

# Advanced Programming in Quantitative Economics

Introduction, structure, and advanced programming techniques

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15 – 19 August 2011, Aarhus, Denmark

## Tutorial Day 1 - Afternoon

14.30 Targets:

1. Learn some syntax
2. *Use* the syntax
3. Get a simulation running

16.00 End for today

## Learning syntax

Four sources for now:

- ▶ Introduction to Ox (included in help system as PDF)
- ▶ Syntax sheets (see webpage, PDF)
- ▶ Language tutorial (included in help system as HTML)
- ▶ Tutors

Check out those sources first, find your way through.

Spend first  $\pm$  half hour on one of those sources, such that you know most important syntax.

## Exercise OLSGenS

Take the model

$$y = \mathbf{X}\beta + \epsilon \quad \epsilon \sim \mathcal{N}(0, \sigma^2)$$

with  $n = 20$  observations,  $\beta = [1; 2; 3]$ ,  $\sigma = 0.25$  and  $\mathbf{X} = [1 \ u_1 \ u_2]$  where  $u_i \sim U(0, 1)$ .

1. Write a program which creates the  $\mathbf{X}$  matrix; print it, and make sure it is what you want it to be. Save the program as `olsgens0.ox`.
2. Generate data  $y$  from the model. Is the mean of  $y$  roughly what you expect it to be? Save the program as `olsgens1.ox`.

## OLSGenS 2

3. Estimate  $b$  using OLS. Is the estimate decent? Save as `olsgens2.ox`.
4. Add a loop, such that you generate  $S = 1000$  samples of  $y$  successively, and for each estimate and store  $b$ . Print as output the mean and variance of the estimated  $b$ 's. Save the program with the name `olsgens3.ox`.
5. Compare the results you get with the theoretical covariance matrix of  $\Sigma = \sigma^2(X'X)^{-1}$ . Does it all still make sense? Save as `olsgens4.ox`.

## Tomorrow

Try to get along with the exercise; leave it in your personal directory for us to check; leave a `olsgen.txt` next to it with questions to ask, if you have any.

Mind you: Course is to get practice, not to do everything 'perfect' at the first try.