

**MACQUARIE UNIVERSITY**  
FACULTY OF BUSINESS AND ECONOMICS

**ECON332**  
**Econometric Models**

**Second Semester, 2010**

**UNIT OUTLINE**

*Department of Economics*

**MACQUARIE UNIVERSITY**  
**FACULTY OF BUSINESS AND ECONOMICS**  
**ECONOMICS DEPARTMENT**

**UNIT OUTLINE**

**Unit:** **ECON332 – Econometric Models**  
**Credit Points:** **Three (3)**  
**Unit Convenor:** **Roger Tonkin**

The purpose of this unit is to provide economics and econometrics students with an overview of the major types of economy-wide econometric models used in practice. At least two major Australian econometric models, one macro-based and one micro-based, are discussed in detail.

*Topics include:* A taxonomy of economy-wide macroeconometric models from Klein to Johansen; the solution of linear and non-linear systems; multiplier analysis in linear and non-linear models; model simulation; policy analysis; the Orani model; the Monash Model; the Murphy model; the Access Economics Model (AEM), and the Treasury Model of the Australian Economy (TRYM).

Familiarity with matrix algebra is desirable, but not essential. Model simulations are implemented using an econometric computer package.

**Prerequisites**

Students must have obtained a Pass grade (i.e. a grade of PC or better) in:

1. ECON200 or ECON201 or ECON203 or ECON204, and
2. ECON141, or ECON241, or 3 credit points in the range STAT270 - STAT272.

**ECON332 Web-Site**

The login page for the Blackboard web-site for this unit can be found at:  
<http://learn.mq.edu.au/>. Note: This web address is case sensitive.

## References:

There is no text-book for the unit. Core references for topics covered in the unit are given below. References for preliminary and background readings, introductory matrix algebra, and other additional reference sources are provided on the next two pages. However, it is not intended that students should attempt to assimilate the material in the those additional references independently of guidelines which will be laid down in the lectures.

## Core References:

- (1) D.W. Challen and A.J. Hagger, *Macroeconometric Systems: Construction, Validation and Applications*, Macmillan, 1983, Chapters 1, 2 & 7.
- (2) P. B. Dixon, B. R. Parmenter, A. A. Powell & P. J. Wilcoxon, *A Stylized Johansen Model, Chapter 3, pages 87-97*, NOTES AND PROBLEMS IN APPLIED GENERAL EQUILIBRIUM ECONOMICS, North-Holland, 1992
- (3) B.R. Parmenter, “Inter-Industry Analysis: the ORANI model of Australia’s Industrial Structure”, Ch. 5 of Webb and Allan (eds.), *Industrial Economics: Australian Studies*, George Allen & Unwin, 1982.
- (4) Murphy, C.W.  
The Macroeconomics of a Macroeconometric Model  
ECONTECH, 1990
- (5) Murphy, C.W.  
The Model in Detail  
ECONTECH, 1990
- (6) Murphy, C.W.  
Murphy Model of the Australian Economy  
User's Guide for version 2.0  
ECONTECH, 1990
- (7) Powell, A.A. & C.W. Murphy  
INSIDE A MODERN MACROECONOMETRIC MODEL:  
A GUIDE TO THE MURPHY MODEL  
Springer-Verlag, 1995

## Note:

References (1), (3) and (4) above are the **major** examinable references for the unit.

### **References for Preliminary and Background Reading (See page 6.):**

- (8) Pindyck, R.S. and R.L. Rubinfeld  
ECONOMETRIC MODELS AND ECONOMETRIC FORECASTS, Third Edition, McGraw-Hill, 1991, chapters 12 and 13, pp. 331-412.
- (9) Wynn, R.F. & K. Holden  
AN INTRODUCTION TO APPLIED ECONOMETRIC ANALYSIS  
The Macmillan Press, 1974

### **Introductory Matrix Algebra References (See page 6.):**

- (10) James D.E. & C.D. Throsby, Chapters 14 & 15, pages 191-249, and Appendix C, pages 303-311, INTRODUCTION TO QUANTITATIVE ANALYSIS IN ECONOMICS, Wiley, 1973
- (11) O'Brien T., D.E. Lewis & J.F. Guest, Chapter 6, pages 94-154,  
MATHEMATICS FOR BUSINESS AND ECONOMICS, Harcourt Brace Jovanovich, 1989

### **Additional References:**

- (12) P.B. Dixon, B.R. Parmenter, J. Sutton and D.P. Vincent, *ORANI: A Multisectoral Model of the Australian Economy*, North-Holland, 1982.
- (13) Fair, R.C. (1984) *Specification, Estimation and Analysis of Macroeconometric Models*, Harvard University Press.
- (14) C.W. Murphy, et al, *A Macroeconometric Model of the Australian Economy for Medium-Term Policy Analysis, Office of EPAC Technical Paper No. 2*, Canberra Printing and Publishing, 1986 (referred to as AMPS).
- (15) Griliches, Z. and Intriligator, M.D., (eds), (1986), *Handbook of Econometrics*, Vol. 3, North-Holland.
- (16) McKibbin W.J. & J.D. Sachs, *GLOBAL LINKAGES: MACROECONOMETRIC INTERDEPENDENCE AND COOPERATION IN THE WORLD ECONOMY*, The Brookings Institution, 1991
- (17) Wallis, K.F., *On Macroeconomic Policy and Macroeconometric Models*, *THE ECONOMIC RECORD*, Vol. 69, No 205, June 1993, pp. 113-30.

- (18) Hargreaves, C., (Editor), A COMPARISON OF ECONOMY-WIDE MODELS OF AUSTRALIA, EPAC Commission Paper No. 2, Australian Government Publishing Service, 1994
- (19) Breece, J.H., K.R. McLaren, C.W. Murphy and A.A. Powell, Using the Murphy Model to Provide Short-run Macroeconomic Closure for ORANI, THE ECONOMIC RECORD, Vol. 70, No 210, September 1994, pp. 292-314.
- (20) THE ACCESS ECONOMICS MACRO MODEL, Version 3  
Access Economics Pty. Ltd., 1995.
- (21) Powell, A.A., From Dornbusch to Murphy: Stylized Monetary Dynamics of a Contemporary Macroeconometric Model, paper presented at the Econometrics Conference, Monash University, July 1995.
- (22) TRYM, THE TREASURY MACROECONOMIC MODEL OF THE AUSTRALIAN ECONOMY, Australia Bureau of Statistics, 1996
- (23) Whiteley, J.D., A COURSE IN MACROECONOMIC MODELLING AND FORECASTING, Harvester/Wheatstead, London Business School, 1994
- (24) Klein, L.R., A. Welfe and W. Welfe, PRINCIPLES OF MACROECONOMETRIC MODELING, North-Holland, 1999

## **Preliminary Reading:**

The book by Challen & Hagger, the first item on the list of references, has been used previously as a textbook for ECON332. It is now somewhat dated, and the unit now places greater emphasis on the actual models themselves than is the case in the book. (It is now out of print.) However, chapter one in Challen & Hagger has a very good overview of economy wide models classified into various types. This classification is still relevant and an interesting way of looking at the whole area.

Chapters 12 & 13 of the book by Pindyck R.S. and R.L. Rubinfeld, *ECONOMETRIC MODELS AND ECONOMIC FORECASTS*, Third Edition, McGraw-Hill, 1991, pp. 331-412, has a very good discussion of simulation based on econometric models.

Policy simulation using economy wide models is discussed extensively in ECON332. Along with forecasting, policy simulation is the major reason why economy wide models are constructed. The policy simulation aspects are more important and arguably more reliable than the forecasting aspects, but the two are very closely related.

Another very good introductory book is the book by Wynn R.F. and K. Holden (listed in the references, on page 4). This book was written in 1974, so it also is dated, but it has an extremely good introduction to economy wide econometric modelling. The entire book is worth reading. The first half of the book is devoted to particular sectors of the economy, Production, Investment and Wages and Prices. The second half, i.e. chapters 5 & 6, is devoted to early examples of major economy wide models, forecasting and multiplier analysis. Multiplier analysis is more general than policy simulation and is also discussed extensively in ECON332. If you don't have time to read the whole book, it is recommended that you read at least chapters 5 & 6.

Finally, if you need a basic introduction to Matrix Algebra, the last half (pages 189-314) of the book by D.E. James & C.D. Throsby, *INTRODUCTION TO QUANTITATIVE METHODS IN ECONOMICS*, is very good. Matrix Algebra is not essential for ECON332 but much of the literature in econometric modelling uses matrix algebra, so it is helpful to have had some exposure to it. Matrix algebra is avoided as much as possible in lectures and tutorials, and it is not examinable in ECON332, but, unfortunately, it is used in some of the key references because it is a very efficient technique for dealing with linear systems of equations. The major focus in ECON332 is not on linear systems of equations, it is on non-linear systems of equations, but it is often useful to discuss various aspects of systems modelling in the context of a linear system before moving on to the discussion of those aspects in the context of non-linear systems. This is the approach taken in ECON332.

## **Class Arrangements:**

There will be a three hour lecture/tutorial each week. Tutorials will normally be conducted in the last hour, but not necessarily.

In weeks 2, 5 and 8 a computing practical will replace the lecture/tutorial during the last hour, if required.

Lecture/Tutorials: Thursday 6 - 9 pm, E7B-164

Computing Practicals: Thursday 8 - 9 pm, E4B-206  
(Weeks 2 and 5 only)

If required, a computing practical will also be held from 8 till 9 pm in Week 8.

## **Computing Software:**

Students will be required to use the Econometric Computing software SHAZAM (Version 10) for tutorial exercises and for the Within-Semester Project. Instruction in the use of SHAZAM commands will be provided in Lectures and in the Computing Practicals. Students will be able to download and install a copy of the SHAZAM (Version 10) software on their home computer or laptop. Computing is not examinable in the End-of-Semester (Final) Examination.

## **Workload:**

Students are expected to devote at least nine hours each week to ECON332, including attendance at Lectures, Tutorials and Computing Practicals.

## **Topics (Second Semester, 2010):**

Weeks 1 – 6 Multiplier Analysis in Non-linear models

Weeks 7 – 9 The Murphy Model (and the Access Economics AEM Model)

Weeks 10 – 12 The Orani Model (and the MONASH Model)

Week 13 Exam Briefing and Review

### **Assessment:**

- (a) Week Two Tutorial Test.
- (b) A major (computer-based) Project.
- (c) A three hour written End-of-Semester (Final) Examination

The Week Two Tutorial Test has a weight of zero % in determining final grades.

The Project has a weight of 40%.

The End-of-Semester Examination has a weight of 60%.

### **Week Two Tutorial Test:**

The University's Examinations Policy stipulates that the assessment for every unit must include a low-risk diagnostic component before the end of the fourth week of the semester. The first two tutorial exercises in ECON332 are diagnostic tasks designed to assist students decide if they have the required level of competence and confidence with mathematics to continue with the unit, or withdraw. To comply with the University's Examinations Policy, students will be required to submit their worked solutions for the Week Two Tutorial Exercise to the Lecturer at the start of the Week 3 Lecture at 6 pm on Thursday 19<sup>th</sup> August. The solutions will be marked and returned before the end of Week 4. Although the Test has a "low-risk" weight of zero % in the overall assessment for the unit, and there is no penalty for non-submission, it is highly recommended that students participate in the Test.

### **Project:**

The Project will be in two parts, Part A and part B.

Part A has a weight of 10%. Part B has a weight of 30%.

The deadline for submission of Part A of the the Project is 4:00 pm on Friday 8<sup>th</sup> October, (Week 8).

The deadline for submission of Part B of the the Project is 4:00 pm on Friday 5<sup>th</sup> November, (Week 12).

Both parts of the Project **must** be submitted in the ECON332 box located in the FBE Student Services Centre (BESS), in E4B-106.

### **End-of-Semester Examination:**

The format for the End-of-Semester (Final) examination is provided on the second page of the Appendix. Additional exam preparation guidelines will be provided on the ECON332 web-site on Blackboard.



**Unit Convenor and Lecturer:** Roger Tonkin  
Room: E4A-408  
Phone: 9850-8494  
Email: [roger.tonkin@mq.edu.au](mailto:roger.tonkin@mq.edu.au)

ECON332 students are requested to use the Mail facility on the ECON332 web-site to send emails to the Unit Convenor about any ECON332 matter, rather than the [roger.tonkin@mq.edu.au](mailto:roger.tonkin@mq.edu.au) email address.

**Office Consultation Hours:**

Monday	4 pm – 6 pm	
Wednesday	4 pm – 6 pm	
Friday	4 pm – 6 pm	(By appointment only)

(Other times by appointment)

Please note that the scheduled Consultation Hours may be subject to change at short notice. Any changes will be notified on Blackboard.

Roger Tonkin  
Unit Convenor & Lecturer  
August, 2010

## **Learning Outcomes and Graduate Capabilities:**

Unit Convenors in the Faculty of Business and Economics are required to include in their Unit Outlines a list of Learning Outcomes, and a list of Graduate Capabilities. When students enrol in ECON332 they are expected to have acquired basic skills in numeracy, to understand the basic rules of sentence construction, to know when to replace a comma with a full stop and start a new sentence, and to know that an adjective should qualify a noun.

The following extract on Learning Outcomes and Graduate Capabilities is from a Unit Outline template prepared for Unit Convenors by the Faculty's professional Learning and Teaching specialists. It is reproduced here in full and without any changes.

### **LEARNING OUTCOMES (THIS AND THE FOLLOWING SECTION MAY BE REPLACED BY A COMBINED SECTION)**

The learning outcomes of this unit are:

- 1
- 2b
- 3
- 4
- 5
- 6

*(This section should reflect the content of the unit, identifying what students who have completed the unit are expected to have learnt. As a guide a unit should have about 6 learning outcomes.)*

### **GRADUATE CAPABILITIES (THIS AND THE PREVIOUS SECTION MAY BE REPLACED BY A COMBINED SECTION)**

*(This section should reflect the content of the unit, delete any graduate capabilities that are not relevant.)*

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world.

This unit contributes to this by developing the following graduate capabilities:

1. Discipline Specific Knowledge and Skills\*
2. Critical, Analytical and Integrative Thinking
3. Problem Solving and Research Capability
4. Creative and Innovative
5. Effective Communication
6. Engaged and Ethical Local and Global citizens
7. Socially and Environmentally Active and Responsible
8. Capable of Professional and Personal Judgement and Initiative
9. Commitment to Continuous Learning

*(\* Discipline specific knowledge and skills may be detailed using 6-8 discipline program specific capabilities graduate as agreed for each program.)*

## **ECON332 Discipline Specific Knowledge and Skills**

The ability to:

- a. Understand existing economic theories
- b. Apply economic theories to practical situations or problems
- c. Critically evaluate competing economic theories
- d. Develop new theories based on the critical evaluation of existing economic theories
- e. Build illustrative examples of economy-wide econometric models
- f. Use estimated economy-wide econometric models for policy simulation
- g. Examine real world issues from an economic perspective

### **Link with Research and Research Practice**

This unit gives students the opportunity to apply research skills and research procedures in a major assessable computer-based project.

## **APPENDIX**

Format of the End-of-Semester (Final) Examination

Standardised Numerical Grades (SNGs)

Plagiarism

Academic Honesty

University Policy on Examination Attendance

Supplementary Assessment

Special Consideration

Exam Script Viewing, Grade Reviews, and Grade Appeals

IT Conditions of Use

Student Support Services

## **Format of the End-of-Semester (Final) Examination**

The examination will consist of five (5) questions. Students are required to attempt each question. There is no choice.

Questions are of equal value.

Answers are to be in essay form. Students may use equations and mathematical arguments in their answers if they wish, but they will not be required to produce mathematical proofs or derivations.

SHAZAM computing commands and procedures are not examinable in the End-of-Semester Examination.

The following is a list of major examinable topics:

1. The Gauss-Seidel procedure for solving a nonlinear system of equations.
2. The Newton-Raphson procedure for solving a nonlinear system of equations.
3. Multiplier Analysis in linear econometric systems.
4. Multiplier Analysis in nonlinear econometric systems.
5. The (stylised) Murphy model : structure, features, characteristics, uses, limitations, advantages and disadvantages.
6. The (stylised) Orani model : structure, features, characteristics, uses, limitations, advantages and disadvantages.

## Standardised Numerical Grades

At the completion of all of the components of assessment for each unit, students at Macquarie University are awarded a descriptive grade (High Distinction, Distinction, Credit, Pass, Conceded Pass, or Fail), and a standardised numerical grade (SNG).

Grades in ECON332 are based solely on academic merit. The raw marks (i.e. the total of the marks received for each component of assessment) are used to construct a list of the results for all of the students in the unit in order of merit. Descriptive grades are determined from this list by the Unit Convenor on the basis of the Unit Convenor's assessment of the minimum level of academic performance that must be achieved for each of the descriptive grades.

Standardised numerical grades may be identical to the raw marks. However, it is usually necessary to determine the standardised numerical grades by scaling the raw marks appropriately.

Scaling is deemed necessary by the University Senate to ensure that the numerical results are comparable across all of the units offered by the university. Students who are awarded a High Distinction (HD) must receive an SNG between 85 and 100, students who are awarded a Distinction (D) must receive an SNG between 75 and 84, students who are awarded a Credit (CR) must receive an SNG between 65 and 74, students who are awarded a Pass (P) must receive an SNG between 50 and 64, students who are awarded a Pass Conceded (PC) must receive an SNG between 45 and 49, and students who are awarded a Fail (F) must receive an SNG between 0 and 44.

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

Grades at Macquarie University are NOT required to fit a predetermined distribution. It is technically possible, but unlikely, for every student to be awarded a High Distinction. It is technically possible, but unlikely, for every student to be awarded a Fail. The Unit Convenor is required to provide an explanation to the University Senate if more than 20% of students fail the unit.

For an entirely unsatisfactory definition of SNG see page 20 of the Macquarie University *2010 Handbook of Undergraduate Studies*.

## Plagiarism

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 Macquarie University *2010 Handbook of Undergraduate Studies* (page 521) and on the University's web-site at:

<http://www.student.mq.edu.au/plagiarism/>

Penalties for plagiarism may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

## Academic Honesty

The nature of scholarly endeavour binds all members of the University community to abide by the principles of academic honesty. Academic honesty is an integral part of the core values and principles contained in the [Macquarie University Ethics Statement](#). Its fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately.

One of the University's objectives is to produce ethically and socially aware graduates, capable of applying the skills and knowledge they have developed at University to all aspects of their lives, as well as to their academic work. Academic dishonesty undermines the integrity of the University's academic awards and assessment processes, and damages the University's reputation. It also reduces the effectiveness of a student's time at the University.

Examples of academic dishonesty are listed in the [Glossary](#).

The University's policy on academic honesty can be accessed at:

[http://www.mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://www.mq.edu.au/policy/docs/academic_honesty/policy.html)

## University Policy on Examination Attendance

Students are expected to attend the End-of-Semester 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. The Draft and Final examination timetable will be available at: <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 a student may apply for Special Consideration. Information about unavoidable disruption and the Special Consideration process is available at: <http://www.reg.mq.edu.au/Forms/APSCon.pdf>

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period. Supplementary examinations conducted by the Division of Economic and Financial Studies for first semester units are normally scheduled during the period between the release of the examination grades and the start of the second semester.

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; that is, until the final day of the official examination period.

The Macquarie University Examination Policy details the principles and conduct of examinations at the University. The policy can be inspected at:

<http://www.mq.edu.au/policy/docs/examination/policy.htm>

## Supplementary Assessment

Students who are prevented by circumstances beyond their control from attending the End-of-Semester Examination, or whose performance in the examination is affected by circumstances beyond their control, may apply for Special Consideration (see below) to be allowed to sit for a Supplementary End-of-Semester Examination, or to have these circumstances taken into account in determining the student's grade.

**Note:** Minor illnesses are **NOT** sufficient grounds for being granted special consideration.



## **Special Consideration**

Students who are prevented by serious and unavoidable disruption or circumstances beyond their control from completing a component of the assessment for the unit or whose performance in the End-of-Semester examination is adversely affected by serious or unavoidable disruption or circumstances beyond their control may apply for Special Consideration for the disruption and those circumstances to be taken into account in determining their final grade.

If Special Consideration is granted with respect to the ECON332 End-of-Semester (Final) Examination, the student may be given permission or may be required to sit for a Supplementary Examination.

If Special Consideration is granted with respect to components of ECON332 assessment other than the End-of-Semester (Final) Examination, the weights of the various components of assessment may be varied.

The University's rules and procedures governing Special Consideration are set out on page 520 of the Macquarie University *2010 Handbook of Undergraduate Studies*, and the University's web-site at:

[http://www.mq.edu.au/policy/docs/special\\_consideration/policy.html](http://www.mq.edu.au/policy/docs/special_consideration/policy.html)

## **Exam Script Viewing, Grade Reviews, and Grade Appeals**

After the completion of the unit, and the grades have been released, students may view their End-of-Semester exam script, request a Grade Review, or lodge an Appeal against their Grade.

The rules and procedures of the Faculty of Business and Economics for viewing exam scripts, requesting a Grade Review, or lodging a Grade Appeal, can be inspected on the Faculty's web-site at:

<http://www.businessandconomics.mq.edu.au> > Information For > New and Current Students > Undergraduate > How Do I? > Appeal my grade

The University's rules and procedures governing Appeals Against Grades are set out on page 521 of the Macquarie University *2010 Handbook of Undergraduate Studies*.

## **IT Conditions of Use**

Access to all student computing facilities within the Faculty of Business and Economics is restricted to authorised coursework for approved units. Student ID cards must be displayed in the locations provided at all times.

Students are expected to act responsibly when utilising University IT facilities. The following regulations apply to the use of computing facilities and online services:

- Accessing inappropriate web sites or downloading inappropriate material is not permitted. Material that is not related to coursework for approved unit is deemed inappropriate.
- Downloading copyright material without permission from the copyright owner is illegal, and strictly prohibited. Students detected undertaking such activities will face disciplinary action, which may result in criminal proceedings.

Non-compliance with these conditions may result in disciplinary action.

Students must use their Macquarie University email addresses to communicate with staff. It is University policy that students use their University issued student email account for all official University communication.

(NOTE: When sending an email message to the ECON332 Unit Convenor about any aspect of the unit, students enrolled in ECON332 are requested to use the Mail facility on the ECON332 web-site on Blackboard, not the Unit Convenor's University Gmail account.)

## **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>.

For FBE students, the BESS drop-in office, located in E4B108, also provides a range of support services. The web address for BESS is:

[http://www.businessandeconomics.mq.edu.au/for/new\\_and\\_current\\_students/undergraduate/bess](http://www.businessandeconomics.mq.edu.au/for/new_and_current_students/undergraduate/bess)