COURSE SYLLABUS

Big Data in Business, Economics and Society

2223-2-F9101Q030-F9101Q030M

Aims

The course aims at showing some recent developments of the model for mathematical portfolio management.

Contents

- Markowitz's portfolio selection model;
- Properties of the minimum variance portfolios;
- The risk parity approach;
- The shrinkage approach.

Detailed program

Introductive remarks: risk measures.
Mathematical derivation of Markowitz's (1952) portfolio selection model. The Capital Asset Pricing Model.
The minimum variance extension as portfolios with a limited exposure to errors in parameters estimation.
The risk parity extension as an optimization problem with no explicit solution.
An introduction to shrinkage estimator and its connections with the optimal portfolio selection theory.

Prerequisites

Basic notions of probability and constrained optimization

Teaching form

In-class lectures

Textbook and teaching resource

Lecturer's teaching notes
A book that students should refer to is:
Thierry Roncalli - Introduction to Risk Parity and Budgeting - 2013 - Chapman & Hall/CRC Financial Mathematics
Series

Semester

Second semester

Assessment method

The oral exam will, **alternatively**, be based:
• on the topics covered during the lab with the implementation of a numerical analysis (financial data collection, portfolio management, post-optimality of optimal portfolios);
• on a report on a topic not necessarily covered in class (to be settled with the instructor at the end of the lectures).

In both cases, students' evaluation will be based on her/his capability of tackling and managing numerical issues in a financial setting.

Office hours

Office hours' schedule will be provided on a weekly basis. Office hours will be held remotely

Sustainable Development Goals