STAT826

Market Research and Forecasting

S2 External 2016

Dept of Statistics

Contents

General Information

Unit convenor and teaching staff
Tania Prvan
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Credit points
4

Prerequisites
Admission to MAppStat or PGDipAppStat or PGCertAppStat or GradDipAppStat

Corequisites

Co-badged status

Unit description
Advanced quantitative methods including multivariate and other statistical methods that have important applications in market research will form the first part of this unit. Consumer choice modelling (conjoint analysis) will also be discussed. Methods for modelling and forecasting trends based on time series data, including techniques for seasonal adjustment will be covered. The unit will make extensive use of appropriate computer packages including SPSS.

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:

Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
Know when it is appropriate to carry out a Factor Analysis (FA), be able to perform the appropriate FA using a statistics package, know how to interpret the factors, determine how many factors to retain, and be aware of the difference between a FA and PCA.
Know how to conduct a Conjoint Analysis (CA) and how to generate an orthogonal plan.
Know what a time series model is and be familiar with the two major types of forecasting models. Be able to fit AR, MA and ARIMA models using a statistics package and be able

to interpret the output. Be able to decide which is the appropriate model to fit to the time series data.

Know how to combine a regression and an ARIMA in the same model. Be able to fit such a model using a statistical package and be able to interpret the output.

Know why you would want to smooth the data first. Be able to use a statistical package to smooth the data and then fitting an ARIMA to the smoothed data.

Assessment Tasks

Name	Weighting	Due
Assignment 1	10%	2 September 2016
Assignment 2	15%	28 October 2016
Test 1	10%	13 September 2016
Test 2	10%	8 November 2016
Participation	5%	Weekly
Final Examination	50%	TBA

Assignment 1

Due: **2 September 2016**
Weighting: **10%**

Online submission through iLearn by 2pm on the due date. Must be submitted as PDF. This can be done in Word or using freeware like Cute PDF Writer. There is no "group work" assessment in this unit. All work is to be the student's own.

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 disruption of studies is made and approved.

On successful completion you will be able to:

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
- Know when it is appropriate to carry out a Factor Analysis (FA), be able to perform the appropriate FA using a statistics package, know how to interpret the factors, determine how many factors to retain, and be aware of the difference between a FA and PCA.

- Know how to conduct a Conjoint Analysis (CA) and how to generate an orthogonal plan.

Assignment 2

Due: **28 October 2016**
Weighting: **15%**

Online submission through iLearn by 2pm on the due date. Must be submitted as PDF. This can be done in Word or using freeware like Cute PDF Writer. There is no "group work" assessment in this unit. All work is to be the student's own.

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 disruption of studies is made and approved.

On successful completion you will be able to:

- Know what a time series model is and be familiar with the two major types of forecasting models. Be able to fit AR, MA and ARIMA models using a statistics package and be able to interpret the output. Be able to decide which is the appropriate model to fit to the time series data.
- Know how to combine a regression and an ARIMA in the same model. Be able to fit such a model using a statistical package and be able to interpret the output.
- Know why you would want to smooth the data first. Be able to use a statistical package to smooth the data and then fitting an ARIMA to the smoothed data.

Test 1

Due: **13 September 2016**
Weighting: **10%**

The test will be available online 6 PM Australian Eastern Standard Time on the same day that the internal students do their test in class. More details will be *given* at a later date.

Students who have not completed the test will be awarded a mark of 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:

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
- Know when it is appropriate to carry out a Factor Analysis (FA), be able to perform the appropriate FA using a statistics package, know how to interpret the factors, determine

how many factors to retain, and be aware of the difference between a FA and PCA.
- Know how to conduct a Conjoint Analysis (CA) and how to generate an orthogonal plan.

Test 2

Due: **8 November 2016**
Weighting: **10%**

The test will be available online 6 PM Australian Eastern Standard Time on the same day that the internal students do their test in class. More details will be *given* at a later date.

Students who have not completed the test will be awarded a mark of 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:

- Know what a time series model is and be familiar with the two major types of forecasting models. Be able to fit AR, MA and ARIMA models using a statistics package and be able to interpret the output. Be able to decide which is the appropriate model to fit to the time series data.
- Know how to combine a regression and an ARIMA in the same model. Be able to fit such a model using a statistical package and be able to interpret the output.
- Know why you would want to smooth the data first. Be able to use a statistical package to smooth the data and then fitting an ARIMA to the smoothed data.

Participation

Due: **Weekly**
Weighting: **5%**

Most weeks there will be set homework to submit through iLearn.

On successful completion you will be able to:

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Final Examination

Due: **TBA**
Weighting: **50%**

The final Examination will be held during the end-of-year Examination period. The final Examination is 3 hours long (with an additional 10 minutes' reading time).

The final examination will cover all topics in this unit. Students may take into the final Exam ONE A4 page of notes handwritten (not typed) on BOTH sides. Calculators will be needed but must not be of the text/programmable type.

Students in overseas locations will be required to find a supervisor to supervise his or her exam and to meet any costs associated with supervision. The University will advise students who reside within Australia of their allocated examination centre. Students are advised to contact Ms Lesley Mooney (email: lesley.mooney@mq.edu.au), postgraduate departmental administrator, in relation to the final examination.

Only documented illness or unavoidable disruption may be used as reasons for not sitting an examination at the designated time. In these circumstances you may wish to consider applying for Disruption to Studies. Information about the Disruption to Studies policy and procedure is available at: http://students.mq.edu.au/student_admin/exams/disruption_to_studies/

The Macquarie university examination policy details, the principles and conduct of examinations at the University can be viewed at http://www.mq.edu.au/policy/docs/examination/policy.htm

It is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period.

On successful completion you will be able to:

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
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Delivery and Resources

The weekly two hour lecture will be recorded with visual capture and made available on iLearn. Lectures commence in Week 1.

Technologies used and required: Lecture material will be placed on iLearn. The statistical package SPSS will be used and is available in iLab.

Recommended Texts: There is no set textbook for this unit. Useful reference texts for the Market Research part of this unit are

- Applied Multivariate Techniques by Subhash Sharma (QA278.S485/1996)
- Applied Multivariate Methods for Data Analysis by Dallas E. Johnson (QA278.J615/1998)
- Multivariate Statistical Methods by Bryan F. J. Manly (QA278.M35/2004)

There is no suitable text for Conjoint Analysis. Most treatments in Market Research textbooks are either too simple or too technical. A useful reference for the Forecasting part is

- Forecasting: Methods and Applications by Spyros Makridakis, Steven C. Wheelwright and Rob J. Hyndman (HD30.27.M34/1998)

Unit Schedule

Week	Topic
1 (1 August)	Principal Components Analysis (PCA)
2 (8 August)	PCA
3 (15 August)	PCA and Factor Analysis (FA)
4 (22 August)	FA
5 (29 August)	Conjoint Analysis (CA)

6 (5 September)	CA and Revision
7 (12 September)	Test 1
8 (3 October)	Introduction to Forecasting
9 (10 October)	ARIMA models
10 (17 October)	ARIMA models
11 (24 October)	Dynamic regression models and intervention analysis
12 (31 October)	Exponential Smoothing and Periodicity
13 (7 November)	Test 2

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/2016/07/19/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.

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

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using

a computer package, be able to interpret output from a PCA and determine how many principal components to use.

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Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Participation
- Final Examination

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

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- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Participation
- 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

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
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- Assignment 2
- Test 1
- Test 2
- Participation
- 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

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
- Know when it is appropriate to carry out a Factor Analysis (FA), be able to perform the appropriate FA using a statistics package, know how to interpret the factors, determine how many factors to retain, and be aware of the difference between a FA and PCA.
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Assessment tasks

- Assignment 1
- Assignment 2
- Test 1
- Test 2
- Participation
- Final Examination

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Know when it is appropriate to carry out a principal components analysis (PCA), whether to use a correlation matrix or covariance matrix for PCA, be able to perform a PCA using a computer package, be able to interpret output from a PCA and determine how many principal components to use.
- Know when it is appropriate to carry out a Factor Analysis (FA), be able to perform the appropriate FA using a statistics package, know how to interpret the factors, determine how many factors to retain, and be aware of the difference between a FA and PCA.
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- Final Examination