

Macroeconometrics; Course Advanced Time Series QED, Winter 2012

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OBJECTIVE

Economists from central bankers, large firms, universities, international organizations or government agencies use sophisticated techniques to obtain information about the state of the business cycle from financial and economic data. This course presents the economic motivation, the statistical principles and the practical use of different type of models to analyze the cyclical position of an economy. Understanding this cyclical position is a necessary condition for private agents and policymakers to take optimal decisions and to forecast future developments of the macroeconomic variables.

The orientation of this section is mainly applied. We will cover theoretical econometric issues but the main objective of the course is to provide the student with the tools to solve economic questions with the data.

METHODOLOGY

Each session starts with the presentation of one or several models, followed by the careful study of some specific applications and the detailed explanation of the computer programs to obtain the results.

The typical session implies 1-2 hours of presentation of the techniques, 1-2 hours of presentation of papers and 1-2 hours of the analysis of the computer programs. The papers presented will be replicated in class with the original data, just to make sure that the student understand all the calculations made to obtain the final results.

OUTLINE

Session 0: Things that you should know

Introduction to programming. Univariate and multivariate standard linear models. ARIMA, VAR, Cointegration and ECM

Session 1: Kalman Filter

Theory:

General introduction to unobserved components models. Kalman filter as a linear filter to capture unobserved components. Derivation of the Kalman filter. Estimation of the parameters. Smoothing. Kalman filter with time varying parameters..

Economic applications:

Permanent and transitory components of economic time series. Coincident indicators. Output gap. NAIRU estimation

Programming exercise:

In the directory, called block1 contains the directory called codes. The student has to run programs 1,2,3,

Session 2: Hodrick Prescott filter.

Theory:

HP original algorithm. HP as a particular case of the Kalman Filter. HP as a moving average. HP from a frequency domain point of view.

Economic applications:

Extracting trend and cycle from economic time series.

Programming exercise:

The directory, called Kalman contains the directory called codes. The student has to run programs 4 and program called hpfilter,

Session 3: Markov switching models.

Theory:

Intuition and motivation. Derivation of Hamilton filter. Estimation of the parameters. Smoothing. Extensions. Linearity tests.

Economic applications:

Statistical definitions of economic recessions. Predictability of recessions. Analysis of the “New Economy”. Financial effects of macroeconomic variables.

Programming exercise:

The directory, called markov contains the directory called codes. The student has to run programs markov1 to markov4

Session 4. Combinations of Markov Switching and Kalman filter Models.

Theory:

Motivation. Why do we need to combine different techniques? Technical complications.

Economic applications:

Third-phase in US GDP cycle. Friedman’s plucking model.

Programming exercise:

The directory called mskalman contains the directory called codes. The student has to run programs msmarkov1

Session 5: Smooth transition regression models.**Theory:**

Intuition and motivation. TAR, STAR, LSTAR models. OLS and Maximum likelihood estimations. Linearity tests.

Economic applications:

Unemployment in the US. STAR models for the US GDP. STAR models in finance.

Programming exercise:

The directory called star contains the directory called codes. The student has to run programs tar star

Session 6: Nowcasting and real time forecasting**Theory:**

Real time analysis as the only option for useful forecasting. Analyzing big information sets. Out of sample analysis.

Economic applications:

GDP forecast, inflation forecast. Turning points prediction.

Programming exercise:

The directory called forecast contains the directory called codes. The student has to run programs fore1 fore2

Session 7: Business cycle synchronization and characteristics**Theory:**

Different measures of comovements, business cycle features. Bootstrapping techniques. Business cycle dating.

Economic applications:

Comovement across European economy. World, European or country-specific business cycles. Measuring duration, amplitude and excess.

Programming exercise:

The directory called synchro contains the directory called codes. The student has to run programs sync1 sync2

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