ACST3057

General Insurance Pricing and Reserving

Session 2, Special circumstance 2020

Department of Actuarial Studies and Business Analytics

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Disclaimer

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and ot her small group learning activities on campus for the second half-year, while keeping an online ver sion available for those students unable to return or those who choose to continue their studies onli ne.

To check the availability of face-to-face and onlin e activities for your unit, please go to timetable vi ewer. To check detailed information on unit asses sments visit your unit's iLearn space or consult yo ur unit convenor.

General Information

Unit convenor and teaching staff

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Credit points
10

Prerequisites
(ACST356 or ACST3056) and (STAT271 or STAT2371)

Corequisites

Co-badged status

Unit description
This unit examines the use of statistical models in general insurance. The models include those used in time series analysis, generalised linear statistical modelling and runoff triangle models. Time series models are considered for both single and multiple time series. These models are often used for forecasting and inferring the behaviour of times series. Generalised linear models are used in the pricing of insurance such as automobile or homeowner insurance. Runoff triangle models are used to predict outstanding insurance liabilities. The use of no claim discount systems as a method of experience rating is also described. A good knowledge of the material covered in STAT2371 is essential. Students should understand regression analysis, and the nature and use of a statistical model. Students gaining a Credit average in both ACST3056 and ACST3057 (minimum mark of 60) will satisfy the requirements for exemption from professional subject CT6 of the Actuaries Institute.

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: Describe and apply important techniques used by actuaries to perform analysis and modelling in general insurance pricing and reserving, and perform statistical analyses using R.

ULO2: Explain basic theories and methodologies of time series model building and forecasting as well as their applications.

ULO3: Describe and apply some important theories and techniques of generalized linear models (GLMs).

ULO4: Apply deterministic and stochastic methods for calculating outstanding claims provisions in general insurance.

ULO5: Use run-off triangles for claims reserving and prediction.

General Assessment Information

- **Criteria and standards for grading**
  - Numerically correct answers based on correct reasoning
  - Assessment criteria for all assessment tasks will be provided on the unit iLearn site.
- **Submission methods**
  - Assignments are submitted via iLearn
  - The class test is in class in Week 6
- **Late assessments, extensions, penalties, resubmissions**
  - **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.
- **Midterm and Final examination conditions.**
  - Non-programmable calculators with no text-retrieval capacity are allowed
  - No dictionaries permitted.
  - 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 to you at the end of the final examination.

- **Availability of marks**
  - 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 Tasks

Name	Weighting	Hurdle	Due
Final Exam	60%	No	University Exam Period
Class Test	20%	No	Week 6
Assignment	20%	No	Week 11

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 28 hours
Due: **University Exam Period**
Weighting: **60%**

The final examination will be a three-hour written paper with ten minutes reading time, to be held during the University Examination period.

On successful completion you will be able to:

- Describe and apply important techniques used by actuaries to perform analysis and modelling in general insurance pricing and reserving, and perform statistical analyses using R.
- Explain basic theories and methodologies of time series model building and forecasting as well as their applications.
- Describe and apply some important theories and techniques of generalized linear models (GLMs).
- Apply deterministic and stochastic methods for calculating outstanding claims provisions in general insurance.
- Use run-off triangles for claims reserving and prediction.

Class Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours

Due: **Week 6**
Weighting: **20%**

The test will be approximately 90 minutes, to be held during class time.

On successful completion you will be able to:

- Describe and apply important techniques used by actuaries to perform analysis and modelling in general insurance pricing and reserving, and perform statistical analyses using R.
- Describe and apply some important theories and techniques of generalized linear models (GLMs).

Assignment

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 20 hours
Due: **Week 11**
Weighting: **20%**

This is an individual assignment which focuses on problem solving using R.

On successful completion you will be able to:

- Explain basic theories and methodologies of time series model building and forecasting as well as their applications.
- Apply deterministic and stochastic methods for calculating outstanding claims provisions in general insurance.
- Use run-off triangles for claims reserving and prediction.

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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

Classes

It is intended that learning in this session will be a combination of pre-recorded online lecture and on-campus tutorials. Tutorials will commence in week 2. The on-campus tutorial will be recorded and made available to students who are unable to attend.

Required and Recommended Texts and/or Materials

Required texts

A set of lecture notes and study pack including tutorial exercises and R examples are available for downloading from the ACST3057 teaching website.

Optional ActEd material

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

Other useful references:

- Generalized linear models for Insurance Data. Cambridge University Press: Cambridge.
- 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.
- Kaas, R., Goovaerts, M., Dhaene, J. and Denuit, M. (2009). Modern actuarial risk theory using R, 2nd edition. Springer.
- Some additional references will be listed in the lecture notes.

Technology Used and Required

- Latex, PDF, Word and Excel are used for preparing the lecture and tutorial materials.
- The R statistical software package will be used throughout the unit. Excel may also be used in the unit.
- Students will be required to use a non-programmable calculator in the final examination and during the in-class test.
- **Unit Web Page**

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

Teaching and Learning Strategy

- The unit is taught using three hours of lectures and a weekly tutorial. Tutorials will commence in Week 2.
- Concepts and examples (including computing examples in R using real datasets in

finance and insurance) will be discussed in the lectures.

- Problem sets will be discussed in tutorials.
- You are expected to read lecture materials in advance of the lectures and to participate actively in the tutorial classes.

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). 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). 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 (https://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 or if you are a Global MBA student contact 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) 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

If you are a Global MBA student contact 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/.

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.