AFIN2070

Stochastic Methods in Applied Finance

Session 1, In person/Online-scheduled-weekday, North Ryde 2022

Department of Applied Finance

Contents

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General Information

Unit convenor and teaching staff
Unit Convenor
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Credit points
10

Prerequisites
50cp at 1000 level or above including (AFIN100 or AFIN102 or AFIN1002 or ACST152 or ACST1052) and (STAT150 or STAT1250 or STAT170 or STAT1170 or STAT171 or STAT1171)

Corequisites

Co-badged status

Unit description
Quantitative modelling and analysis are significant components in the discipline of applied finance. The models employed by practitioners and researchers are based on assumptions about the stochastic properties of financial variables and time series. This unit covers a variety of stochastic models for use in applied finance and includes extensive use of Excel spreadsheets. The topics include discrete and continuous probability distributions, extreme events, joint probability distributions, copulas, bayesian analysis, regression models, time series models, and risk-neutral pricing.

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:

ULO1: Use a range of probability distributions to model different financial variables.

ULO2: Assess the dependence between financial variables with suitable statistical tools.

ULO3: Apply regression models and time series models to various financial time series.

ULO4: Examine the concepts of no-arbitrage principle and risk-neutral pricing.

ULO5: Perform mathematical computations on Excel spreadsheets for practical problems.

General Assessment Information

Late submissions of assessments

Unless a Special Consideration request has been submitted and approved, no extensions will be granted. There will be a deduction of 10% of the total available assessment-task marks made from the total awarded mark for each 24-hour period or part thereof that the submission is late. Late submissions will only be accepted up to 96 hours after the due date and time.

No late submissions will be accepted for timed assessments – e.g., quizzes, online tests.

Table 1: Penalty calculation based on submission time

Submission time after the due date (including weekends)	Penalty (% of available assessment task mark)	Example: for a non-timed assessment task marked out of 30
< 24 hours	10%	10% x 30 marks = 3-mark deduction
24-48 hours	20%	20% x 30 marks = 6-mark deduction
48-72 hours	30%	30% x 30 marks = 9-mark deduction
72-96 hours	40%	40% x 30 marks = 12-mark deduction
> 96 hours	100%	Assignment won't be accepted

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

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Quiz	5%	No	Week 3
Mid Session Test	20%	No	Week 8
Assignment	15%	No	Week 10
Final Examination	60%	No	Final exam period

Online Quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 1 hours

Due: **Week 3**
Weighting: **5%**

The online quiz will be conducted through iLearn and consist of multiple choice questions, and calculation based questions, where a numerical value will need to be entered.

On successful completion you will be able to:
- Use a range of probability distributions to model different financial variables.

Mid Session Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 12 hours
Due: **Week 8**
Weighting: **20%**

A practical test of 60 minutes will be held to give students practice on a summative task and to provide feedback on their progress midway through the session.

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.

Assignment

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 10 hours
Due: **Week 10**
Weighting: **15%**

The assignment will cover quantitative analysis of the materials taught in the class.

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.

- Examine the concepts of no-arbitrage principle and risk-neutral pricing.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Final exam period**
Weighting: **60%**

A two hour exam will be held during the University Examination Period.

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.

- Examine the concepts of no-arbitrage principle and risk-neutral pricing.

- Perform mathematical computations on Excel spreadsheets for practical problems.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment

- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Recommended reading materials: *Probability and statistics for finance*, by ST Rachev, M Hoechstoetter, FJ Fabozzi, SM Focardi, 2010.

Regarding class delivery, please see iLearn for details.

Unit Schedule

Week	Topic
1	Measures of location and spread

2	Discrete probability distributions
3	Basic option pricing techniques
4	Continuous probability distributions
5	Modeling extreme events
6	Joint probability distributions
7	Copulas and dependence measures
8	*Mid-term test*
9	Regression models
10	Time series models
11	No-arbitrage pricing
12	Business ethics
13	Revision

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.