Time Series Analysis

Instructor: Luca Benati

I. General characteristics of the course

The focus of the course will be on structural VAR (SVAR) analysis and its applications, but I will also briefly touch upon several issues which are either conceptually related, or instrumental to specific uses of VARs (e.g., bootstrapping, in order to get confidence intervals with the correct coverage).

II. Organisation of the course

The course will consist of a standard series of class lectures, plus several sessions in the computer lab, in which students will be asked to solve specific problems.

III. Computer software

All the computer work will be done in MATLAB. Prior knowledge of MATLAB would be an advantage, but it is not a pre-requisite for the course: MATLAB is very easy to learn, and is extremely intuitive (basically, if you know the math of a specific econometric problem, you can write the problem into MATLAB straight away). I have an extensive library of MATLAB codes for VAR estimation and structural VAR analysis which I have written over the years, and I will share them with the students, first to get them ‘jumpstarted’ easily, and then to show them specific applications.

IV. Grading

Fifty per cent of the final course grade will be based on a written examination. The remaining fifty per cent will be based on a term paper, whose topic will be agreed with the instructor. The topic can be either an original research project, or an extension/modification/etc. of a key paper in the literature.

V. Reference textbooks

The course will be mostly based on papers. The following two textbooks are however useful as general background references on VAR analysis:

- Helmut Luetkepohl, *Introduction to Multiple Time Series Analysis*, Springer-Verlag, in particular chapters 2 and 3
General outline of the course, and main references

A [R] next to a paper denotes required reading.

I. Why structural VAR analysis?

Two (complementary) rationales behind SVAR analysis: (i) Sims’ critique of the ‘incredible restrictions’ of the Cowles Commission approach, and (ii) the link with DSGE models, which, in general, have a structural VAR(MA) representation.

II. VAR estimation and lag order selection, computation of impulse-response functions, and variance decompositions


III. Identification

Alternative ways to achieve identification:

- **Long-run restrictions**
  
  
  
  
  
  
  

- **Short-run restrictions: Cholesky**


• Short-run restrictions: more general exclusion restrictions


• Short-run restrictions: sign restrictions


• Achieving identification via a mixture of restrictions


**IV. SVAR-based policy counterfactuals**


**V. Applications: What does monetary policy do?**

VI. Applications: What are the sources of business cycles?


VII. Applications: What is the impact of a technology shock?


VIII. Applications: What are the causes of the ‘Great Moderation’?


