Regression and Time Series Models — LM, CF
Introduction and general information

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Course outline

- The course is structured into four sections
- 1. Review of statistical inference $\rightarrow$ prof.ssa Manuela Cattelan
- 2. Financial data sources and variables of interest, an introduction
- 3. Market equilibrium and the CAPM, an empirical investigation: the financial model, linear regression, estimation and inference
- 4. Stylized facts of financial data and the efficient market hypothesis: (un)predictability, the random walk hypothesis, unit root testing, ARMA models, forecasting

Your expectations....

- ...do not expect the content to be completely new! Some elements should be known to you, you should have already seen part of the content. We will review several basic elements in statistics which are fundamental for the courses of the next semesters. What might be novel, is the view on these tools from a financial perspective.
- ...do not expect too much emphasis on the theory! We will provide a combination of methodology and practice, with an emphasis on the financial interpretation of statistical tools when applied to financial data.
- ...do expect an evaluation (grade) based on both theoretical knowledge and practice with real data!

My expectations....

- At the end of the course...
- ...you should be able to run a linear regression, perform diagnostic analyses and make inference on parameters, interpret the model outcome
- ...you should be able to evaluate the predictability of a variable by means of ARMA models, including the possible presence of a unit root
- ...you should not run Python commands estimating a model without knowing what the model does and how the outcomes should be interpreted!

Books and Python

- Two reference textbooks

1 T. Haslwanter, An Introduction to Statistics with Python - With Applications in the Life Sciences, 2022, Springer - Statistics and Computing series

2 C. Huang and A. Petukhina, Applied Time Series Analysis and Forecasting with Python, 2022, Springer - Statistics and Computing series

- Python is not my coding environment for research, so I will use very basic commands (!)
- If you do not know Python, look at Haslwanter book, it provides details on installation and a basic user guide; many further resources are mentioned in the book's first chapter
- I will provide in the slides the code generating: plots, model estimation, statistical tests...; you are required to practice on your own on the use of Python for replicating the analyses available in the slides

Questions on your background

- Please answer all the questions available at this link **https://www.wooclap.com/RTSINTRO25**
- Please fill the file for group formation, the link is available in Moodle

Exam

- Grades will be given as the combination (weighted sum) of two parts

1. Written exam (60%): composed by 3 to 5 exercises including both theoretical questions as well as interpretation of results from model estimation and testing
2. Group homework (40%): two group assignments (points 3 and 4 of the course outline)

- Homework assignments will be provided in due time, they will include a description of the data to be recovered, and a number of questions to be answered. Results should be collected in a report, with appropriate comments. Data and code must be provided together with the report.
- Groups are going to be heterogeneous in terms of BA studies, and I will post them on Moodle as soon as possible. Groups are invited to meet as soon as formed. I do not care on how you organize within the group (coding, estimation, leader...) but group roles must be reported within the report. The grade will be given to the entire group with the aid of peer evaluation.

Lectures schedule

- Planned lectures (all in LabP55):
  i. Monday 13:30-15:30
  ii. Tuesday 13:30-15:30
  iii. Wednesday 8:30-10:30
- Prof.ssa Manuela Cattelan: from 30-Sept. to 22-Oct. (16 hours)
- Prof. Caporin from **23-Oct**,
- Cancellations of lectures will be posted on Moodle
- Without changes to the schedule, the last lecture will be 10-Dec.

Office hours and dissertations

- Office hours for the first semester: Monday and Friday 10-12 - Department of Statistical Sciences - Via Battisti 241
- Quick questions: before/after lectures
- Office hours for the second semester will be posted on-line at the beginning of the next year
- For meetings in other days/time, please contact me by email
- Dissertations: available for dissertation supervision with topics in quantitative finance, financial data science, financial econometrics; ask for dissertation title **not before** the end of the first semester of the **second year**