Part IIB Paper 10 Theory and Practice of Econometrics II
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Paper Content
This paper is a more advanced course in Econometrics which builds on the material which has been covered in **Theory and Practice of Econometrics I** (Paper 3 of Part IIA). The paper has a practical, rather than a theoretical, emphasis

Aims of the Paper
The aims of this paper are to show how economic theory and statistical methods interact, and to illustrate this interaction by drawing on examples taken from the recent literature of applied economics.

Objectives of the Paper
By the end of this paper, students should have acquired an understanding of the most important problems of specification, estimation and testing which arise in applying statistical techniques to the analysis of economic problems. They should also have developed the skills needed to provide a critical evaluation of applied work in economics, and to undertake such work independently. More specifically

- they should be familiar with the use of a range of statistical methods which are available and widely used in applied studies

- they should have an intuitive understanding of the motivation which has led to the development of these methods, and the type of problem for which they are appropriate

- they should be familiar with a number of important recent studies in applied econometrics, and be capable of providing a critical assessment of their findings

- they should be aware of the most important sources of quantitative economic data for the UK and other industrialised nations

Lecture Courses

There are two lecture courses associated with this paper each of 16 hours
Time Series Methods (Dr D. Robertson, 16 lectures, Michaelmas Term)
Time Series Methods Class (Dr D Robertson, 1 hour, week 4)

Microeconometrics (Dr M. Weeks, 16 lectures, Lent Term)
Microeconomics (*Dr M Weeks*, *1 hour, to be arranged nearer to Easter Term*)

Statistical Methods
These build on the content of Part IIA Paper 3, and extend the multiple regression model and associated testing procedures to cover a number of important cases in economics, particularly those where
- the explanatory variables are not fixed, but themselves the outcome of economic processes
- both dependent and explanatory variables are stochastic time series rather than independent random samples drawn from a population
- the range of values which the dependent variable can take is limited by economic considerations
- the data consists of repeated time series observations on a cross section of agents

Students are expected to develop an intuitive understanding of the relationship between the statistical implications of these assumptions, and the associated econometric methods, rather than to reproduce formal proofs under examination conditions. The detailed rubric describing the techniques covered is set out below.

Examination

For details of the examination structure, please refer to the Form and Conduct Notice pages on Moodle.

Course Texts

Wooldridge, J (2008), *Introduction to Econometrics* (4th edition), Thomson South-Western
Also recommended for Part IIA – 3rd edition is also acceptable.

Stock, J H and Watson, M W (2006), *Introduction to Econometrics* (2nd edition), Addison Wesley

Johnston, J and Dinardo, J (1997), *Econometric Methods* (4th edition), McGraw-Hill International

Kennedy, P (2008), *A Guide to Econometrics* (6th edition), Blackwell, Oxford

Verbeek, M (2008), *A Guide to Modern Econometrics* (3rd edition), Wiley

Pesaran M H (2015) Time Series and Panel Data Econometrics

Sample Examination Questions

Sample questions for the examination are too long to be reproduced here. They can be obtained from http://www.econ.cam.ac.uk

Details of the statistical techniques covered

(i)   *time series models*; ARMA models, unit roots and trend/cycle decompositions, VAR models, cointegration (Engle-Granger residual based test and Johansen). Error-correction models.

(ii)   *an introduction to modelling systems of economic relationships*; seemingly unrelated regressions; vector autoregressions and causality testing; simultaneity; systems of equations; identification; 2SLS

(iii)   *regression*; maximum likelihood and GMM estimation;

(iv)   *hypothesis tests* Wald LM and likelihood ratio procedures

(v)   *discrete dependent variable models*; discrete response models.

(vi)   *panel data models*; static panel data, fixed effects and random effects, instrumental variable and GMM estimation of dynamic panel data models;

(vii)   *treatment effect models*; programme evaluation; difference in difference estimators

(viii)   *An introduction to machine learning and decision trees*