

Course Syllabus

Financial Risk Management

Spring 2023

National Tsing Hua University
Department of Quantitative Finance
Master Program
3 Credits
Tuesday: 13:20-16:20

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Course outline

This course examines modern techniques for managing financial risks, including market risk, credit risk, liquidity risk, and operational risk. The course starts with an analysis of risk management problems and risk profiles; then it provides measurement techniques for different types of financial risks on equities, bonds, financial derivatives. It will cover the measurement of value-at-risk (VaR) for measuring market risk and credit risk, economic capital, risk adjusted return on capital. It will discuss how risk measurement tools used for active management of the risk/return profile of financial institutions. It will cover the new Basel III regulatory requirements for banks. It will also cover the issues of climate risk to financial institutions.

Aims

- To provide participants with an in-depth knowledge of the most recent risk identification, measurement and management techniques. This topic is essential for people involved in managing risks, trading financial assets, making financial corporate strategy, as well as regulatory supervision of financial institutions.
- To provide participants with the skills to quantify practically widely-used financial risks: Value-at-Risk.
- To offer the techniques of analyzing financial risks both for financial and industrial firms.
- To provide participants with the knowledge of the effects of climate risks on financial institutions.
- To offer participants with the knowledge in pursuing the *Financial Risk Management (FRM)* certification organized by GARP.
- To offer participants with some knowledge in pursuing the *Sustainability and Climate Risk (SCR)* certification organized by GARP.
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Learning objectives

By the end of this course, students will be able to:

1. Discuss risk management problems, risk profiles, and financial risks, including market risk, credit risk, liquidity risk, and operational risk.
2. Evaluate Value-at-Risk (VaR) for market risk on stocks, bonds, and financial derivatives.
3. Compute VaR with different approaches, including closed-form, historical simulation method, and Monte Carlo simulation.
4. Discuss traditional VaR limitations and assess the ability of VaR on measuring financial risks.
5. Analyze credit risk with its measurement, management, and derivative securities.
6. Discuss Basel regulation on financial institutions.

Required textbook

Essential Reading:

- [1] Jorion, Phillippe, *Value at Risk: The New Benchmark for Managing Financial Risk*, 3rd edition, McGraw-Hill, 2007
- [2] Yan, Yuxing, *Python for Finance: Apply powerful finance models and quantitative analysis with Python*, 2nd edition, Packt, 2017.
- [3] Jorion, Phillippe, *Financial Risk Manager Handbook*, Sixth Edition, GARP, Wiley Finance, 2011

Supplementary Reading:

- [1] Hull, John. *Options, Futures and Other Derivatives*. Pearson (9th Global Edition)

Teaching Methods

- Teaching stuff will distribute teaching materials to the website: <https://elearn.nthu.edu.tw/>
- 2.5-hour lectures (Theory knowledge) + 0.5-hour lab (Coding skill)
- Learn Python in Datacamp or Codecademy
- Bring laptops to the classroom

Evaluation

Individual assignment 1	20%
Individual assignment 2	20%
Group Assignment (Part I)	20%
Group Assignment & presentation (Part II)	40%