

ECG 790: Topics in Advanced Econometrics
Syllabus for Fall 2006

Instructor: Alastair Hall

Contact information:

- Office: 4162 Nelson Hall;
- Phone: 513-2871;
- Email: alastair_hall@ncsu.edu.

Class time and location: 1.30-2.45pm M W in Room 2402, Nelson Hall.

Office hours: 10.00-11.00am F or by appointment.

Course Topic: Generalized Method of Moments: estimation and inference

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 this course, we provide a comprehensive review of GMM estimation and its associated methods of inference. The class material includes both a rigorous presentation of the large sample statistical theory behind these methods, and also a discussion of the issues that arise in the implementation of the method in practice. We discuss applications to cross section, time series and panel data.

Textbook: A. R. Hall, 2005, *Generalized Method of Moments*, Oxford University Press.

Computations:

Computations are performed in MATLAB and handouts are provided to support this part of the

class including the provision of a toolbox for GMM estimation written by Kostats Kyriakoulis. The class will meet in the computer labs about four or five times during the semester. These meetings will be 1.30-2.45pm on Fridays in Nelson B400 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 two problem sets and a paper. Each problem set will count for 20% of the course grade. The paper will count for 60%. 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 empirical study that uses GMM estimation in an empirical study. You are expected to extend the published analysis in some way that can and should be discussed with the instructor. 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. A first draft of your paper must be handed in to me not later than Friday, November 17, 2006. Presentations will take place in the class periods during week 15, that is November 27 and 29. You will then have the opportunity to revise your paper on the basis of the feedback that you receive at the presentation. A final version of the paper must be submitted electronically in pdf format by 6.00pm on December 11, 2006.

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: www.amstat.org/publications/jbes/index.html; www.econ.queensu.ca/jae. See Hall (2005), Table 1.1 (p. 3-4) for a listing of applied studies using GMM.

Your choice of paper must fit the following two criteria:

1. It must involve GMM estimation.
2. The parameter vector must be overidentified by the population moment condition because this offers more scope for diagnostic testing.

You are also advised to bear in mind the following two considerations when choosing a paper.

3. The GMM toolbox is designed to handle cross-section or time series data but not panel data.
4. To use the GMM toolbox, you will need to program both the moment condition and also the derivative of the moment condition with respect to the parameters. Therefore, you should avoid nonlinear models with large numbers of parameters.

Course Outline:

1. Population moment conditions in econometrics and statistics; Hall(2005)[Ch.1].
2. IV estimation of the static linear model; Hall (2005)[Ch.2].
3. Estimation in correctly specified nonlinear dynamic models; Hall (2005)[Ch.3].
4. Hypothesis testing; Hall (2005)[Ch.5].
5. Moment selection; Hall (2005)[Ch. 7].
6. Weak identification; Hall (2005)[Ch. 8.2].