

# **Building and simulating DSGE models – part 2**

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## **Aim of the lectures:**

The lectures provide a self contained introduction to the building, simulation and estimation (second week, with Gauthier Vermandel) of DSGE models that constitute the main workhouse of today's financial macroeconomics.

These models are now commonly used in central banks for policy projections. Their interest is to mix micro foundations, dynamic relations and rational expectations. Furthermore, they can be estimated using recent developments in Bayesian econometrics.

The objective of this course is to provide the basic tools to allow participants to get some intuitions on these models and to be able to read and understand policy and research papers using this approach.

*Participants are encouraged to bring their laptops with matlab installed to perform quantitative exercises presented during the course. (Possibility to obtain a matlab trial version at [https://www.mathworks.com/programs/trials/trial\\_request.html](https://www.mathworks.com/programs/trials/trial_request.html)).*

## **Tentative organization:**

### **March 23<sup>th</sup> (classroom 0.11 CEUE)**

#### **8.00-11.15** The standard 3-equation New Keynesian model

- Households
- Firms and the sticky price device
- Monetary policy rule
- Steady state
- Log-linear model

#### DSGE models and real life

- Ad hoc calibration; Second moments statistics matching by calibration; Maximum likelihood
- Bayesian estimation of the 3-equation model applied to the Polish economy.
- Measurement equations, measurement errors.

(4 lectures with 15 min. breaks)

#### **11.15-12.30** lunch break

#### **12.30-15.45** DSGE models and real life (part II)

- Priors: choosing the prior information (mean, standard deviation and shape).
- Posteriors distributions.
- Identification issues: calibration versus estimation.
- Shock decompositions, aggregates' driving forces.

The canonical framework of estimated DSGE models: Smets and Wouters 2007

- Equilibrium conditions.

- Estimation: data, prior and posterior informations.
  - Bayesian VAR versus DSGE Model.
- (4 lectures with 15 min. breaks)

**March 24<sup>th</sup> (classroom 0.7 CEUE)**

**8.00-11.15** An application via Dynare

An introduction to optimal policy

- The welfare criterion and its approximation by a loss function.
- Optimal monetary policy applied to the Polish economy.
- The Taylor frontier: the trade-off between output volatility and inflation volatility.
- Spurious welfare reversal and the need for a second order approximation of the welfare criterion.
- An introduction to non-linear DSGE models (higher order approximation).

(4 lectures with 15 min. breaks)

**References :**

Jean-Christophe Poutineau, Karolina Sobczak, Gauthier Vermandel, The analytics of the New Keynesian 3-equation Model, forthcoming PUER, 2015

Smets F, Wouters R. Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach (2007). American Economic Review.

Jean-Christophe Poutineau, Gauthier Vermandel, An introduction to modern policy evaluation tools: Poland through the lens of the New Keynesian 3 equation model.

Other references will be given during lectures

A useful website for simulations: [dynare.org](http://dynare.org)