

ECON6003 Econometric Analysis

Course Outline Semester 1, 2017

Part A: Course-Specific Information

Students are also expected to have read and be familiar with **Part B Supplement to All Course Outlines**. This contains Policies on Student Responsibilities and Support, Including Special Consideration, Academic Misconduct and Plagiarism, and Key Dates. It also contains the BUSINESS SCHOOL PROGRAM LEARNING GOALS.

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1 STAFF CONTACT DETAILS

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Consultation Times: TBC

1.1 Communications with staff

The lecturer-in-charge is responsible for the course content as well as the overall administration of the course. You should feel free to approach me during consultation times about any academic matter related to the course.

You are encouraged to ask questions during lectures when time permits and especially during tutorials. Given the relatively small size number of students, you and fellow classmates will benefit from questions and subsequent discussions during the lectures/tutorials.

You must not expect a review of the lecture material during consultation hours. I will not go over tutorial problems that have been discussed in tutorials. You should prepare specific questions and discuss the specific issues and concerns you have encountered in understanding the course material.

Discussion of course subject material will not be entered into via lengthy emails.

Email correspondence on administrative matters will be responded to within 48 hours, but not over weekends.

2 COURSE DETAILS

2.1 Teaching Times and Locations

Lectures start in Week 1 to Week 12 inclusively. There is one 2-hour lecture and one 1-hour tutorial class per week.

Lecture Time: Wednesdays 18:00 - 21:00

Location: UNSW Business School 232

2.2 Units of Credit

The course is worth 6 units of credit.

2.3 Summary of Course

This course is designed to provide students a rigorous foundation of modern econometrics for applied research in economics, as a unified theme of analyzing economic models and data using mathematical statistics. The first part of the course covers classic econometric concepts and techniques, such as moment estimation, conditional expectation and projection, maximum likelihood, least squares regression, and hypothesis testing and inference, in a rigorous way. Although unnecessary technicalities will be avoided, some statistical theory such as the law of large numbers and the central limit theorem as well as basic matrix algebra will be taught. The second

part of the course builds on these sound fundamentals of econometric theory. It will cover IV and 2SLS estimators, GMM, and the bootstrap. Additional topics such as time series and panel data may be covered briefly. Finally, students will be required to use statistical packages, e.g. Stata or MATLAB, to conduct econometric analysis with data.

2.4 Aims and Relationship to Other Courses

This course is a graduate level (for PhD and MEd students) econometrics course. It aims to give an equivalent treatment of advanced econometrics with similar courses in other top research universities worldwide.

2.5 Student Learning Outcomes

The Course Learning Outcomes are what you should be able to DO by the end of this course if you participate fully in learning activities and successfully complete the assessment items.

The Learning Outcomes in this course also help you to achieve some of the overall Program Learning Goals and Outcomes for all undergraduate coursework students in the Business School. Program Learning Goals are what we want you to BE or HAVE by the time you successfully complete your degree. You demonstrate this by achieving specific Program Learning Outcomes - what you are able to DO by the end of your degree.

For more information on the Undergraduate Program Learning Goals and Outcomes, see Part B of the course outline.

The following table shows how your Course Learning Outcomes relate to the overall Program Learning Goals and Outcomes, and indicates where these are assessed:

Program Learning Goals and Outcomes		Course Learning Outcomes	Course Assessment Item
<i>This course helps you to achieve the following learning goals</i>		<i>On successful completion of the course, you should be able to:</i>	<i>This learning outcome will be assessed in the following items:</i>
1	Knowledge	<ul style="list-style-type: none"> Use matrix algebra to formulate econometric problems. Apply statistical software to real economic data and interpret the results. Have a thorough understanding of recent developments in econometrics such as generalized method of moments as well as classic econometric techniques such as maximum likelihood and least squares. 	<ul style="list-style-type: none"> Problem Sets Exam
2	Critical thinking and problem solving	<ul style="list-style-type: none"> Evaluate critically any piece of empirical research. Understand the implications of model assumptions on the estimation and inference. 	<ul style="list-style-type: none"> Problem Sets Exam

3a	Written communication	<ul style="list-style-type: none"> Construct written work which is logically and professionally presented. 	<ul style="list-style-type: none"> Problem Sets Exam
3b	Oral communication	<ul style="list-style-type: none"> Communicate ideas in a succinct and clear manner. 	<ul style="list-style-type: none"> Problem Sets Individual Presentation
4	Teamwork	<ul style="list-style-type: none"> Work collaboratively to complete a task. 	<ul style="list-style-type: none"> Problem Sets
5a.	Ethical, environmental and sustainability considerations	<ul style="list-style-type: none"> Not specifically addressed in this course. 	
5b.	Social and cultural awareness	<ul style="list-style-type: none"> Not specifically addressed in this course. 	

3 LEARNING AND TEACHING ACTIVITIES

3.1 Approach to Learning and Teaching in the Course

The philosophy underpinning this course and its Teaching and Learning Strategies (3.3 below) are based on “Guidelines on Learning that Inform Teaching at UNSW”. These guidelines may be viewed at: www.guidelinesonlearning.unsw.edu.au.

Quantitative information and statistics are pervasive not only in the study of economics and business but in understanding a wide range of phenomena. Every attempt will be made to demonstrate the relevance of the course to understanding such phenomena. This will require applying econometric and statistical methods and techniques to practical problems in a broad set of topics.

Students who are undertaking this course will have some background in basic statistics and grounding in the principles of regression analysis. Using this knowledge as a base, an extensive discussion of the use of regression theory and some of its extensions will be provided. We demonstrate how regression models can be applied to data to estimate relationships, to forecast and to test hypotheses that arise in economics and business. We also discuss common problems that arise in most economic data.

General principles or guidelines for undertaking applied work are discussed. In particular, we stress careful data analysis, the need to evaluate estimated models and the importance of the links between econometric models and the underlying substantive knowledge or theory associated with the particular application. These issues will be related to applications drawn from various fields.

It is essential that the discussion of how to use econometric tools effectively be complemented with practice in analysing data. An important aid in this particular task will be the computing component where the popular econometrics package STATA or MATLAB will be used.

3.2 Learning Activities and Teaching Strategies

The examinable content of the course is defined by the references given in the Lecture Schedule, the content of Lectures, the content of the Tutorial Program, and the assigned readings.

Lectures

The purpose of Lectures is to provide a logical structure for the topics that make up the course; to emphasize the important concepts and methods of each topic, and to provide relevant examples to which the concepts and methods are applied.

Tutorials

In this course, problem sets replace tutorials. The object of the problem sets is to practice various approaches to, and issues associated with the assigned exercises and topics covered in the course.

Out-of-Class Study

While students may have preferred individual learning strategies, it is important to note that most learning will be achieved outside of class time. Lectures can only provide a structure to assist your study, and tutorial time is limited.

Discussion Forum

A Discussion Forum will operate on the Course website. Tutors will monitor the discussion and answer questions when needed.

Learning strategies

While students may have preferred individual learning strategies, it is important to note that most learning will be achieved outside of class time. Lectures can only provide a structure to assist your study, and tutorial time is limited.

An 'ideal' learning strategy (on which provision of the course materials is based) might include:

- Prior to attending a lecture, read the assigned readings for the lecture. Also download and read the lecture notes for your lecture and bring them with you to the lecture. The lecture notes are available for downloading on the course website.
- Attend the lecture. The lecture notes form the basis for the lecture. Key concepts will be emphasised and demonstrated through worked examples.
- Complement your lecture notes with the assigned readings and ask questions from the lecturer if some issues are still unclear.
- Attempt the assigned problem set questions for that week. Do not be discouraged if you cannot answer all of the questions as some questions are more difficult than others. Attempting the assigned problem set questions will provide a self-test of your understanding of particular topics and identify those topics that may require further attention.

4 ASSESSMENT

4.1 Formal Requirements

To be eligible for a passing grade in this course, students must achieve a composite mark of at least 50 out of 100.

4.2 Assessment Details

	Assessment Task	Weighting	Length	Due Date
1	Problem Sets	20%		Week 3,6,9,12
2	Midterm Exam	30%	1 hour	Week 7
3	Final Exam	50%	2 hours	University exam period

4.3 Problem Sets

A problem set will be distributed approximately every two weeks. In order to review your progress, written answers for problem set questions will be collected in Week 3,5,8, and 12. Each problem set is worth 5%.

The problem sets will be marked and handed back as promptly as possible. Written answers **must be neatly presented**. Pages must be stapled and the student name and number must be indicated. More details on the problem sets will be provided in class and on the website. **You are allowed to work with other students in the class, but you must write up your own solutions.**

The purpose of the problem sets is to test knowledge and understanding of econometric concepts, methodology and interpretation of results and the ability to apply econometric reasoning in solving a realistic problem. It will also provide a self-test of how you are doing in the course.

Problem sets along with the midterm exam provide important feedback mechanism for the lecturer on any major issues faced by the students. These will then be addressed in lectures/tutorials.

4.3.1 Submission Procedure for Problem Sets

You must submit one hard copy of your own solutions to the problem set to the lecturer at the start of the lecture of the week the assignment is due.

If you fail to submit your own solutions you will be given a mark of zero.

4.4 Individual Presentation

The individual presentation gives students opportunities to demonstrate their understanding of the learned principles and techniques and their ability to apply them to practical problems. Topics, format, and marking criteria will be announced on the course webpage.

4.5 Final Exam Format

A **two** hour final examination will be held during the University's final examination period. Examples of previous exam questions will be provided and the format of the exam will be discussed in the lectures.

The purpose of the final examination is to assess knowledge of econometric concepts, methodology and interpretation of results relating to the models reviewed in class. It is designed to test your learning and understanding of both the theoretical and empirical aspects of different econometric techniques discussed. As outlined in 3.2 above all material covered in the lectures and tutorial program is examinable.

Applications for special consideration for the final exam must be lodged online through myUNSW within 3 working days of the assessment (Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration). Then submit the originals or certified copies of your completed Professional Authority form (pdf - download here) and any supporting documentation to Student Central.

4.6 Quality Assurance

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential and will not be related to course grades.

5 COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students and other stakeholders about the courses offered in the School and continual improvements are made based on this feedback. UNSW's myExperience Survey Tool is one of the ways in which student evaluative feedback is gathered. You are strongly encouraged to take part in the feedback process.

6 COURSE RESOURCES

6.1 Course website

The website for this course is on UNSW Moodle at: <http://moodle.telt.unsw.edu.au>

The website contains: (a) the course outline, the tutorial documents and other course handouts; (b) the lecture notes; (c) data used in the tutorial problems and project; (d) past exam papers; and (e) course announcements.

Students should consult this website at least once a week as it contains important information about the course. It will be assumed that all students have seen any notice posted on the course website.

6.2 Textbook and readings

Required Text Books:

- Hansen, B.E. (2017): *Econometrics*, manuscript, University of Wisconsin-Madison (downloadable for free): <http://www.ssc.wisc.edu/~bhansen/econometrics/>

Substitutes/compliment textbooks:

The content and methodology of following books can be used as substitutes to the main reference book:

- Angrist, J. D. and Pischke, J-S (2009): *Mostly Harmless Econometrics- An Empiricist's Companion*. Princeton University Press.
- Wooldridge, J. M. (2013): *Introductory Econometrics: A Modern Approach*, 5th ed. South-Western.
- Casella, G. and R. L. Berger (2002): *Statistical Inference*, 2th ed. Duxbury.
- Greene, W. (2007): *Econometric Analysis*, 6th ed. Prentice Hall.
- Hayashi, F. (2000): *Econometrics*, Princeton University Press.

6.3 Computing work

Computing is an integral component of Econometric analysis. In this course we will use MATLAB to perform empirical analysis using datasets to address specific economic questions and to conduct Monte Carlo simulations to illustrate finite-sample or large-sample behaviour of various estimators. You may use other statistical software such as Stata. Both MATLAB and Stata are available for use on the Business School labs.

7 COURSE SCHEDULE

Lectures start in Week 1 and finish in Week 12. The schedule is approximate and subject to change. Changes will be announced in class, if any.

LECTURE SCHEDULE		
Week	Topic	Reference
Week 1 1 March	Introduction, Review of Matrix Algebra and Probability theory	Hansen Ch.1, Appendix A, B
Week 2 8 March	Conditional Expectations and Projection	Hansen Ch.2
Week 3 15 March	The Algebra of Least Squares PS 1 Due	Hansen Ch.3
Week 4 22 March	Least Squares Regression	Hansen Ch.4
Week 5 29 March	Normal Regression and Maximum Likelihood	Hansen Ch.5
Week 6 5 April	Asymptotic Theory for Least Squares PS2 Due	Hansen Ch.6-7
Week 7 12 April	Asymptotic Theory for Least Squares (cont.) Midterm Exam	Hansen Ch.6-7
Mid-semester break: Friday 14 – Saturday 23 April inclusive		
Week 8 26 April	Hypothesis Testing and Confidence Interval	Hansen Ch.9
Week 9 3 May	The Bootstrap PS 3 Due	Hansen Ch.13
Week 10 10 May	Instrumental Variables (IV) and Two-Stage Least Squares (2SLS)	Hansen Ch.10
Week 11 17 May	Further Topics on IV	Hansen Ch.10
Week 12 24 May	Generalized Method of Moments (GMM) PS 4 Due	Hansen Ch. 11
Week 13 31 May	NO LECTURES	