

School of Economics and Finance

QUAN 201 INTRODUCTION TO ECONOMETRICS

Trimester One 2009

COURSE OUTLINE

Contact Details

Lecturer/Course Coordinator: Dr Mohammed Khaled
Office: RH 322, Phone 463-5787
Office Hours: Tuesdays and Wednesdays 12.30-1.30
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Administration: Suzanne Freear, RH 327, Phone: 463-5380
Suzanne.Freear@vuw.ac.nz

Class Times and Room Numbers

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| Lectures: | Tuesdays | 8:30-10:20 | Rutherford House Lecture Theatre 3 (RHLT3) |
| | Wednesdays | 8:30-9:20 | Rutherford House Lecture Theatre 3 (RHLT3) |

Tutorials

Two-hour tutorials/computer lab sessions will begin in the *second week* of the trimester. Tutorial preferences will be sought during first lecture and announced on blackboard at the end of the week. One of the Thursday tutorials may be cancelled at the discretion of the Course Coordinator.

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| Thursday | 10.30 – 12.30 and 12.40 – 14.30 |
| Friday | 12.30 – 14.30 and 14.40 – 16.30 |

The final examination of this course will be held during the exam period 12 June – 1 July, 2009.

Course Objectives

The course is designed to give students experience of using statistical methods important in economics and other business subjects, and to build skill and confidence in the use of those methods. It provides skills in regression essential for understanding much of the literature of economics, finance, and empirical studies in other areas of business.

We begin with an introduction to the nature of empirical studies in economics and business. The simple regression and multiple regression models are then treated in depth and in a range of applications in both lectures and tutorials. Careful attention is given to model assessment, choosing a model, and departures from the standard assumptions. The tutorial programme has been designed to give hands on experience with these methods. Assignments consolidate this learning process by giving an opportunity to formulate models and interpret empirical results independently of lecturer or tutor intervention.

By the end of this course, students should be able to

- C1 estimate a relation between two variables using Ordinary Least Squares (OLS), explain how OLS estimators behave in terms of their probability distributions, test hypotheses on the relation between variables using t -values and p -values, and measure goodness of fit in a regression
- C2 estimate a relation between three or more variables using the OLS method, and test two or more hypotheses jointly using F -tests or chi -square tests
- C3 use dummy variables to measure binary explanatory variables, then test for any associated structural change in the relation between variables
- C4 explain the effects of non-constant error variance and/or serially correlated errors in estimation and hypothesis tests, and how to adjust the tests and/or estimation to account for these problems
- C5 use an econometric computer program to implement the econometric methods.

Course Content

A provisional lecture outline appears at the end of this course outline.

Expected Workload

On average, you will need to devote about 17 hours per week to this course:

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| Lectures: | 3 hours |
| Tutorial/Lab: | 2 hours |
| Reading/Reviewing: | 10 hours |
| Assignments: | 2 hour |

Readings

The textbook that you should have is *Introduction to Modern Econometrics with Applications*, by **M. Khaled, Pearson/Prentice-Hall, 2008**. Other useful (but not required) references are: *Introductory Econometrics*, 3rd edition, by J. M. Wooldridge, Thomson/South-Western, 2006, *Introductory Econometrics with Applications* by Ramu Ramanathan, Dryden-HBJ, 2002, *Undergraduate Econometrics* by R. C. Hill, W. E. Griffiths and G. G. Judge, Wiley, 1997, and *A Guide to Econometrics* by Peter Kennedy, The MIT Press, Cambridge, Massachusetts, 1998.

For statistical computing, the primary program used will be EVIEWS at a university computer lab. A student version of this program is also available for home use at a small price, please check their website for ordering details. All the procedures/commands in this program that are necessary for our course will be introduced through the tutorial notes and exercises that you will be able to download from the Blackboard, <http://www.blackboard.vuw.ac.nz> prior to each tutorial. For more information on EVIEWS methods, you can look up the help menu in the EVIEWS menu bar – e.g. user's guide.

You will need to have a printed copy of each tutorial assignment (to available on Blackboard) at the commencement of that tutorial, but preferably before then so you know about the expected work ahead of time. This is very important; a few spare copies will be available from tutors at the first tutorial, but none after that. Opening a window in a part of your screen to display the tutorial questions is not good enough as it takes up too much time to read it that way; tutors may not be able to help you in following the questions this way. *Tutorials begin in the second week of lectures*. The notes are necessary for the tutorials since they contain:

- a description of each tutorial's objectives
- theoretical material relevant for each tutorial
- detailed calculation procedures and descriptions of statistical functions

Materials and Equipment

Electronic pocket calculators are permitted at tests or examinations.

Assessment Requirements

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| Homework Assignments (4) | 20% | <i>Assignment due dates are indicated in the detailed course schedule appended to this outline</i> |
| Mid-trimester Test (1 hour) | 30% | <i>In lecture week 7, date & time to be announced</i> |
| Final Exam (2 hours) | 50% | <i>During the Examination Period (12 June – 1 July, 2009)</i> |

Any illness or adverse personal circumstances must be notified to the course coordinator – in writing, with medical certificate or relevant evidence – before an assessment. If absence from such assessment is approved, marks for any missed assessment items will be allocated to the Final Exam mark (e.g. if one assignment is missed with approval, then the weighting will be assignments 15%, test 30% and exam 55%).

Penalties

Unapproved late submission of assignments will incur a penalty of 10% per day up to two days. Unauthorised submissions beyond that will not be marked.

Mandatory Course Requirements

There are no mandatory requirements for this course.

Communication of Additional Information

Announcements, and any changes relating to the course, will be made through the Blackboard website, <http://www.blackboard.vuw.ac.nz>. Later in the trimester, copies of the test and final examination questions of the years 2007 and 2008 along with answers will be made available on the Blackboard.

Faculty of Commerce and Administration Offices

Railway West Wing (RWW) - FCA Student and Academic Services Office

The Faculty's Student and Academic Services Office is located on the ground and first floors of the Railway West Wing. The ground floor counter is the first point of contact for general enquiries and FCA forms. Student Administration Advisers are available to discuss course status and give further advice about FCA qualifications. To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

Easterfield (EA) - FCA/Education/Law Kelburn Office

The Kelburn Campus Office for the Faculties of Commerce and Administration, Education and Law is situated in the Easterfield Building on the ground floor (EA005). This counter is the first point of contact for:

- Duty tutors for student contact and advice.
- Information concerning administrative and academic matters.
- Forms for FCA Student and Academic Services (e.g. application for academic transcripts, requests for degree audit, COP requests).
- Examinations-related information during the examination period.

To check for opening hours call the Student and Academic Services Office on (04) 463 5376.

Notice of Turnitin Use

Student work provided for assessment in this course may be checked for academic integrity by the electronic search engine <<http://www.turnitin.com>>. Turnitin is an on-line plagiarism prevention tool which identifies material that may have been copied from other sources including the Internet, books, journals, periodicals or the work of other students. Turnitin is used to assist academic staff in detecting misreferencing, misquotation, and the inclusion of

unattributed material, which may be forms of cheating or plagiarism. *At the discretion of the School, handwritten work may be copy typed by the School and subject to checking by Turnitin.* You are strongly advised to check with your tutor or the course coordinator if you are uncertain about how to use and cite material from other sources. Turnitin will retain a copy of submitted materials on behalf of the University for detection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

General University Policies and Statutes

Students should familiarise themselves with the University's policies and statutes, particularly the Assessment Statute, the Personal Courses of Study Statute, the Statute on Student Conduct and any statutes relating to the particular qualifications being studied; see the Victoria University Calendar or go to www.victoria.ac.nz/home/about/policy/students.aspx

For information on the following topics, go to the Faculty's website www.victoria.ac.nz/fca under Important Information for Students:

- Academic Grievances
- Student and Staff Conduct
- Meeting the Needs of Students with Impairments
- Student Support

Academic Integrity and Plagiarism

Academic integrity is about honesty – put simply it means *no cheating*. All members of the University community are responsible for upholding academic integrity, which means staff and students are expected to behave honestly, fairly and with respect for others at all times.

Plagiarism is a form of cheating which undermines academic integrity. The University defines plagiarism as follows:

The presentation of the work of another person or other persons as if it were one's own, whether intended or not. This includes published or unpublished work, material on the Internet and the work of other students or staff.

It is still plagiarism even if you re-structure the material or present it in your own style or words.

Note: It is however, perfectly acceptable to include the work of others as long as that is acknowledged by appropriate referencing.

Plagiarism is prohibited at Victoria and is not worth the risk. Any enrolled student found guilty of plagiarism will be subject to disciplinary procedures under the Statute on Student Conduct and may be penalized severely. Consequences of being found guilty of plagiarism can include:

- an oral or written warning
- cancellation of your mark for an assessment or a fail grade for the course
- suspension from the course or the University.

Find out more about plagiarism, and how to avoid it, on the University's website:

www.victoria.ac.nz/home/studying/plagiarism.html

Manaaki Pihipihinga Programme

Manaaki Pihipihinga is an academic mentoring programme for undergraduate Māori and Pacific students in the Faculties of Commerce and Administration, and Humanities and Social Sciences. Sessions are held at the Kelburn and Pipitea Campuses in the Mentoring Rooms, 14 Kelburn Parade (back courtyard), Room 109D, and Room 210, Level 2, Railway West Wing. There is also a Pacific Support Coordinator who assists Pacific students by linking them to the services and support they need while studying at Victoria. Another feature of the programme is a support network for Postgraduate students with links to Postgraduate workshops and activities around Campus.

For further information, or to register with the programme, email manaaki-pihipihinga-programme@vuw.ac.nz or phone (04) 463 6015. To contact the Pacific Support Coordinator, email pacific-support-coord@vuw.ac.nz or phone (04) 463 5842.

Course Content

The following outline gives the topics we expect to cover, some variations are possible.

| Lecture Week | Lecture Topics | Tutorial Topics |
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| 1 | The nature of econometrics and economic data; some key statistical concepts; causality and regression. (Assigned Reading: Textbook chapter 1) | <i>Tutorials begin from the second week. This week, try out your computer logon username and password (if not done already) to avoid any logon problems next week.</i> |
| 2 | Simple regression: interpretation of coefficients; basic assumptions; the ordinary least squares (OLS) method; Properties of OLS estimators – randomness, linearity, unbiasedness, efficiency, consistency, and asymptotic efficiency. (Assigned Reading: chapter 2) | Tutorial 1 Data handling in EViews, calculate descriptive statistics, draw scatter plots, draw random samples, find critical values and probability values from probability distributions. |
| 3 | Probability distribution of OLS estimators; estimating error variance; interval estimation; testing a hypothesis by the interval method, the <i>t</i> -value method, and the <i>p</i> -value method; testing hypotheses with a non-zero null and one-sided alternatives. (Assigned Reading: chapter 3, to p.69) | Tutorial 2 Simple regression estimation, interpretation of estimates, and test of hypothesis using confidence intervals. Assignment 1 handed out on Tuesday in class. |
| 4 | Forecasting; goodness of fit; choice of functional forms of variables, and interpretation of the slope coefficients; comparing the fit of models with the dependent variable in different forms; forecasting with the dependent variable | Tutorial 3 Tests using critical region and <i>p</i> -value. Measuring and testing goodness of fit. |

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| | <p>in the log form; effects of changing units of measurement.</p> <p>(Assigned Reading: chapter 3, p.69-end; chapter 4, the corresponding topics)</p> | <p>Assignment 1 due this week on Wednesday by 4 pm in your tutor's box.</p> |
| 5 | <p>Multiple regression: assumptions; interpretation of coefficients in multiple regression; estimation by the OLS method, example with two regressors; how other things are held fixed in multiple regression; multiple regression with three or more regressors.</p> <p>(Assigned Reading: chapter 5, p.101-114)</p> | <p>Tutorial 4 Examine regression residuals, construct a model non-linear in variables, forecasting.</p> <p>Assignment 2 handed out on Tuesday in class.</p> |
| 6 | <p>Measures of goodness of fit in a multiple regression; properties of OLS estimators; coefficient variances and covariances; testing hypotheses in multiple regression; testing a single linear restriction on coefficients; selecting the variables to include in a regression.</p> <p>(Assigned Reading: chapter 5, p.114-128)</p> | <p>Tutorial 5 Fit a multiple regression by solving the normal equations, and also by using the relevant EViews command; simulating the assumption of <i>other things remaining the same</i> by multiple regression.</p> <p>Assignment 2 due this week on Wednesday by 4 pm in your tutor's box.</p> |
| MID-TRIMESTER BREAK | | |
| 7 | <p>OLS estimation with omission of important variables; OLS estimation when unnecessary variables are included; multi-collinearity: consequences, indication, dealing with multicollinearity.</p> <p>(Assigned Reading: chapter 5, p.128-138, chapter 6, p.141-145)</p> | <p>Tutorial 6 Model selection by using R^2, \bar{R}^2 and MSE measures, Specification error analysis.</p> <p>Assignment 3 handed out on Tuesday in class.</p> <p>Mid-trimester Test this week on topics covered by the first four weeks of lectures and readings. <i>Date & time to be announced.</i></p> |
| 8 | <p>Testing a joint hypothesis by separate t-tests; Testing a joint hypothesis - the WALD F-test; Testing goodness of fit; F-test of a single hypothesis, \bar{R}^2 in relation to the t-statistic.</p> | <p>Tutorial 7 Multi-collinearity analysis, testing a single linear restriction on coefficients, testing joint hypotheses by using the WALD and LM tests.</p> |

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| | (Assigned Reading: chapter 6, p.145-153) | Assignment 3 due this week on Wednesday by 4 pm in your tutor's box. |
| 9 | <p>Testing joint hypotheses with non-normal errors: the WALD chi-square and the Lagrange multiplier tests; variable selection methodologies; dummy variables; interpreting coefficients of dummy variables; modelling and testing for structural change.</p> <p>(Assigned Reading: chapter 6, p.153-159, chapter 7, p.166-173)</p> | <p>Tutorial 8 Binary explanatory variables, interpretation regression results using such variables.</p> <p>Assignment 4 handed out on Tuesday in class.</p> |
| 10 | <p>Violation of assumption on errors: cross-section data and heteroscedasticity, its consequences; how to detect heteroscedasticity; log transformation to alleviate heteroscedasticity; generalised (or weighted) least squares and measuring goodness of fit.</p> <p>(Assigned Reading: chapter 8)</p> | <p>Tutorial 9 Heteroscedastic Models.</p> <p>Assignment 4 due this week on Wednesday by 4 pm in your tutor's box.</p> |
| 11 | <p>Ordering of data by time and spurious regressions; trend and seasonality; serial dependence of errors; OLS estimation and its consequences; heteroscedasticity and autocorrelation consistent (HAC) standard errors; testing for serial correlation of residuals.</p> <p>(Assigned Reading: chapter 9, p.203-228)</p> | <p>Tutorial 10 Serial correlation models.</p> |
| 12 | <p>Dealing with serial correlation: FGLS estimation; regressions with lagged exogenous variables as regressors; models with lagged dependent variables as regressors; testing for serial correlation in, and estimation of dynamic models</p> <p>(Assigned Reading: chapter 10)</p> | <p>Tutorial 11 Dynamic Models.</p> |
