Financial Econometrics

Course Outline
Academic Semester: 2025/26

1. General

School	**School of Finance and Statistics**		
Academic Unit	**Department of Banking and Financial Management**		
Level of Studies	**Undergraduate**		
Course Code	**XPXOM01-1**		
Semester	**6th or 8th**		
Course Title	**Financial Econometrics**		
Idependent Teaching Activities		Weekly Teaching Hours	Credits
	Lectures	**4**	**7,5**
Course Type	**Special background**		
Prerequite Courses			
Language of Instruction and Examinations	**Greek**		
Is the course offered to Erasmus Students?	**Yes**		
Url (Eclass)	**https://eclass.unipi.gr/modules/auth/courses.php?fc=64**		

2. Learning Outcomes

Learning Outcomes

- Students will be acquainted with specific financial applications which require the use of econometric analysis.
- The students will learn how to use the programming language R.
- The students will learn how to determine whether an event of interest has an effect on the value of a company or an asset price.
- The students will learn how to specify and estimate probit and logit models.
- The students will learn to predict the probability of default of a borrower.
- They will learn how to simulate the returns of an investment strategy based on past historical data, as well as, to evaluate the forecasts generated from this strategy out of-sample.
- They will learn how to use the bootstrap technique to estimate the standard errors of the estimated parameter coefficients of a prediction model, to construct bootstrap confidence intervals without the use of a distribution assumption, and to conduct reliable statistical inference.
- They will learn how to estimate time-varying parameter coefficients of an asset pricing
- They will learn how to implement econometric tests of exuberance (explosive behavior) in asset prices (asset bubble detection).
- They will learn how to implement the variance ratio tests in order to evaluate the random walk hypothesis.
- They will learn to identify when we use a momentum strategy or a contrarian strategy based on the autocorrelation of the financial asset returns.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making

- Working independently
- Production of free, creative and inductive thinking

3. Syllabus

- Bootstrap: we show how to estimate the standard errors of the estimated parameter coefficients of a prediction model, to construct bootstrap confidence intervals without the use of a distribution assumption, and to conduct reliable statistical inference. The lectures focus on both non-parametric and parametric bootstrap methods.
- Backtesting: simulating the returns of an investment strategy based on past historical data and then evaluating the forecasts generated from this strategy out of-sample.
- Statistical test procedures to evaluate the out-of-sample forecasting performance of the prediction model. The lectures explain the nature of directional forecasting and its importance alongside conventional forecast evaluation procedures.
- Event study analysis: implementation of an econometric procedure in order to investigate the effect of an event on the stock price of a company.
- Binary Choice models: we show how to specify, estimate probit, logit and ordinal models. These models are used when the variable we want to predict is binary. We explain how to use a binary choice model to predict the probability of default of a company.
- Econometric tests of exuberance (explosive behavior) in asset prices: the objective of these tests is to detect periods in which the data generating process of a financial variable is characterized by explosive dynamics. We make use of these methods to investigate for the presence of bubbles in the stock markets, crypto-currencies, exchange rates, etc.
- Estimating models with time-varying parameters: students will code and learn methods such as rolling regressions, expanding regressions, Kalman Filters and Flexible Least squares.
- Variance Ratio tests: we make use of the random walk hypothesis to evaluate the weak efficient markets hypothesis, and consequently, whether markets are predictable or not. We apply the Variance Ratio tests to examine the random walk hypothesis. These lectures focus on various variance ratio tests: the power transformed tests of Chen and Deo (2006), the exact rank and sign-based Variance Ratio tests of Wright (2000), the subsampling method of Whang and Kim (2003), and the bootstrap test of Kim (2006).
- Investment strategies: contrarian and momentum strategies.
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4. Teaching and Learning Methods - Evaluation

Delivery	**Face-to-face**	
Use of Information and Communications Technology	**Laboratory Education**	
Teaching Methods	**Activity**	**Semester Workload**
	Lectures	30
	Independent Study	135,5
	Study and analysis of bibliography	22
	Course Total	**187,5**
Student Performance Evaluation	The evaluation procedure will involve a written exam which will include short-answer questions, laboratory work, and problem solving.	

5. Attached Bibliography

Suggested Bibliography

- Ηλίας Τζαβαλής, 2008. Οικονομετρία. Εκδόσεις ΟΠΑ.
- JackJohnston, JohnDinardo. Οικονομετρικές μέθοδοι. Εκδόσεις Κλειδάριθμος.
- Dimitrios Asteriou, Stephen G. Hall. Εφαρμοσμένη Οικονομετρία. Εκδόσεις ΠΡΟΠΟΜΠΟΣ.
- JamesD. Hamilton. Time Series Analysis. Princeton University Press.

Related Academic Journals