

# Monetary Policy Analysis: Empirical Modelling (3CP)

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HS21

## Course outline, procedure and grade

The course introduces time series models to analyse macroeconomic and financial data, with an emphasis on applications in monetary policy analysis. We discuss various ways of imposing identification restrictions to obtain a structural interpretation of the model. We introduce impulse response analysis and variance decomposition to evaluate specific economic hypotheses. Finally, we discuss various procedures to assess the forecasting performance of a model.

The course is a mix between brief introductions to models and econometric methods, and practical exercises implementing and analysing models in software packages, mainly gretl and also Matlab. Students participate actively by presenting and sharing written solutions to exercises. The students will form teams of minimum 3 to maximum 5 persons and write a term paper (Seminararbeit, maximum 20 pages) on an empirical investigation, in which they apply (one of) the models and the methods discussed during the course. The students are free to choose the topic of interest and formulate a working hypothesis.

After participating, the students should know about the main econometric issues to address when implementing an empirical time series model for macroeconomic and financial data. Students should also be able to implement and analyse simple and small models either in gretl or Matlab. gretl is available at <http://gretl.sourceforge.net/> and Matlab at the repository of the University of Zurich.

The grade is the average between the grade obtained for presenting the solution of exercises (50%) and the term paper (50%). Attendance required to present the solution of the exercise.

## Timetable

The course takes place on Fridays, 12.15 – 13.45, KOL-F-123.

By mid-November: First draft (one page) of working hypothesis, including a brief description of the data, the model and the methods used for the investigation.

By mid-January: Submission of term paper.

## Topics

### 1. Introduction

- Relevant questions
- Models we discuss
- Some issues

### 2. Univariate modelling

- Time series modelling
- Augmented distributed lag (ADL) models
- Examples and issues (diagnostics, stationarity)

### 3. Multivariate analysis

- Vector autoregression (VAR)  
Identification, impulse responses, variance decomposition, forecasts
- Cointegration and vector error correction model (VECM)  
Mean reversion and weak exogeneity
- VECM with foreign variables (VECX) – Implementing the notion of a small open economy

### 4. Forecasting macroeconomic variables

- Model evaluation
- Conditional and scenario-based forecasts

### 5. Advances

- Missing information in macroeconomic variables – Adding factors to a VAR
- Non-linear effects of monetary policy – Non-linear modelling of time series

## Literature

1. Neusser, Klaus, 2016, *Time Series Econometrics*, Springer International Publishing AG Switzerland.
2. Verbeek, Marno, 2012, *A Guide to Modern Econometrics*, John Wiley & Sons Ltd., 4th edition.

Additional literature will be indicated during the course.

### Prerequisites:

Macroeconomic and econometrics courses at the BA level

Desirable: Advanced macroeconomic and time series econometrics at the MA level

Useful: Some basic programming experience