



# AFIN2070

## Stochastic Methods in Applied Finance

Session 2, Special circumstance 2020

*Department of Applied Finance*

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#### Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

#### Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

## General Information

Unit convenor and teaching staff

Unit Convenor

Yin Liao

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Angela Chow

[angela.chow@mq.edu.au](mailto:angela.chow@mq.edu.au)

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

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

It is the responsibility of students to view their marks for each within-session-assessment on iLearn within 20 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 tasks (not including the final exam mark) will not be addressed.

### Late submissions and extensions

Tasks 10% or less – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

Tasks above 10% - 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 special consideration is made and approved. No submission will be accepted after solutions have been posted.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Online Quiz</a>	5%	No	Week 3
<a href="#">Online Test</a>	20%	No	Week 8
<a href="#">Assignment</a>	15%	No	Week 10
<a href="#">Final Examination</a>	60%	No	During University Examination Period

### Online Quiz

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 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.

## Online Test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 12 hours

Due: **Week 8**

Weighting: **20%**

An online practical test of 60 minutes will 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 <sup>1</sup>: Quantitative analysis task

Indicative Time on Task <sup>2</sup>: 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 <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **During University Examination Period**

Weighting: **60%**

An online two hour open book 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.

<sup>1</sup> 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.

<sup>2</sup> 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

<b>Learning and Teaching Activities:</b>	<p>The content for each week will comprise of a lecture recording and a set of tutorial questions (Problem Sets).</p> <p><b>Lectures</b></p> <p>A lecture recording will be uploaded each week. Lecture notes will be available on iLearn.</p> <p><b>Tutorials</b></p> <p>Students will need to register to either an on-campus tutorial or an online (Zoom) tutorial. Tutorials are considered compulsory but no marks are allocated. Tutorials will be available for most, but not all weeks of the semester. In weeks where there aren't any live (on-campus or online) tutorials, a recording will be provided to cover the relevant material.</p> <p>The tutorial schedule will be made available on iLearn.</p> <p>Tutorial enrolment or change of tutorial can be made through <i>eStudent</i> in the first two weeks of the semester. <u>No tutorial changes are allowed after Week 2.</u> Students should attend their allocated tutorial, but exceptions may occur on a one-off basis. That is, where circumstances prevent you from attending your own tutorial in a given week, you may attend an alternative tutorial if room available.</p> <p>Students are expected to complete the '<i>Tutorial Questions</i>' as a self-directed study activity before attending a tutorial. Additional learning support will be available in tutor consultation times.</p> <p>The timetables for classes can be found on the University website at: <a href="https://timetables.mq.edu.au/2020/">https://timetables.mq.edu.au/2020/</a> (Excel workshops) will commence in Week 1.</p>
<b>Recommended Text:</b>	Rachev S.T., Hoechstoeetter M., Fabozzi F.J., and Focardi S.M., 2010, Probability and Statistics for Finance, John Wiley & Sons.

<b>Unit Web Page:</b>	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.
<b>Technology Used and Required:</b>	Students will be required to use iLearn, Excel, PDF, Word, and a non-programmable calculator.

## Unit Schedule

Week	Topic
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	Copulas and Dependence Measures
Week 8	Online Test
Week 9	Regression Models
Week 10	Time Series Models
Week 11	Risk-Neutral Pricing
Week 12	Professional Ethics
Week 13	Revision

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## 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](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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

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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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/](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.

## Changes since First Published

Date	Description
22/07/2020	Additional information on Learning and Teaching Activities.