

**A TRAVEL THROUGH THE UNIT ROOT LAND and THE  
COINTEGRATION VILLAGE**  
Master in Finance, University of Leon

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**Description**

Unit Roots and Cointegration is a course of 8 hours designed to cover the theoretical basic foundations of this standard type of non-stationarity with the goal of equipping students with the necessary tools for doing empirical time series research in *Applied Financial Economics*.

The first block (part I) of the course presents a quick review of the theory of univariate non-stationary (unit roots) time series variables. The second block (part II) represents the main part of the course and will focus on the multivariate level covering the different aspects of Cointegration-VAR modelling that have been relevant in the recent Applied Economics time series literature. The last block (part III) consists of some economic applications.

**Software:**

E-Views.

## COURSE OUTLINE

### PART I: UNIVARIATE NON-STATIONARY LINEAR MODELS

#### VISITING THE UNIT ROOT LAND (2 hours)

Deterministic trends versus stochastic trends. Forecasting stationary processes versus non-stationary processes. Permanent versus transitory shocks. Decomposition in trend and cycle: Beveridge-Nelson decomposition. Testing for a Unit Root: Dickey-Fuller tests. Unit roots and structural changes.

### PART II: MULTIVARIATE NON-STATIONARY LINEAR MODELS

#### VISITING THE COINTEGRATION VILLAGE (3+3 hours)

Spurious regression. Cointegration. Implications of cointegration for the VAR modelling: The Error correction model (Granger's representation theorem). Common trends representations: Stock-Watson and Gonzalo-Granger representations. Estimation and Inference: Single equation's approach (Engle-Granger) and system equation's approach (Johansen).

### PART III: APPLICATIONS

#### TRAVELLING AROUND SOME APPLICATIONS

- Rational Expectations: Present Value Models
- International Economics: Cross-Country Comovements
- Price Discovery

## REFERENCES

Brooks, C., *Introductory Econometrics for Finance*. Cambridge University Press, 2002.

Burke, S. and J. Hunter, *Modelling Non-Stationary Economic Time Series*. Palgrave, 3rd Qtr 2003.

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

Enders, W., *Applied Econometric Time Series*. John Wiley and Sons, 1994.

Mills, T., *Time Series Techniques for Economists*. Cambridge University Press, 1990.

Mills, T., *The Econometric Modelling of Financial Time Series*. Cambridge University Press, 1999.

Patterson, K., *An Introduction to Applied Econometrics: A time series approach*. Palgrave Publishers, 2000.

Patterson, K., *Unit Roots in Economic Time Series*. Palgrave Publishers, 4th Qtr 2003.

I hope you enjoy the course. GOOD LUCK.