comprehension, computing and writing skills.
- You should take the time to work on the problem sets, since they will tend to be similar in nature to the problems you see on the test and exam. Solutions will be provided for the assigned selected questions.
- We cover many examples of financial valuation and decision making problems and how to solve these using spreadsheets. Our approach is one of learning by example and by practicing using excel to solve financial decision making problems.

Unit Schedule

week 1	Interest rates, debt securities and the term structure structure of interest rates.	Lecture notes
week 2	Forward and futures contracts	Lecture notes
week 3	Interest rate and currency swaps, valuation and applications	Lecture notes
week 4	Introduction to options and the Black Scholes Formula	Lecture notes
week 5	The binomial option pricing method, dynamic hedging and the law of one price, risk neutral valuation	Lecture notes
week 6	Mathematical background for option pricing: Statistical Theory, Calculus, Brownian Motion, Ito's Lemma	Lecture notes
week 7	Valuation Methodology: PDEs, Risk Neutral Discounted Expectation, Examples. (**Assignment is due - Wednesday 13 September 4:00pm**)	Lecture notes
mid term break		
week 8	Numerical valuation methods: Monte Carlo Simulation and Lattice Methods	Lecture notes
week 9	Exotic Options & Case Studies of applying analytical & numerical methods	Lecture notes
week 10	Hedging, portfolio insurance, case studies	Lecture notes
week 11	Class test (**Wednesday 25 October 9:00am**)	Lecture notes
week 12	Standard Interest rate derivative products and valuation models	Lecture notes
week 13	Measurement of Market Risk	Lecture notes
exam period		

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-

planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Supplementary Exams

Information regarding supplementary exams, including dates, is available at:

http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/disruption_to_studies

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

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Assessment tasks

- Assignment
- Class Test
- Final Examination

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Understand the risk neutral discounted expectation approach to derivative pricing and be able to apply it to deriving analytic formulae for some of the standard derivative securities

and simpler exotic securities.

- Develop expertise in using excel spreadsheet software to apply numerical methods for the valuation of derivative contracts and financial decision making.

- Be able to apply the knowledge of derivative contracts and the theory of derivative valuation to various hypothetical financial scenarios including hedging, speculation, valuation of securities, valuation of incentives and financial decision making.

- Be able to explain the concepts covered in the course in a clear and concise manner and be able to communicate it to others effectively.

Assessment tasks

- Assignment
- Class Test
- Final Examination

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Understand the risk neutral discounted expectation approach to derivative pricing and be able to apply it to deriving analytic formulae for some of the standard derivative securities and simpler exotic securities.

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Assessment tasks

- Assignment
- Class Test
- Final Examination

Research and Practice

This unit uses research by both Macquarie University researchers and from external sources (references will be given in the lectures, tutorials and assignment).

This unit gives you practice in applying research findings in your tutorials and assignments.