UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Financial Markets Analytics

2425-1-FDS01Q007

Learning objectives

The objective of the course is to deepen and analyze some theoretical and empirical developments in portfolio management, focusing in particular on tactical asset allocation and the main quantitative models of stock selection.

In this perspective, some of the classes will be of an applicative/informatics nature, based on the use of the software R and Python.

Contents

The course focuses on two macro areas of topics. A first part focused on more advanced portfolio theory models, i.e. Strategic/Tactical Asset Allocation models. The focus in this first part will be more on the empirical applications of the models and the more technical data issues involved in the development of the models. In the second part the course focuses on more specific topics, related to the implementation of active investment strategies, clarifying the relationship with the market efficiency hypothesis, the relevance of data and its quality for building reliable investment strategies.

Detailed program

Modern Portfolio Theory

- a) Introduction to asset management
- b) The properties of financial assets, returns properties, volatility and correlations
- c) The portfolio choice, the Markowitz model
- d) The Implementation of the Markowitz model, the efficient frontier

- e) From Markowitz to an equilibrium approtch the CAPM
- f) The new Efficient Frontier the Capital Market Line (CML)
- g) The Market Portfolio in the CML and the passive management
- h) The Security Market Line and the Beta in the CAPM
- i) Active vs Passive management, total risk vs systematic and specific risk
- l) The Markowitz model drawbacks, instability and low diversification

Quantitative Equity Portfolio Management (QEPM)

- a) The basics of QEPM
- b) The Efficient Market Hypotesis (EMH)
- c) The fundamental law of asset management
- d) The APT e and the factor models
- e) Economic factor models versus Fundamental factor models
- f) A special case of Fundamental models: Screening models
- g) Sequential screening and Simultaneus screening
- h) The Citigroup models RAM and Group Rotation

One-off topics in Portfolio Management

- a) Basic priciples of stock valuations: analysts consensus
- b) Basic priciples of stock valuations: key financial items, dividends, market orders and liquidity
- c) Active Funds: The case of hedge funds
- d) Hedge funds popular strategies
- e) Market effinciency and links with extraperformance (Alpha)
- f) The pairs trading strategy based on cointegration tests
- g) Implementation of the pairs trading startegy
- h) The momentum strategy, cross sectional, time series and residual version
- I) The dangerous biases that arise when working with historical datasets: look-ahead bias and survivorship bias

Prerequisites

There are no formal prerequisites for the course, but basic knowledge of financial theory will be useful.

Students are also expected to know the basic concepts of statistics and in particular those related to multiple linear regression models. Basic concepts of matrix algebra will also be given for granted.

Teaching methods

The course is taught in a traditional way, therefore based on frontal teaching. It provides for the development of applications and models in the computer lab with the help of the R or Python programming language. The implementation of models, of which some examples are Screening models, pairs trading and momentum strategies, is prodromic to the Assignment that is delivered at the end of the course and represents a concrete opportunity for students to exploit and consolidate the knowledge developed during the course.
All lectures are delivered in face-to-face delivery modalities:

- 21 (2-hour) lectures delivered in face-to-face delivery mode.

Assessment methods

The learning will be tested through:

1. An oral presentation of the voluntary Assignment, proposed during the course, in groups of 2-3 students, with critical discussion of the results.

2. An oral assessment.

The final result will be the average of the two parts.

This method of assessing learning is motivated by the objective of putting the students in the operational conditions typical of work activity and to bring out in particular their soft skills (organisational, communicative, creative...).

Textbooks and Reading Materials

The course content is based in part on the book:

- Ludwig B Chincarini, Daehwan Kim, 2006, Quantitative Equity Portfolio Management, McGraw-Hill Library of Investment and Finance. The relevant chapters of the text range from ch.1 to 7.

The textbook covers approximately 30% of the course topics. The remaining topics are taught using sets of slides, web resouces on implementation of strategies in R and Python, and some papers:

- Scherer, B., 2002, Portfolio Resampling: Review and Critique, *Financial Analysts Journal*, 58(6), pp. 98-109.
- Drobetz, W., 2001, How to Avoid the Pitfalls in Portfolio Optimization? Putting the Black-Litterman Approach at Work, *Swiss Society for Financial Market Research*, 15(1), pp. 59-75.

All the resouces wiil be made available to students

Semester

Second semester

Teaching language

English

Sustainable Development Goals