AFIN270

Stochastic Methods in Applied Finance

S2 Day 2016

Dept of Applied Finance and Actuarial Studies

Contents

General Information

Unit convenor and teaching staff
Unit convenor and lecturer
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Credit points
3

Prerequisites
(15cp including (ACST101 and (AFIN100 or AFIN102 or ACST152) and (STAT150 or STAT170 or STAT171))) or ACST252

Corequisites

Co-badged status

Unit description
The applied finance discipline has become more reliant on quantitative analysis in recent years. Increasingly, models employed by practitioners and researchers are based on assumptions about the stochastic properties of financial time series. This unit provides students with a more detailed insight and understanding of the valuation models introduced in earlier units and includes extensive use of Excel. The unit addresses a number of topics, within which theoretical models are developed and then explored further using Excel. These topics include random walks, martingales, ito calculus, and arbitrage.

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:

Use a range of probability distributions to model different financial variables

Assess the dependence between financial variables with suitable statistical tools

Apply regression models and time series models to various financial time series

Understand the basic concepts of no-arbitrage principle and risk-neutral pricing

Perform mathematical computations on Excel spreadsheets for practical problems

General Assessment Information

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.

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

Assessment Tasks

Name	Weighting	Due
Assessed Coursework	20%	Throughout
Class Test	25%	Week 7
Final Exam	55%	Exam Period

Assessed Coursework

Due: **Throughout**
Weighting: **20%**

Weekly questions should be attempted and the work will be collected in four (4) of the tutorials / lectures randomly throughout the session, without prior notice. Marks will be granted for accuracy and clarity of the work submitted.

At least one set of weekly questions will be collected before the census date (i.e. before end of week 4). Please use the assessment results as an indicator of whether you are progressing satisfactorily in the unit. If you are having difficulties, please see the Unit Convenor and consider withdrawing before the census date on Friday of week 4.

No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of zero (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:

- Use a range of probability distributions to model different financial variables
- Assess the dependence between financial variables with suitable statistical tools
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- Perform mathematical computations on Excel spreadsheets for practical problems

Class Test

Due: **Week 7**
Weighting: **25%**

Details will be provided via iLearn.

Students who do not attend the class test will be awarded a mark of zero (0) for the test, except for cases in which an application for disruption of studies is made and approved.

On successful completion you will be able to:

- Use a range of probability distributions to model different financial variables
- Assess the dependence between financial variables with suitable statistical tools

Final Exam

Due: **Exam Period**
Weighting: **55%**

A two-hour (2) written exam will be held during the normal university exam period. Questions will cover the entire unit. Marks will be granted for accuracy and clarity of the work shown.

You are permitted one (1) A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed. The page will not be returned to you at the end of the final exam. Non-programmable calculators with no text-retrieval capacity are permitted.

Students who do not attend the final exam will be awarded a mark of zero (0) for the exam, except for cases in which an application for disruption of studies is made and approved.

On successful completion you will be able to:

- Use a range of probability distributions to model different financial variables

- Assess the dependence between financial variables with suitable statistical tools

- Apply regression models and time series models to various financial time series

- Understand the basic concepts of no-arbitrage principle and risk-neutral pricing

- Perform mathematical computations on Excel spreadsheets for practical problems

Delivery and Resources

The timetables for classes can be found on the University website at:

timetables.mq.edu.au/2016/

Tutorials will commence in Week 1.

The required textbook is:

Rachev S.T., Hoechstoetter M., Fabozzi F.J., and Focardi S.M., 2010, Probability and Statistics for Finance, John Wiley & Sons.

Lecture handouts are available for download from iLearn before lectures. Students are expected to read the handout and the corresponding textbook chapter(s) before each lecture.

Students will be required to use iLearn, Excel, PDF, and a non-programmable calculator.

Unit Schedule

Week 1   Measures of Location and Spread

Week 2   Discrete Probability Distributions

Week 3   Basic Option Pricing Techniques

Week 4   Continuous Probability Distributions

Week 5   Modelling Extreme Events

Week 6   Joint Probability Distributions

Week 7   Class Test & Copulas and Dependence Measures

Week 8   Bayesian Analysis

Week 9   Regression Models

Week 10   Model Diagnostics

Week 11   Time Series Models

Week 12   Risk-Neutral Pricing

Week 13   Professional Ethics; Revision

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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.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 http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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

Further information regarding supplementary exams, including dates, is available here

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

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcome

- Perform mathematical computations on Excel spreadsheets for practical problems

Assessment tasks

- Assessed Coursework
- Class Test
- Final Exam

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them

competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Use a range of probability distributions to model different financial variables
- Assess the dependence between financial variables with suitable statistical tools
- Apply regression models and time series models to various financial time series
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Assessment tasks

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- Class Test
- Final Exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Use a range of probability distributions to model different financial variables
- Assess the dependence between financial variables with suitable statistical tools
- Apply regression models and time series models to various financial time series
- Understand the basic concepts of no-arbitrage principle and risk-neutral pricing
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Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Use a range of probability distributions to model different financial variables
- Assess the dependence between financial variables with suitable statistical tools
- Apply regression models and time series models to various financial time series
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Changes from Previous Offering

Weightings of assessments have been updated.