

DSGE Models and the data: Methods and Problems
BSSM, June 2007
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Outline

The course presents a self contained exposition of systemwide methods to study DSGE models.

It is assumed that participants are familiar with the following topics:

- (a) Current basic models used in dynamic macro, monetary economics, international economics and international finance.
- (b) Working knowledge of Matlab programming language.

The lectures for this course are based on chapters 2, 3, 6 and 9 to 11 of my book: *Methods for Applied Macroeconomic Research*, Princeton University, Press, 2007.

Slides of the presentations will be available shortly before the course at the CREI BSSM homepage. No material will be distributed in class.

Sample codes implementing some of the techniques discussed in the lectures will be provided be posted. Practice session will illustrate the mechanics of the codes. Some discussion of the Dynare package will also be presented.

Program

Monday June 25, 2007 Review of log-linear and second order approximations to solutions of DSGE models and preliminary treatment of the data.

Tuesday, June 26, 2007: Maximum likelihood estimation of DSGE models

Wednesday, June 27, 2007: Introduction to Bayesian methods and posterior simulators

Thursday, June 28, 2007: Bayesian methods for DSGE models

Friday, July 29: Forecasting and evaluation of DSGE models

Topics covered and reading list

1) Solution of DSGE models and data treatment

- Dynamic Programming and Lagrange Multipliers
- Linear and second order methods
- Detrending/filtering for calibration and estimation

References

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2 Maximum likelihood estimation

- State space models and Kalman filter
- Prediction error decomposition and numerical tips
- Application to DSGE models

References

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- Altug, S. (1989), "Time to build and Aggregate Fluctuations: Some New Evidence", *International Economic Review*, 30, 883-920.
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- Ireland, P. (2000) Sticky Price Models and the Business Cycle: Specification and Stability, *Journal of Monetary Economics*, 47, 3-18.
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- Linde', J. (2005), "Estimating New Keynesian Phillips curve: A Full Information maximum likelihood", *Journal of Monetary Economics*.

3 Introduction to Bayesian methods and posterior assimilators

- Preliminaries : Bayes Theorem, Prior Selection, Nuisance Parameters
- Normal approximations

- Acceptance and Importance Sampling
- MCMC methods (Gibbs sampler and Metropolis-Hastings)
- Prior Robustness

References

- Berger, J. and Wolpert, R. (1998), *The Likelihood Principle*, Institute of Mathematical Statistics, Hayward, Ca., 2nd edition
- Bauwens, L., M. Lubrano and J.F. Richard (1999) *Bayesian Inference in Dynamics Econometric Models*, Oxford University Press.
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4 Bayesian estimation of DSGE models

- Bayesian DSGE models
- Comparison with ML/ GMM/VAR approaches
- Identification problems in DSGE
- Examples

References

- An, S and Schorfheide, F. (2007) Bayes analysis of DSGE models, *Econometric Reviews*.
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5 Evaluation and forecasting with Bayesian DSGE models

- Statistical and economic evaluation
- Unconditional and Conditional forecasting

References

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