Allievi Program, Master in Economics and Ph.D. Economics

Macroeconometrics

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Course Aims and Objectives

The main goal of the course is to provide students with the knowledge of a variety of techniques and models in the field of time series econometrics that are used for macroeconomic analysis.

This course has two parts. The first part examines the principles and practice of making forecasts of economic and financial time series for decision making in government, business and economics more generally. The second part discusses techniques and methods designed to study causality in macroeconomics.

Each session will feature also a practical component (to build forecasting models and to make and assess forecasts), for which we will use MATLAB.

Students who complete the course should be able to:

- use a range of models to produce point forecasts of economic and financial variables;
- undertake both economic and statistical evaluation of point forecasts;
- understand the limitations of point forecasts and be able to quantify forecast uncertainty through the use and evaluation of density forecasts;
- identify and estimate the transmission mechanisms macroeconomic shocks;
- perform impulse response functions analysis;
- perform variance and historical decomposition,

Contents

Part 1: Forecasting

1: Principles of model building with an eye to the forecast
- Introduction to (a) simple ARMA/VAR model and to (b) state-space models (and Kalman filtering).

- Discussion of the pros and cons of the various alternatives with an eye on what you're trying to forecast.
- Examples could include: Short term inflation forecasting

2: Point forecast and Combination
- Basic forecasting principles, evaluating point forecast and the principle of combination (include criteria for evaluating point forecasts).
- Examples: Discussion of the mechanics behind the model combination for macroeconomic forecasting

3: Density and events forecasts
- Assessing interval and density forecasts (include criteria for evaluating density and event forecasts).
- Value-at- risk/expected shortfall forecasts (If of interest)
- Examples: Bank Fan Charts
- Assessing events forecasts (e.g. probability of inflation above/below a certain threshold/ letter writing probability). Understanding the Brier score and its decomposition.

4: Nowcasting and adding judgement to the forecast
- Nowcasting/Backcasting Economic Activity (includes dealing with mixed frequency and real time data)
- Adding judgment to forecasts : Conditional forecast with a VAR

Part 2: Causal effects in Macroeconomics

1: Shocks identification
- Representations of the economy
- Relations between reduced form and structural shocks

2: Strcutural VAR
- Impulse response functions analysis
- Variance and historical decomposition.
- Identification schemes: recursive scheme, sign restrictions, SVAR-IV

3: Large information:
- FAVAR models.
- Factor models.

4: Nonlinear SVAR:
- Smooth transition SVAR.
- Nonlinear Moving Averages.