

HG/RNy 14 January 2014 (preliminary)

ECON 5101, Advanced Econometrics: Times Series. Spring 2014

Lecture plan

The textbook used in the course is:

Hamilton, J.D: *Time Series Analysis*, 1994. Princeton University Press.

For those familiar with Davidson, R. and J.G. MacKinnon: *Econometric Theory and Methods*, 2004. Oxford University Press., we give some references to that book as well.

In the lecture plan, the two books are referred to as *H* and *DM*. We plan to publish several lecture notes (*LN*) on the course internet page. The lectures will make further references to the time series econometrics literature as well. These are usually meant as suggestions for further reading and for self-study.

Plan by lecture theme

1. *Introduction to stochastic difference equations – basic concepts (HG 1 lecture)*

- Introduction to trends and stationarity (H3)
- White noise and moving averages. Causal versus non-causal processes (H3)
- Autocorrelation (H3)
- A first dynamic process, the AR(1) process, (H1.1, DM1.3-1.5)
- Stability, causality, and dynamic multipliers for AR(1)
- Introduction to AR(p) and lag operation forms.

2. *Stochastic difference equations (linear) and ARMA processes (HG 1-2 lectures)*

- The mathematics of stochastic difference equations, (H1.2, LN)
- Solution via companion form, and the unit circle (H1.2)
- Dynamic multipliers (H1.2)
- Eigenvalues and stability
- AR(p), MA(q), ARMA (p,q) processes (H3)

3. *ARMA, ARIMA (briefly) and VAR* (HG 1 lecture)

- Estimation and identification – acf and pacf
- Introduction to VAR and structural VAR (SVAR)
- Exogeneity

4. *Kalman Filter Methods* (HG 1-2 lectures)

- Introduction to Kalman filters (H13)

5. *Models with lead-in-variables and rational expectations* (RN 1 lecture)

- The “invariance critique” and the “Lucas critique”
- Solving rational expectations models---the New Keynesian Phillips curve
- Estimation and econometric evaluation of models with lead-in-variables

6. *Non-stationarity ((RN, 1 lecture)*

- Deterministic non-stationarity and structural breaks H15, H22, DM24
- Autometrics to detect breaks
- Stochastic non-stationarity, integratedness H 16.1, DM 14
- Integratedness: Consequences for inference H 17.1-17.4
- Unit-root tests H 17.6-17.8, DM 14.3

7. *Cointegration* (RN, 2 lectures)

- The spurious regression and the cointegration regression H18.3, DM 14.5
- The Engle-Granger Representation Theorem LN
- Testing cointegration rank and estimation of cointegrating vectors in full systems and in conditional subsystems. H 19, H20
DM 2
- Identification
- Cointegrated VAR

8. *Model based economic forecasting* (RN, 1 lecture)

- Stationary data. H 4, H13
- Non-stationary data

(Please note that the references to the books and lecture notes will be updated)