MSc Econometrics

2012-2013

Lecturers: Prof Carol Newman
Mr Michael Curran
Prof Agustín Bénétrix

Course Description

The aim of this course is to provide students with the skills required to undertake independent applied research using modern econometric methods. The course begins with revision of some of the fundamental concepts and aims to extend students' understanding of the subject to an advanced level as each part progresses. The course attempts to provide a balance between theory and applied research.

Students attending this course will deepen their theoretical knowledge of the list of topics below and, thus, develop the necessary practical skills to estimate their own micro and macro economic models. Lectures will be accompanied by tutorials and computer sessions. These applied sessions will instruct students primarily in the use of Stata but may also include sessions on MATLAB.

Module I Assessment

Students will be required to complete fortnightly homework exercises and to undertake one individual project each semester. Students are also required to attend all laboratory sessions and submit exercises as required at the end of each session. Twenty percent of the marks for the course will be awarded for the combination of homework (5%), labs (5%) and project (10%).

Reading

The core texts for this course are:

- Baum, C. F. (2006), *An Introduction to Modern Econometrics using Stata*. Stata Press.
- Davidson, R. D. and MacKinnon J. G. (2004), *Econometric Theory and Methods*, Oxford University Press.
- Enders, W. (2009), Applied Econometric Time Series, Wiley.
- Greene, W. (2008), *Econometrics Analysis*, Pearson
- Pevalin, D. and Robson, K. (2009), *The Stata Survival Manual*. McGraw Hill.
- Verbeek M. (2004), *A Guide to Modern Econometrics*, 2nd Edition. Wiley.
- Wooldridge, J. M. (2010), *Econometric Analysis of Cross Section and Panel Data*, 2nd edition, MIT Press.

The course will primarily follow the notation in Greene with students advised to consult Wooldridge, Verbeek and Davidson and MacKinnon for an alternative treatment of the issues of concern. In addition, supplementary reading will be provided from time to time as the course progresses. Baum and Pevalin and Robson are important source for the applied component of the course.

Prerequisites

A good knowledge of the material covered in the preliminary Mathematics and Statistics course and dealt with in the Appendices of Greene.

PART I (18 hours)
Prof C. Newman

Topics:

1. The Classical Linear Regression Model (Chapters 1-8, 12, Greene)
   a) Specification, estimation and testing
      Ordinary Least Squares and Method of Moments Estimation
      Small sample and asymptotic properties of the OLS estimator
      Goodness of fit, hypothesis testing, confidence intervals
      Testing restrictions, misspecification testing
   b) Violations of assumptions of the CLRM
      Autocorrelation, heteroscedasticity and Generalised Least Squares
      Endogeneity, instrumental variables and the Generalised Method of Moments

2. Maximum Likelihood Estimation (Chapter 16, Greene)
   a) Principle of Maximum Likelihood
      Estimation, properties, testing (Wald, Likelihood Ratio and Lagrange Multiplier tests)

3. Models for Panel Data I (Chapter 9, Greene)
   Fixed effects and random effects methods

4. Models with Limited Dependent Variables (Chapters 23-24, Greene)
   a) Binary choice models
      The linear probability model, probit and logit models: estimation, interpretation of coefficients, goodness of fit, specification testing, correcting for specification errors
   b) Multi response models
      Multinomial logit and ordered probit models
   c) Censored regression models

Additional Reading

Maddala, G. (1983), *Limited Dependent and Qualitative Variables in Econometrics*, Cambridge University Press.

PART IIa (9 hours)
Mr Michael Curran

Topics (subject to change):

1. Identification
    a. Problem of Identification: conditional prediction
    b. Incomplete data
    c. Treatment response

2. Stationary time series
    a. AR, MA, ARMA, ADL models
    b. Autocorrelations and Partial Autocorrelation Functions. Identification, estimation, testing and forecasting
    c. ARCH/GARCH/MS/SV models
    d. Frequency domain approach

3. Forecasting
    a. Forecast assessment
    b. Forecasting with many predictors

4. Filtering & Simulation
    a. Filters & Smoothers
    b. Simulation methods

PART IIb (9 hours)
Prof Agustín Bénétrix

Topics:

1. Systems of Equations
    a. The seemingly unrelated regression model (SUR)

2. Simultaneous equations models
    a. Simultaneous equation models: identification
    b. Estimation by 2SLS, 3SLS

3. VAR
    a. Structural VAR
    b. Specification and Estimation
    c. Identification of shocks
    d. Impulse-response functions
    e. Variance decomposition

4. Models for Panel Data II
    c. Limited dependent variables and Panel Data
    d. Dynamic Panel Data models

Additional Readings (subject to change)

Hayashi, F. (2000), Econometrics, Princeton University Press.
Lütkepohl H. (2005), New Introduction to Multiple Time Series Analysis, Springer.

N.B.: Additional readings will be suggested in the lectures.