Course Structure and Standard Syllabus

Course Topic: General Macroeconomic Analysis

Course Title: Fiscal and Monetary Policy Analysis with DSGE Models (DSGE)

Objectives
This two-week course, presented by the IMF’s Institute for Capacity Development, focuses on the use and interpretation of dynamic stochastic general equilibrium (DSGE) models. The emphasis is on applications of fiscal and monetary policies using models with nominal and real rigidities that are commonly used in central banks and ministries of finance. The course relies on case studies relevant for the region to illustrate the application of these models, and to show how they can be used as an input in the policymaking process.

Topics (Core Units)
1. The real business cycle model
2. The New Keynesian model
   - Monetary policy
   - The use of MATLAB/Octave Dynare/Iris for DSGE models
3. Labor market rigidities in the NK model
4. The NK model in an Open Economy
   - Monetary and fiscal policy analysis
5. Fiscal policy in the NK Model
6. A new Keynesian Model with Financial frictions
7. Bringing DSGE models to the data (1)
   - State-Space models
   - Bayesian techniques
8. Bringing DSGE models to the data (2)
   - Forecasting with DSGE models
9. Policy applications with DSGE models
10. Course summary and key takeaways

Target Audience
Mid- to senior-level officials from central banks and ministries of finance involved in the macroeconomic analysis of monetary and fiscal policy issues with dynamic stochastic general equilibrium (DSGE) models.

Prerequisites
Participants should have an advanced degree in economics or equivalent experience, good quantitative skills, and a basic knowledge of MATLAB/Octave and Dynare/Iris or equivalent
software. It is highly recommended that they have taken the modules available online for this course.

**Performance Evaluation**

Two multiple-choice quizzes will be given. One online-quiz will be given at the beginning and the other one at the end of course. If the evaluation process is universally adopted, then tests results should be recorded in participants’ evaluation.
EXTERNAL CURRICULUM REVIEW
PROPOSED PROGRAM OUTLINE FOR DSGE

UNIT 1: THE REAL BUSINESS CYCLE MODEL

Outline of Lecture (3 hours)

- Introduction to the basic Real Business Cycle (RBC) model
- Bellman equation and optimization
- Derivation of the first-order conditions, deterministic steady-state, log-linearization of equilibrium conditions
- Calibration
- Solution methods for linear rational expectations models.

Workshop (3 hours)

- **Topics**: Introduction to MATLAB/Octave and Dynare/Iris. Simulation of the basic RBC model

  *Activity*: The workshop (1) introduces the MATLAB/Octave plus Dynare/Iris programming environment, (2) the structure of a Dynare/Iris program and basic commands for model simulation, (3) studies the dynamic properties of the model through impulse responses in a calibrated real business cycle model to various shocks.

References


UNIT 2: THE NEW KEYNESIAN MODEL

Outline of Lecture (3 hours)

- Introduction to the basic New Keynesian (NK) model for monetary policy analysis.
- Main imperfections and assumptions of the model (monopolistic competition and sticky prices) and derivation of the key equations.

Workshop (3 hours)

- **Topic**: Simulation of the basic NK model.

  *Activity*: Discussion of the dynamic properties of the model through impulse responses in a calibrated NK model to various shocks.
**References**


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**UNIT 3: LABOR MARKET RIGIDITIES IN THE NEW KEYNESIAN MODEL**

**Outline of Lecture (3 hours)**

- The “Divine Coincidence” and the role of sticky wages
- Optimal monetary policy under labor market frictions
- Labor market search models
- A NK model with commodities (oil price shocks) and wage rigidities

**Workshop (3 hours)**

- **Topic**: The effects of oil prices in an economy with labor market rigidities.

- **Activity**: The workshop (1) discussed how the introduction of sticky wages affects the dynamics of the NK model, (2) estimates the impacts of oil price shocks in economies with no labor market frictions; and (3) estimate the transmission of oil price shocks in an economy with labor market rigidities.

**References**


http://www.crei.cat/people/gali/bgoil08wp.pdf

UNIT 4: THE NEW KEYNESIAN MODEL IN AN OPEN ECONOMY

Outline of Lecture (3 hours)

- Extension to an small-open economy framework
- International risk-sharing
- Discussion of fixed versus flexible exchange rates

Workshop (3 hours)

- **Topic**: The transmission mechanism in the open economy
- **Activity**: The workshop discusses the transmission mechanisms under fixed versus flexible exchange rates. Extension to include oil as input in the production function and as part of the consumption basket.

References


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**UNIT 5: FISCAL POLICY IN THE NEW KEYNESIAN MODEL**

Outline of Lecture (3 hours)

- Extensions of the NK model to distortionary taxation, liquidity constrained households and OLG Households
- Introducing a fiscal policy reaction function

Workshop (3 hours)

- **Topic:** The effects of fiscal policy in the NK model and interactions between fiscal and monetary policy
- **Activity:** The workshop illustrates the effects of various fiscal policies (1) simulate the effect of different fiscal policy shocks (fiscal multipliers to government spending and tax shocks) under different assumptions for monetary policy.

References


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**UNIT 6: A NEW KEYNESIAN MODEL WITH FINANCIAL FRICTIONS**

Outline of Lecture (3 hours)
➢ A medium scale model in an open economy with financial frictions (financial accelerator model)
➢ Macro-prudential policies and financial frictions

Workshop (3 hours)
• Topic: External shocks, monetary and macro-prudential policies
• Activity: The workshop helps to generate optimal responses of monetary, fiscal, and macro-prudential policies to capital flows.

References


UNIT 7: BRINGING DSGE MODELS TO THE DATA (1)

Outline of Lecture (3 hours)
➢ State-space model representation, the Kalman Filter and Maximum Likelihood estimation of linearized DSGE models
➢ Introduction to Bayesian methods
➢ Bayesian estimation of linearized DSGE models (Markov Chain Monte Carlo methods, the Metropolis-Hastings algorithm).
Workshop (3 hours)

- **Topic**: Bayesian estimation of DSGE Models
- **Activity**: The workshop presents applications of different techniques to estimate DSGE models on simulated data.

References


UNIT 8: BRINGING DSGE MODELS TO THE DATA (2)

Outline of Lecture (3 hours)

- Forecasting with DSGE models (conditional and unconditional), forecasting performance of DSGE models
- Generating risk scenarios and fan charts

Workshop (3 hours)

- **Topic**: Forecasting with DSGE models
- **Activity**: The workshop generate scenarios and fan charts using data from a real economy.

Note

It is recommended the adoption of regional examples/applications for each division.

References

UNIT 9: POLICY APPLICATIONS WITH DSGE MODELS

Outline of Lecture (3 hours)
- Use of DSGE models for computing natural levels
- Conducting counterfactual policy analysis

Workshop (3 hours)
- **Topic:** Application the case of Chile
- **Activity:** The workshop describes how to conduct policy analysis and counterfactual policy analysis using the Chilean economy.

Note
It is recommended the adoption of regional examples/applications for each division.

References


UNIT 10: COURSE SUMMARY AND KEY TAKEAWAYS

Outline (1 hour)
- Key takeaways from lectures and workshops
### Summary of Instructional Time

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<th>Workshop</th>
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