CEMFI, 2023-2024
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TIME SERIES ECONOMETRICS

Contents

This course studies econometric models for describing and predicting economic and financial time series, and analysing the interrelations suggested by economic theory.

Part A

1. **Univariate time series:**
Stochastic processes. Stationarity and serial correlation. Prediction theory and the Wold decomposition. The frequency domain. ARMA models. Temporal aggregation.

2. **Multivariate time series:**
Serial correlation structure in the time and frequency domains. VARMA models. Contemporaneous aggregation, marginalisation and causality. Impulse-response analysis. Dynamic models with latent variables and the Wiener-Kolmogorov and Kalman filters.

3. **Integration and non-linear models:**
Integrated processes. Cointegration. Non-linear models. Volatility models. Compound autoregressive processes. Markov chains, dynamic regime-switching models and the Hamilton filter.

Part B

4. **Inference with dependent observations:**
Identification. Asymptotic properties of pseudo-maximum likelihood estimators in the time and frequency domains. Specification tests: Lagrange multiplier, Hausman and information matrix tests.

5. **Estimation of time series regression models:**
Autoregressive models. Unit roots and cointegration. Dynamic regression models. Heteroskedasticity and autocorrelation. Predictive densities.

References

The main references are:

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

Martin, V., Hurn, S. and Harris, D.: *Econometric Modelling with Time Series: Specification, Estimation and Testing*, Cambridge University Press, Cambridge, 2013

Course assessment

Participation in lectures, and classes is compulsory. The students' performance in presentations will contribute 10% of the final grade. In turn, the homework is worth 20% while the remaining 70% will be determined by the grade of the exam questions on the material covered in the lectures.