Time series (it is strongly advised to have some knowledge in R for this course)

ECTS : 3

Description du contenu de l'enseignement :

This course will present the modelling and forecasting of time series. We will expose the main concepts and methodsapplied to univariate time series : stationnarity and unit roots, ARIMA models, univariate volatility models, forecasting. We will also present the methods for multivariate framework : VAR, Cointegration and VECM, Multivariate GARCH. The learning goal of this course is that students become able to engage in and conduct original research. It is also toprepare them to be professionals in careers that require training in econometrics. **Outline**

1. Univariate time series modelling and forecasting Stationnarity and unit roots, unit root tests, ARIMA models : estimation, testing
2. Univariate volatility models ARCH, GARCH models and their extensions
3. Multivariate times series models VAR models, Causality, Impulse-Response analysis, Cointegration, VECM
4. Multivariate GARCH models BEKK, CCC and DCCmodels

Software The software that will be used in this course is R. No prior knowledge of this software package is assumed. This package will be introduced in lectures and in the problem sets as the course proceeds.
Students are asked to install R and RStudioDesktop :

1. R can be found on https://pbil.univ-lyon1.fr/CRAN/
2. RStudio Desktop can be found on https://www.rstudio.com/products/rstudio/download/

Compétence à acquérir :

After this course, the students should be able to produce their own empirical study with time series. They also should have acquired sufficient knowledge to read and understand more complex time series econometric methods.

Mode de contrôle des connaissances :

The grade is based on an individual project.

Bibliographie, lectures recommandées :

Brooks, C., Introductory Econometr cs for F nance, Cambridge University Press, 3rd edition 2014.
Ghysels, E. and M. Marcellino,A ed Econom c Forecast ng s ng me er es Methods, Oxford University Press, 2018.
Mills, T., et R.N. Markellos, R.N., he Econometr c Mode ng of F nanc a me er es, Cambridge University Press ; 3ème Édition, 2008 **Additional references** Campbell, J., A. Lo and C. MacKinlay, he Econometr cs of F nanc a Mar ets, Princeton University Press, 1997 Bauwens L., Hafner C. et S. Laurent, Handboo of Vo at ty Mode s and the r A cat ons, John Wiley & Sons, 2012. Taylor, S. J., Asset Pr ce Dynam cs) Vo at ty and Pred ct on, Princeton University Press, 2007.
Jondeau, E., Poon S.-H. et M.Rockinger, F nanc a mode ng under non-gauss an d str but ons, Springer.
Linton, O., F nanc a Econometr cs) Mode s and Methods, Cambridge University Press, 2019