ACST862

General Insurance Pricing and Reserving

S2 Day 2014

Applied Finance and Actuarial Studies

Contents

General Information

Unit convenor and teaching staff
Unit Convenor
Piet de Jong
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Contact via email
E4A610
Tues 15h-16h

Credit points
4

Prerequisites
STAT806 or STAT810(P)

Corequisites

Co-badged status

Unit description
This unit examines the use of statistical models in the general insurance context. Applications will include methods of estimating reserves for future insurance payments, generalised linear models and time series models.

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 the R statistical software package to conduct statistical analyses of the types covered in this unit.
Understand and perform calculations using simple no claim discount systems.
Understand and apply the method of maximum likelihood estimation.
Understand and apply generalised linear models.
Understand simple stationary univariate time series models for description and forecasting.
Understand and apply deterministic and basic stochastic methods for the calculation of

outstanding claims provisions in general insurance.

Apply knowledge and understanding to a complex problem.

General Assessment Information

- **To be eligible to pass this unit, a pass is required in the final examination**
- C**riteria and standards for grading**
    - **N**umerically correct answers based on correct reasoning
- **Submission methods**
    - Assignments are submitted via iLearn
    - Midterm is in class on the indicated date
- **Late assessments, extensions, penalties, resubmissions**
    - 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.
- **Midterm and Final examination conditions.**
    - You are permitted ONE A4 page of paper containing reference material printed on both sides. The material may be handwritten or typed. The page will not be returned at the end of the midterm or final examination.
    - 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.
- **Standardised Numerical Grade (SNG)** will be awarded based on your overall performance. An SNG gives you an indication of how you have performed within the band for your descriptive grade. The SNG is not a mark, and you may not be able to work it out based on your raw examination and other assessment marks. Nor are you able to determine you are “one mark away” from a different grade.
- **Supplementary Exams.** Further information regarding supplementary exams, including dates, is available here *http://www.businessandeconomics.mq.edu.au/current_students/undergraduate/how_do_i/special_consideration*

Assessment Tasks

Name	Weighting	Due	Groupwork/Individual	Short Extension	AI Approach
1. Class Test	10%	Tuesday 7 October 4pm		No	
2. Group Assignment	20%	TBA		No	
3. Final Examination	70%	Examination period		No	

1. Class Test

Due: **Tuesday 7 October 4pm**
Weighting: **10%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

Closed book test. Non-programmable calculators with no text-retrieval capacity are allowed.

On successful completion you will be able to:

- Use the R statistical software package to conduct statistical analyses of the types covered in this unit.
- Understand and perform calculations using simple no claim discount systems.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.

2. Group Assignment

Due: **TBA**
Weighting: **20%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

Application of methods from the unit to the problem of forecasting mortality rates.

On successful completion you will be able to:

- Use the R statistical software package to conduct statistical analyses of the types

covered in this unit.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.
- Understand simple stationary univariate time series models for description and forecasting.
- Apply knowledge and understanding to a complex problem.

3. Final Examination

Due: **Examination period**
Weighting: **70%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

Examination under usual exam conditions. Formulae sheet will be provided. Non-programmable calculators with no text-retrieval capacity are allowed.

On successful completion you will be able to:
- Use the R statistical software package to conduct statistical analyses of the types covered in this unit.
- Understand and perform calculations using simple no claim discount systems.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.
- Understand simple stationary univariate time series models for description and forecasting.
- Understand and apply deterministic and basic stochastic methods for the calculation of outstanding claims provisions in general insurance.
- Apply knowledge and understanding to a complex problem.

Delivery and Resources

Classes

The timetable for classes can be found on the University web site at www.timetables.m

q.edu.au.

Required and Recommended Texts and/or Materials

Required texts

Lecture Handouts (i.e. notes with gaps) are available for downloading from the ACST357/862 teaching website.

Optional ActEd material

The ActEd CT6 are not set as required or recommended reading for this unit, since the unit notes are comprehensive and detailed.

Other useful references

Hossack, I.B., Pollard J.H, and Zehnwirth, B. (1999). Introductory statistics with applications in general insurance, second edition. Cambridge University Press: Cambridge.

De Jong, P. and Heller, G.Z., (2008). Generalized linear models for Insurance Data. Cambridge University Press: Cambridge.

Casualty Actuarial Society. (2001). Foundations of Casualty Actuarial Science, 4th edition. Casualty Actuarial Society.

Unit Web Page

To access the website, go to http://ilearn.mq.edu.au and login using your usual login and password.

Learning and Teaching Activities

The unit is taught using three hours of lectures and a weekly tutorial. Tutorials commence in Week 2.

You are expected to read lecture materials in advance of the lectures and to participate actively in the tutorial classes.

Technology Used and Required

MS Excel and MS Word will be used throughout the unit.

The R statistical software package will be used throughout the unit. Students will be required to use a non-programmable calculator in the final examination and during the in-class test.

What has changed since the previous offering of this unit?

Development of a new assignment relating to forecasting mortality rates and updates to material in the curriculum to reflect minor changes to the CT6 professional syllabus.

Unit Schedule

Week Number	Week Beginning Monday	Topic and Notes	Tutorial
1	4 August	Section 1: Introduction to R	No tutorial
2	11 August	Section 2: No claim discount, Section 3: MLE	Section 1 Exercises
3	18 August	Section 3: MLE	Section 2 Exercises
4	25 August	Section 4: Generalized Linear Models I	Section 3 Exercises
5	1 September	Section 5: Generalized Linear Models II	Section 4 Exercises
6	8 September	Section 6: Time Series I	Section 5 Exercises
7	15 September	Section 7: Time Series II:	Mock Test
STUDY BREAK	22 September 29 September	No classes No classes	STUDY BREAK
8	6 October	Tuesday: Class Test: Wed: Section 7 Time Series II	Section 6: Exercises
9	13 October	Section 8: Time Series III	Section 7 Exercises
10	20 October	Section 9: Time Series IV: Section 10: Outstanding Claims (deterministic)	Section 8 Exercises
11	20 October	Section 10: Outstanding Claims (deterministic)	Section 9 Exercises
12	27 October	Section 11: Outstanding Claims (stochastic)	Section 10 Exercises
13	3 November	Section 11: Outstanding Claims (stochastic)	Section 11 Exercises

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.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.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/

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://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use 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

- Understand and perform calculations using simple no claim discount systems.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.
- Understand simple stationary univariate time series models for description and forecasting.
- Understand and apply deterministic and basic stochastic methods for the calculation of outstanding claims provisions in general insurance.

Assessment tasks

- 1. Class Test
- 2. Group Assignment
- 3. 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

- Use the R statistical software package to conduct statistical analyses of the types covered in this unit.
- Understand and perform calculations using simple no claim discount systems.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.
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forecasting.
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- Apply knowledge and understanding to a complex problem.

Assessment tasks

- 1. Class Test
- 2. Group Assignment
- 3. 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

- Use the R statistical software package to conduct statistical analyses of the types covered in this unit.
- Understand and perform calculations using simple no claim discount systems.
- Understand and apply the method of maximum likelihood estimation.
- Understand and apply generalised linear models.
- Understand simple stationary univariate time series models for description and forecasting.
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- Apply knowledge and understanding to a complex problem.

Assessment tasks

- 1. Class Test
- 2. Group Assignment
- 3. Final Examination

Research and Practice

The unit will include some links to research through the use of a group assignment. Professional practice in the area of general insurance will also be discussed during the unit.