ECG 790:  
Advanced Econometrics  
Fall 2004

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Office hours:  10.00-11.00am F or by appointment  
Class details:  1.30-2.45pm M W in Room 3210, Nelson Hall

Course Topics: (i) Generalized Method of Moments; (ii) Panel data models

(i) Generalized Method of Moments:
Generalized Method of Moments (GMM) was first introduced into the econometrics literature in 1982 by Lars Hansen. Since then it has been widely applied to analyze economic and financial data. This interest has both stimulated and been facilitated by the development of numerous statistical inference techniques based on GMM estimators. These applications have been in very diverse areas spanning macroeconomics, finance, agricultural economics, environmental economics and labour economics. Depending on the context, GMM has been applied to time series, cross-sectional and panel data. In the first part of the course, we focus on the use of GMM estimation in the context of time series data and illustrate the various inference procedures using examples from macroeconomics and finance.

(ii) Panel data models:
Panel data consist of a cross section that is observed over time. These types of data sets are becoming increasingly important in economics, particularly in areas such as labour. In this part of the course, we discuss some of the basic specification issues in linear models for panel data. We also briefly consider GMM estimation of linear panel data models.

Textbooks:
The lectures on GMM are based on:

A. R. Hall, Generalized Method of Moments, in press, Oxford University Press.

The latest information is that the book will be available in early October. Until then, I will distribute copies of the page proofs as needed.

An alternative is the following set of readings:

The lectures on panel data will pull together material from a number of sources. The main text will be:


Good additional references are:


Computations:

All computations are performed in MATLAB and handouts are provided to support this part of the class. It is also anticipated that the class will meet in the computer labs for about three or four times at the beginning of the semester. These meetings will be 1.30-2.45pm on Fridays in Nelson B411 but the exact schedule will be announced in class.

Course Requirements and Grading:

It is assumed that the student has taken ECG 751 and 752 or the equivalent.

Grades will be based on four problem sets and a paper. Each problem set will count for 12.5% of the course grade. The paper will count for 50%. At the end of the course, each student will be required to make a presentation based on his/her paper.

The paper must involve a replication of an existing published study that uses GMM estimation in an empirical study. You are expected to extend the published analysis in some way.

It is important that you choose a topic for your paper early in the semester, not least because some of the questions in the problem set will refer to the model on which your paper is based. Once you have picked a paper to replicate, you must obtain my approval to use it for class. If you have not picked a paper by September 24, 2004 then a paper will be assigned to you. Your written paper must be handed in to me not later than November 24, 2004. Presentations will take place in the last week of class and the exam slot for the class.

Previous experience suggests that obtaining data can be a limiting factor. So it is worth noting that the Journal of Business and Economic Statistics and Journal of Applied Econometrics provide web sites on which are posted the data used in papers published in these journals. These web sites are respectively:
Your choice of paper must fit the following criteria:

1. It must involve GMM estimation.
2. It must involve cross-section or time series data and not panel data so that you can use the MATLAB programs provided.
3. The parameter vector must be overidentified by the population moment condition because this offers more scope for diagnostic testing.

One word of caution, you will need to program the derivative of the moment condition with respect to the parameters and you should bear this in mind when considering your choice of paper. You should avoid nonlinear models with large numbers of parameters.

Course Outline:

GMM:
1. Introduction: population moment conditions in statistics and economics
2. Estimation in correctly specified nonlinear dynamic models
   - Limit Theorems for weakly dependent time series
   - Consistency
   - Asymptotic normality
   - Covariance matrix estimation
   - Two step, iterated GMM estimation
   - Continuous updating GMM estimation
3. Hypothesis testing
4. Methods of moment selection
5. Weak identification

Panel data:
1. Covariance structures and panel data
2. Individual effects: fixed and random
3. Instrumental variables estimation
4. Dynamic panel data models