Division of Economic and Financial Studies

ECON233
ECONOMETRIC PRINCIPLES

First Semester - 2008

Unit Outline

Unit convenor: **Dr Roselyne Joyeux**

Prerequisites: ECON232
or
3 credit points from units in the range STAT270 - STAT273
together with ECON110 or ECON111 or BBA103.

Students in this unit should read this unit outline carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit.

INTRODUCTION

This is one of the two 200-level Econometrics units currently offered in the School. The unit is designed for the students who want to major in Applied Econometrics in the third year and those who desire to extend their knowledge of Econometrics or to learn how to apply their statistical knowledge to the analysis of economic or financial data without the intention of majoring in Applied Econometrics. The course will provide you with the basic statistical and econometric tools needed to understand and criticise empirical work in finance and to enable you to carry out your own empirical research in the future. The mathematical knowledge necessary for this course (a priori) beyond arithmetic and basic algebra is the concepts of differentiation, functions, and summation operator. The topics included are listed below.

During the course students will be required to use *Excel, Matlab, Eviews* and *Shazam* in solving tutorial questions and in doing the assignment. Although the computing itself is not examinable, the ability to understand and interpret its output is. Pre-knowledge of this software is not required. Instruction in the use of *Shazam* and *Eviews* will be given in lectures as required.

This unit is worth three credit points.

TEACHING STAFF

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CLASSES AND TUTORIALS

Students are expected to attend a two-hour lecture each week. Tutorials will be held on the following weeks and days:

4	August 26
5	September 2
6	September 9
7	September 16
8	October 7

Class test in Week 9, Tuesday October 14

10	October 21

Assignment due in Week 11, Tuesday October 28

12	November 4
13	November 11

Most tutorials and classes will be held in room W6B-286, but some will be in the computing laboratory E4B-214.
Tutorials will not necessarily be held from 8pm to 9pm, rather it will be left to the discretion of the lecturer. On weeks where no tutorial has been scheduled lectures will be held from 6pm to 8pm.

TEXT

Recommended texts for the unit are

Brooks, Chris
Introductory Econometrics for Finance
Cambridge University Press

and/or

Watsham, Terry J. and **Parramore,** Keith
Quantitative Methods in Finance
International Thomson Business Press

Gujarati, Damodar N.
Basic Econometrics
3rd edition, McGraw-Hill

References to the following texts will also be given where appropriate:

Cuthbertson, Keith
Quantitative Financial Economics, Stocks, Bonds and Foreign Exchange
John Wiley,1996

Ramanathan, Ramu
Introductory Econometrics with Applications
3rd edition, Dryden Press

Pindyck, Robert S. and **Rubinfeld**, Daniel L.
Econometric Models and Economic Forecasts
3rd edition, McGraw-Hill

COMPUTING

Students are required to use a computer to carry out certain tasks of the course, such as tutorials and assignment. It is assumed that students are familiar with the procedure needed to log on to the Division's student computing network from a computer in the students' computing labs. The software programs used in this course include: *Excel, Matlab, Eviews* and *Shazam.*

UNIT WEB PAGE

The web page for this unit can be found at: http://learn.mq.edu.au

UNIT OBJECTIVES

- To introduce the basic economics, statistics and computation necessary for equilibrium pricing and hedging arguments for contingent claims securities. The unit material will specifically deal with options, but has much wider applicability.
- To introduce students to concepts and models of time series processes that are relevant for the analysis of financial market data.
- To extend students' knowledge of time series econometrics beyond that taught in ECON232, and prepare them to study econometrics at the 300-level.

LEARNING OUTCOMES

Students who successfully complete this unit will be able to:
- Understand the basic economic theory of option pricing and risk management.
- Choose and implement alternative computational procedures for option pricing and hedge parameter estimation.
- Understand basic time series concepts.
- Estimate ARIMA models
- Estimate and analyse GARCH models
- Test hypotheses about cointegration and conditional volatility

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop students' generic skills in a range of areas. One of the aims of this unit is that students develop their skills in the following:

Foundation skills of literacy, numeracy and information technology;

Critical analysis skills;
Problem-solving skills;
Creative thinking skills.

TEACHING AND LEARNING STRATEGY

- Since the unit does not closely follow any particular textbook, it is vital that students attend all classes so that they can understand what the unit objectives and content are.
- Students should complete all tutorial exercises. Some of these will be marked and count towards the final grade.
- Students must submit an assignment and sit a mid-semester test.
- In addition to working on set exercises, students are encouraged to set their own exercises. Rather than working though prescribed exercises, it is often more interesting to choose a practical application of the unit material and work through it. The internet has many sources of free, up-to-date financial market data which students can utilise. Staff are happy to discuss these applications with students.
- Students should attend all classes and devote considerable effort to the tutorial work and the assignment. It should be noted however, that private study is a large component of learning at university. In total, it is expected that the average student would spend around 12 hours per week working on ECON233.

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

The modes of assessment are designed to ensure that students become familiar with the econometric tools necessary to develop, estimate and evaluate their own models. The assignment will also ensure that you are proficient with the softwares and can interpret the relevant computer outputs.

The components of assessment in this course are as follows:

(1) **Mid-semester test** 15%
There will be a class test in **Week 9 (Tuesday October 14).** It will be of one hour duration to be held from 6.05pm to 6.55pm on the material covered in Weeks 1 - 7. Calculators are needed.

(2) **Assignment** 15%
The Assignment is due in Week 11, Tuesday October 28, by 6 pm in the ECON233 box provided in ERIC. Students are strongly recommended to keep a photocopy of their assignment to insure against loss.

(3) **Tutorials** 10%
Tutorials 3, 6 and 7 will be marked. Due dates will be announced in lectures.

(4) **Final Examination** 60%
This will cover all of the material discussed in the course and will be of three-hour (plus 10 minute-reading time) duration. The schedule for this examination will be determined by the University examination section, and thus it is individual student's responsibility to find the time and venue for the examination when the information becomes available.

Requirements to Pass This Unit

To pass ECON233, students must satisfy each of the following requirements:

(1)   An overall satisfactory performance in all assessment components;

(2)   **A pass in the final examination;** and

(3)   Submission of the assignment.

Under the current grading system, a **standardised numerical grade (SNG)** will be awarded together with a band grade HD, D, Cr, P, PC, or F.

It is important for students to note that the SNG is NOT the weighted aggregate of the raw marks for the above three assessment components. It is rather a detailed grade that is chosen from 0 to 100 based on other criteria as well as the raw marks. For instance, the SNG for a student who gains a raw aggregate mark of 55 but fails the final would be lower than 45 indicating that he/she fails the unit.

As such, an SNG of say 73 or 74 does **NOT** mean that the student's aggregate mark is one or two marks below the threshold for a D. It means that his/her work and performance in the unit is of predominantly good quality and did better than other students in the Cr band but not quite of superior quality needed for a D.

The University Examination period in Second Half Year 2008 is from November 19 to December 5 inclusive.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations.
http://www.timetables.mq.edu.au/exam

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at
http://www.reg.mq.edu.au/Forms/APSCon.pdf
All claims have to be substantiated by a signed *Professional Authority Form*, and if they are based on non-medical grounds, supporting documentation (such as statutory declarations by independent witnesses, police reports, or statements from sufficiently senior officials in the place of employment) must also be provided.

If accepted, in most cases, the students will be required to sit a supplementary examination on a date set by the Division. So, students who intend to be away must take account of this rule in scheduling any travel after lodging the request.

The format of the supplementary examination may be different from the usual examination. To prevent students from abusing this facility and to protect only the students with genuine reasons, **the result of supplementary examination will <u>replace</u> the result of the usual examination if a student sits a supplementary examination as well as the usual examination**. This implies that a student will fail the unit if he/she fails the supplementary

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examination regardless of his/her performance in the usual examination. If you believe this rule unfairly disadvantages you, contact the lecturer in charge <u>before</u> lodging the request form.

You are advised that 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, i.e. the final day of the official examination period.

PLAGIARISM

The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found in the *Handbook of Undergraduate Studies* or on the web at: http://www.student.mq.edu.au/plagiarism/

The policies and procedures explain what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

UNIVERSITY POLICY ON GRADING

Academic Senate has a set of guidelines on the distribution of grades across the range from fail to high distinction. Your final result will include one of these grades plus a standardised numerical grade (SNG).

On occasion your raw mark for a unit (i.e., the total of your marks for each assessment item) may not be the same as the SNG which you receive. Under the Senate guidelines, results may be scaled to ensure that there is a degree of comparability across the university, so that units with the same past performances of their students should achieve similar results.

It is important that you realise that the policy does not require that a minimum number of students are to be failed in any unit. In fact it does something like the opposite, in requiring examiners to explain their actions if more than 20% of students fail in a unit.

The process of scaling does not change the order of marks among students. A student who receives a higher raw mark than another will also receive a higher final scaled mark.

For an explanation of the policy see
http://www.mq.edu.au/senate/MQUonly/Issues/Guidelines2003.doc or
http://www.mq.edu.au/senate/MQUonly/Issues/detailedguidelines.doc.

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at http://www.student.mq.edu.au.
The Division of Economic and Financial Studies offers additional support for its students such as EFS Resource and Information Centre commonly known as ERIC, Peer

Assisted Learning (PAL), etc… Details of these services can be accessed at
http://www.efs.mq.edu.au/ss

COURSE OUTLINE

Week 1: Introduction to options, Risk-neutral valuation

Week 2: Lattice methods

Week 3: Lattice methods

Week 4: Lattice methods

Week 5: Monte Carlo methods

Week 6: Inference in Multiple Regression Models
        (Brooks, chapters 1-4)
        (Gujarati, chapters 1-8, 10-13)
        (Watsham & Parramore, chapters 5 and 6)
Application: The Capital Asset Pricing model

Week 7: ARIMA Models
        (Brooks, chapter 5)
        (Gujarati, chapters 21, 22)
        (Watsham & Parramore, chapter 7)
Applications: Stylised facts of financial returns.

Week 8: ARIMA Models
        (Brooks, chapter 5)
        (Gujarati, chapters. 22)
        (Watsham & Parramore, chapter 7)

Weeks 9 and 10: Trends and Unit Roots, Tests of the Random Walk Hypothesis and Cointegration
        (Brooks, chapter 7)
        (Gujarati, chapters 21, 22)
        (Watsham & Parramore, chapter 7)

Weeks 11, 12 and 13 : Volatility and Applications of ARCH and GARCH models in Forex and Stock returns
        (Brooks, chapter 8)
        (Gujarati, chapter 12)
Applications: Volatility tests for efficiency and bubbles in financial markets.

COURSE DIARY

Week	Dates	Lecture	Tutorial
1	August 5	Introduction to options, Risk-neutral valuation	X

2	August 12	Lattice Methods	X
3	August 19	Lattice Methods	X
4	August 26	Lattice Methods	**Tut 1**
5	September 2	Monte Carlo Methods	**Tut 2**
6	September 9	Inference in Multiple Regression Models	**Tut 3**
7	September 16	ARIMA Models	**Tut 4**
September 20- October 6		**Mid-semester Break**	
8	October 7	ARIMA Models	**Tut 5**
9	October 14	**Class Test** Trends and Unit Roots, Tests of the Random Walk Hypothesis and Cointegration	X
10	October 21	Trends and Unit Roots, Tests of the Random Walk Hypothesis and Cointegration	**Tut 6**
11	October 28	**Assignment due at 6pm** Volatility and Applications of ARCH and GARCH models in Forex and Stock returns	X
12	November 4	Volatility and Applications of ARCH and GARCH models in Forex and Stock returns	**Tut 7**
13	November 11	Volatility and Applications of ARCH and GARCH models in Forex and Stock returns Examination Briefing	**Tut 8**

Outline ECON233-08.doc(01/08/08)