

## Econometrics of Financial Markets – 24 hours

### Course objectives:

The past ten years have seen an extraordinary growth in the use of quantitative methods in financial markets. Professionals now use sophisticated statistical techniques in portfolio management, proprietary trading, derivative pricing, risk management and securities regulation. The purpose of the course is to offer an overview of mostly used econometrics tools and the way these methodologies can be used in empirical finance, both in investment banking and asset management. A strong emphasis is placed on practical applications, with a strong relation with the topics treated during the Matlab class.

### Course outline:

#### 1 / An Overview of Financial Data: Stylized facts of returns distributions

- *Prices, Returns and Time Aggregation*
- *Portfolio Returns and Spatial Aggregation*
- *Parameter Estimation*
- *Market Efficiency and The Random Walk Hypotheses*
- *Tests of the Random Walk Hypotheses*

#### 2 / Econometrics of the Efficient Frontier

- *Theoretical Background*
- *Traditional Econometric Approaches*
- *Alternative Econometric Approaches*

#### 3 / Capital Asset Pricing Model

- *Review of the CAPM*
- *Statistical Framework for Estimation and Testing*
- *Nonnormal and Non-IID Returns*
- *Implementation of Tests*
- *Cross-Sectional Regressions*

#### 4 / Multifactor Pricing Models

- *Theoretical Background*
- *Estimation and Testing, SURE Regressions*
- *Risk Premia and Expected Returns*
- *Selection of Factors*
- *Deviations from Exact Factor Pricing and Arbitrage*

#### 5 / Econometrics of Derivative Pricing Models

- *Brief Review of Derivative Pricing Methods*
- *Parameter Estimation of Asset Price Dynamics*
- *Estimating  $\sigma$  in the Black-Scholes Model*
- *Quantifying the Precision of Option Price Estimators*
- *Implied Volatility Estimators*
- *Stochastic Volatility Models*

### References:

Brandt, M. (2009), Portfolio Choice Problems, in Handbook of Financial Econometrics, Y. Ait-Sahalia & L.P. Hansen, Eds, North Holland.

Campbell J., Lo A., McKinley, A. (1997), The Econometrics of Financial Markets. NJ: Princeton University Press.

Garcia, R., Ghysels, E. & Renault, E. (2009). Econometrics of Option Pricing Models, in Handbook of Financial Econometrics, Y. Ait-Sahalia & L.P. Hansen, Eds, North Holland.

Gourieroux, C., Scaillet, O., Szafarz, A (1997), Econométrie de la Finance, Economica.

Lo A. (2008), Hedge Funds: An Analytic Perspective. Princeton, NJ: Princeton University Press.

**Assessment:** Project