Course unit: Models and Decisions

Beware! Under construction.

Course metadata

Title in French: Modèles et Décisions

Course code: tbaECTS credits: 8Type: ground courseTeaching hours: 100h

• Period: September to mid-November

• Language of instruction: English and French

Coordinator: tba

 Instructor(s): Mitra Fouladirad, Christophe Pouet, Jiakun Zheng, Dominique Henriet, Clément Depoutre (BNP Paribas), Gaël Leboeuf (Aix-Marseille Université)

• Last update 23/07/2025 by C. Pouet

Brief description

This course unit is divided into four parts:

- Risk and decision (24 hours) taught by Dominique Henriet, Jaikun Zheng andClément Depoutre
- Statistics and decisions (24 hours) taught by Mitra Fouladirad and Christophe Pouet
- Corporate finance (24 hours) taught by Gaël Leboeuf
- Data project: business issues understanding (20 hours) taught by tba

Learning outcomes

- Understand how to take decision under uncertainty
- Learn how to assess risk and how to compare risky situations
- Learn how to model, estimate and predict time series
- Understand how capital structure affects the value of the firm

Course content

Risk and decision

- 1. Part 1: Risk and Expected Utility
 - 1. Introduction: diversification and mutualization
 - 2. Risk measures
 - 1. Risk magnitude: cumulative distribution and quantile function
 - 2. Risk measures based on the quantile function, the actuarial approach
 - 3. Risk measures based on CDF, the expected utility approach

- 3. Expected utility
 - 1. Risk Aversion in the expected utility approach
 - 2. The measure of risk aversion
 - 3. The characteristics of risk aversion
- 2. Part 2: Behavioral decision making
 - 1. Decision under risk
 - 1. Introduction to Expected Utility Theory, Risk Aversion and Measurement
 - 2. Behavioral Decision Theories under Risk
 - 2. Decision under uncertainty
 - 1. Eliciting Beliefs in Economics
 - 2. Multiple Priors and Ambiguity
 - 3. Time preferences
 - 1. Discounted Utility Theory: Time versus Risk
 - 2. Hyperbolic Discounting and Its Measurement

Statistics and decisions

- 1. Reminder on probability: conditional expectation
- 2. Stochastic processes in discrete and continuous time
- 3. ARMA process: definition, existence, characteristics (autocovariance, partial autocovariance)
- 4. Estimation of ARMA processes: identification, parameters estimation and validation
- 5. Extensions: SARIMA, ARCH and GARCH processes

Corporate finance

- 1. The Corporation
- 2. Introduction to Financial Statements Analysis
- 3. Financial Decision Making and the Law of One Price
- 4. The Time Value of Money
- 5. Investment Decision Rules
- 6. Fundamentals of Capital Budgeting
- 7. Capital Markets and The Pricing of Risk
- 8. Optimal Portfolio Choice and the Capital Asset Pricing Model
- 9. Estimatong the Cost of Capital
- 10. Capital Structure in a Perfect Market
- 11. Mergers and Acquisitiions

Data Project: business issues understanding

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Bibliography

You can check the availability of the books below at Centrale Méditerranée library.

- 1. Risk and decision
 - course ebook

- Wakker, P. P. (2010). Prospect Theory: For Risk and Ambiguity. Cambridge university press.
- Carvalho, A. (2016). An overview of applications of proper scoring rules. Decision Analysis, 13(4), 223-242.

2. Statistics and decisions

- course handout
- Brockwell, P.J. and Davis, R.A. (1991). Time Series: Theory and Methods. Second Edition.
 New York: Springer Verlag.
- Box, J.E.P. and Jenkins, G.M. (1970). Time Series Analysis; Forecasting and Control. San Francisco: Holden Day.

3. Corporate finance

- Berk, J. and DeMarzo, P. (2019) Corporate finance. Prentice Hall; 5th edition.
- Aswath Damodaran at NYU: Course and video materials, formulas, spreadsheets, estimated risk premium, Cost of capital by sector and more.
- The Vernimmen handbook homepage: Course and video materials, formulas, spreadsheets, corrected exercises and case studies, newsletter, financial data on 7,000 listed companies and more.
- AMF. Annual reports and legal informations on French listed companies.
- Yahoo! Finance. Financial data on listed companies.

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