

SYLLABUS

Bavarian Graduate Program in Economics

Frontiers in Econometrics: July 21-25, 2008

A. Colin Cameron, University of California - Davis

GOAL

This course presents econometrics methods used in linear and nonlinear regression modelling. The course covers the major estimation methods - least squares, instrumental variables estimation, maximum likelihood and generalized method of moments - and their application to cross-section and panel data.

ORGANIZATION

The daily schedule is:

9.00 - 10.30: First lecture

10.30 - 10.45: Break

10.45 - 12.15: Second lecture

12.15 - 14.00: Lunch

14.00 - 16.30: Problem Set and Reading

16.30 - 17.00: Presentation

17.00 - 18.00: Review Session

COURSE OUTLINE

Day 1: Linear Regression: OLS and GLS

Ordinary least squares regression and feasible generalized least squares. Statistical inference based on both finite sample theory and asymptotic theory.

Day 2: Nonlinear Regression: MLE and NLS

General theory for m-estimators in nonlinear models. Maximum likelihood estimation. Nonlinear least squares. Nonlinear optimization.

Day 3: Limited dependent variable models

Binary choice models – logit and probit. Tobit models and sample selection.

Day 4: Linear panel data models

Estimation of fixed and random effects models in short panels.

Day 5: IV / GMM and brief overview of additional topics.

Instrumental variables estimation. Generalized method of moments estimation. Brief overview of bootstrap, nonparametric regression, duration models.

SUPPLEMENTAL MATERIAL

Familiarity with ordinary least squares estimation of the linear regression model and matrix algebra is necessary. To aid students who have gaps in preparation a lengthy problem set and associated brief lecture notes will be made available to course participants ahead of time. All course participants must attempt the problem set before the first day of lectures, to ensure possession of the necessary background for a course that covers a lot of material. Some lecture material will also be provided. The methods will be illustrated using Stata, and course exercises will include analysis using Stata. Ideally students will have access to Stata at the time of the course. If this is not possible then all relevant Stata output will be provided.

TEXTS

Many graduate-level texts cover most or all of the material in this course. It is assumed that you have access to one of these. I have provided a reading guide for the following four books, but there are several others that are also suitable.

Cameron, A. C. and P. K. Trivedi (2005), *Microeconometrics: Methods and Applications*, Cambridge University Press.

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

Greene, W. G. (2003, 2007), *Econometric Analysis*, 5th or 6th edition, Prentice-Hall.

Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

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

COURSE READINGS

Topic / Book	Cameron & Trivedi	Davidson & MacKinnon	Greene (5th ed.)	Wooldridge
1. OLS and GLS	4.4-4.5	1.4-1.5; 3.1-3.5; 4.4-4.5	2.1-2.3; 5.1-5.3; 10.1-10.6	4.2; 7.4
2. M-estimators	5.2-5.5	—	16.5	12.1-12.3; 12.6
MLE	5.6-5.8	10.1-10.6	17.1-17.5	13.1-13.6
NLS	5.9	6.3	9.2	—
Optimization	10.2-10.3.1	6.4	Appx E.6.1-E.6.3	12.7.1
3. Binary	14.1-14.4	11.2-11.3	21.1-21.4	15.1-15.6
Tobit / Selection	16.1-16.7	11.6-11.7	22.1-22.4	16.1-16.5; 17.4.1
4. Panel data	21.1-21.8	7.10	13.1-13.4	10.1-10.7
5. IV	4.8	8.1-8.3	5.3	5.1-5.2
GMM	6.1-6.4	9.1-9.5	18.1-118.3	14.1-14.2