

ECO392M.2 - Econometrics I

Spring 2010

Prof. Stephen G. Donald

Description: Econometrics I is an introduction to econometrics for PhD students who have already taken a graduate level statistics class. The aim of the course is to introduce the regression model and various extensions, as tools for examining, empirically, the nature and strength of economic relationships. We begin by examining bivariate distributions, conditional expectations, best linear predictors and the simple linear regression model. After quickly reviewing the properties of the simple model and estimates we extend the results to the multiple regression model. We will focus on properties of OLS under various assumptions and consider methods of conducting inference - a decent knowledge of matrix algebra will be essential, although certain matrix results will be reviewed from time to time. The remainder of the course will then be devoted to extensions of the classical regression model and methods for assessing the validity of assumptions underlying standard treatment of the classical regression model. The coursework will be theoretical in nature, but students will also be required to use the methods to estimate certain models and test certain hypotheses. Additionally it would be helpful if you were comfortable with matrix algebra.

Meeting Time: Tuesday and Thursday 11am-12:30pm (BRB 1.118)

Grading Policy: The course work will consist of two midterm exams, a final exam plus a number of homework assignments. The homework will involve the use of a computer and an econometrics package. The dates for the midterm exams are indicated below in the schedule. The final exam will be during the final exam period at a date, time and place TBA.

The components of the final grade are:

final exam	40%
midterm exams	20% each
homework	20%

I strongly encourage students to complete all homework exercises. Although there are benefits to be obtained from working in groups I would advise against students free-riding off other students. Homework that is handed in late will receive a zero grade unless accompanied by a medical certificate. The same is true for the midterm exams.

Textbook: Greene, W.A. (2007) *Econometric Analysis*, 6th Edition, Prentice-Hall. This is a very expensive book. If you can find an earlier edition then you should buy it. The problems will not come from the textbook (if they do I will type them out). Some other good books are listed below.

Computer Package: You can use any econometrics package - the department has several that are useful for this class. These include STATA, TSP, LIMDEP, SAS. I will use STATA in class for illustrating some aspects of regression analysis. You can use STATA through the timeshare facility or else purchase your own through STATA GRADPLAN (for \$95) package for your home computer.

Some Good Books:

Wooldridge, J.M. (2002) *Econometric Analysis of Cross Section and Panel Data* MIT Press. (Most likely used as text in Metrics II).

Hayashi, Fumio (2000) *Econometrics*, Princeton University Press

Davidson, R and J. G. MacKinnon (2004) *Econometric Theory and Methods* Oxford University Press.

Ruud, P.A. (2000) *An Introduction to Classical Econometric Theory*, Oxford University Press.

Johnston, and DiNardo (1997) *Econometric Methods*, McGraw-Hill (4th Edition).

Goldberger, A.S. (1991) *A Course in Econometrics*, Harvard University Press.

Kennedy, P. (1998) *A Guide to Econometrics*, MIT Press (4th Edition).

There may be other textbooks that are good substitutes for the assigned text. Please check with me if unsure.

Office Hours: Monday, Wednesday 1-2:30pm. I am in Office BRB 3.126. My office phone number is 471-8907 and my email address is donald@eco.utexas.edu

TA's: Shu Shen (BRB 2.124, innoshu@gmail.com) and Karen Mulligan (BRB 2.130, mulligan0182@yahoo.com). The TA's will be conducting weekly ``tutorial'' sessions where they will go over problems and answer questions on the material. Office hrs TBA.

website: All course materials will be made available on the web through **BLACKBOARD**.

If the office hours are not convenient then please arrange to meet me at some other time - either, see me after class or contact me using email to set up some other appointment. I will also schedule special office hours near the midterm and final exams. I would encourage students to make use of my office hours during the semester and not wait until the day before the exam. So please make use of my office hours to sort out difficulties as they arise.

Class Schedule and Course Outline

The lecture notes are self contained for each class.

Jan 19: Introduction: Distribution of Syllabus.
Jan 21: Multiple Regression I: Goal of Regression Analysis: Conditional expectations, linear projections, covariance and correlation.
Jan 26: Multiple Regression II: Linear Regression Model, estimation by method of moments and OLS.
Jan 28: Multiple Regression III: MLE, FWL Theorem relation to correlation and goodness of fit and Prediction in simple regression model.
Feb 2: Multiple Regression IV: Review of Large Sample Theory
Feb 4: Multiple Regression V: Large Sample Properties of OLS estimator and estimation of standard errors.
Feb 9: Multiple Regression VI: Statistical inference based on Wald principles for linear and nonlinear restrictions and confidence intervals.
Feb 11: Multiple Regression VII: Imposing and testing restrictions using F and LR like tests.
Feb 16: Multiple Regression VIII: Finite sample properties of OLS estimator under restrictive assumptions, sampling distributions, Gauss Markov.
Feb 18: Multiple Regression IX: Finite sample properties of tests and Monte Carlo Simulation.
Feb 23: **First Midterm Exam to be held in class**
Feb 25: Going over solutions on Midterm and material that was tough.
Mar 2: Multiple Regression X: Dummy variables, nonlinearities in variables.
Mar 4: Multiple Regression XI: Specification analysis - omitted variables, irrelevant variables and model selection.
Mar 9: Heteroskedasticity I: Heteroskedastic Residuals and diagnosis.
Mar 11: Heteroskedasticity II: Remedies for heteroskedasticity.
Mar 16: Spring Break!!!!
Mar 18: Spring Break!!!!
Mar 23: Systems of Equations and SUR -- SUR estimation under homoskedasticity.
Mar 25: Generalized Method of Moments: Estimation of linear models with linear moment conditions - examples for linear model and properties.
Mar 30: **Second Midterm Exam to be held in class**
Apr 1: Going over solutions for midterm
Apr 6: Simultaneity I: Examples of models with simultaneity bias, structural form reduced form.
Apr 8: Review
Apr 13: Simultaneity II: Identification of a single equation in a system, estimation of exactly identified models via GMM.
Apr 15: Simultaneity III: Estimation and inference in overidentified models using 2SLS and LIML.
Apr 20: Times Series Regression I: Dynamic Models for univariate time series data and notion of serial correlation, weak dependence and stationarity.
Apr 22: Time Series Regression II: Multivariate models, VAR's and Cointegration.
Apr 27: Panel Data.
Apr 29: Qualitative Response Models I: Linear probability, logit and probit models for modelling qualitative phenomena.
May 4: Qualitative Response Models II: Estimation and inference in qualitative response models.
May 6: Nonlinear Regression Models: Estimation and inference in the nonlinear regression model.