The Danish Graduate Programme in Economics (DGPE) and Center for Research in Econometric Analysis of TimE Series (CREATES) announce:

Ph.D. course on "Advanced Programming in Quantitative Economics"

August 20–24, 2012

Lectured by

Charles Bos, VU University Amsterdam
Henning Bunzel, School of Economics and Management, Aarhus University

Local Organizer

Henning Bunzel, Aarhus University

Programme

Monday, August 20, 2012

09.30–11.00 L Introduction
- Programming by example
- Concepts of data, variables, functions

11.00–12.30 P Implementation of first programme

12.30–13.30 Lunch in the canteen

13.30–14.30 L Structuring your thoughts
- What is programming?
- Preparation of program

14.30–16.00 P Tutorial
Exercise, extending earlier work
Work through 'Introduction to Ox', Ch 1-5

Tuesday, August 21, 2012

09.00–10.30 L Structuring your programme
- Recursive programming
- Building blocks
- Declarations/data/actions/output
- Passing data back and forth

10.30–12.00 P Reimplementation of first programme
- dissect it into minimal blocks
- test passing variables back-and-forth

12.00–13.00 Lunch in the canteen

13.00–14.30 L Background of computations (Henning Bunzel)
- Floating point numbers and rounding errors
- Compilers and CPUs
- Computing environment at Aarhus University

14.30–16.00 P Simulate data duration model
- Apply concepts of the day
- Think of rounding errors

Wednesday, August 22, 2012

09.00–10.30 L Optimization I
- Newton-Raphson and quadratic approximation
- Hessian: Importance and problems
- Loglikelihood and Covariance
- MaxBFGS

10.30–12.00 P Estimating a duration model I
- dissect it into minimal blocks
- test passing variables back-and-forth

12.00–13.00 Lunch in the canteen

13.00–14.30 L Optimization II
- Restrictions, transformations
- Delta-method for covariance estimation

14.30–16.00 P Implementing covariance estimation
- Duration model with restriction
- Covariance of parameter estimates

18.00 Course dinner

Thursday, August 23, 2012

09.00–10.30 L Object oriented programming
- Concepts of objects
- Implementation issues for Modelbase

10.30–12.00 P Estimating a duration model II
- Setting up a class
- Moving likelihood to modelbase

12.00–13.00 Lunch in the canteen

14.15 (Seminar ?)

16.00–17.00 L Added capabilities
- Graphics packages
- ARFIMA/SsfPack and others

Friday, August 24, 2012

09.00–10.30 L Data handling
- Difference in formats
- Reading large datasets
- Selecting and transforming:

10.30–12.00 P HF Duration modelling
- Read transaction data sets
- Implementing autoregressive duration model or: Using packages
- Graphing
- AR(p) estimation with/without ARFIMA package

12.00–13.00 Lunch in the canteen

13.00–14.30 L Efficiency and remaining topics
- Alternative algorithms
- Matrices
- Own code/existing functions/C-code
- Parallel programming (use, implementation)
- Others

14.30–15.30 P Finding the difference
- AR(p) estimation: loop vs arma() vs ARFIMA package
- Moving likelihood to modelbase

15.30– Handing out exam
Final remarks

Remarks on Exam

This course gives 5 ECTS.

Examination

Take home exam, to be handed in by email before TBA to c.s.bos@vu.nl. Exam consists in solving an Econometric exercise, given a rough data file and the model to be implemented. Students will hand in, in groups of max. 3 students:
a) Report with analysis of problem, data description, graphic results, parameter estimation. Max. 5 pages excluding graphs/tables.
b) Programs 'ready-to-run', including cleaned (if necessary) data files.
Exam will be marked on the basis of
- Structure of solution (relating to analysis of problem) [20%]
- Readability of programs/comments [20%]
- Correctness of programming [20%]
- Robustness of programming [20%]
- Choice of descriptive statistics/graphs [10%]
- Report, relating to structure of solution [10%]

Between brackets the approximative weight of each part in the final mark.