The Science and Art of DSGE Modelling: Construction, Calibration, Estimation and Policy Exercises*

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Contents

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1 Introduction

The following introduces a series tutorials that covers the setting up of DSGE models and their steady state, calibration, estimation by Bayesian ML methods, model identification and validation and finally optimal policy exercises. It is all based on existing facilities in Dynare. Future extensions will develop the latter considerably and examine models solved assuming imperfect information on the part of the private sector.

2 Reading

There are a number of excellent books on modern dynamic macroeconomics that will be used for the course. Dejong and Dave (2007) covers all the empirical aspects of DSGE modelling. This should be supplemented with Del Negro *et al.* (2007) and Del Negro and Schorfheide (2004). To understand the models themselves a good recent text-book to start with is Wickens (2008). Then go on to Gali (2008). Other useful books are McCandless (2008) and Lim and McNelis (2008). At some stage researchers will need to dip into two seminal books: one on New Keynesian models, Woodford (2003) and the other covering the empirical side, Canova (2007); but they are both difficult reads!

3 Software

Participants all need laptops with the following software:

1. Matlab with the optimization toolbox
2. The latest Dynare (Currently 4.2)

Dynare can be downloaded free from its web-site, but Matlab is rather expensive.

4 Details of the Course

1. **Setting up DSGE Models**
   (a) From RBC to NK closed economy models
   (b) Adding financial and labour market frictions

(c) The open economy

2. **The CES Production Function, Calibration and Dimensional Issues**

   (a) Calibration with Cobb-Douglas Production

   (b) Calibration with CES Production

3. **Linearization**

4. **Bayesian Estimation of DSGE Models**

   (a) Detrending the Data

   (b) Estimating Linear Models

   (c) Estimating Non-Linear Models

   (d) Identification

5. **Model Validation**

   (a) Second Moment Comparisons with Data

   (b) The DSGE-VAR Benchmark

   (c) Impulse Response Functions

6. **Policy Exercises.**

   (a) Optimal Commitment

   (b) Optimized Simple Taylor-Type Rules

   (c) Discretion

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