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Risk Management

Academic Year: (2023 / 2024) **Review date: 14-09-2023**

Department assigned to the subject: Business Administration Department

Coordinating teacher: PEÑA SANCHEZ DE RIVERA, JUAN IGNACIO

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Finance I and Finance II, Mathematics and Econometrics
Programming skills in Matlab o similar language are recommended

OBJECTIVES

We design this course to train participants to evaluate and measure financial risks. The course starts with a detailed analysis of matrix and risk profiles, the importance of financial risk factors, and hedging risk exposure techniques. Then the main points related to why and how firms should hedge are addressed. We discuss Basel capital accords. After ensuring that the participants know how to compute and backtest Value-at-risk (VaR) and Expected Shortfall (ES) for portfolios exposed to market risk. We discuss important market risk modeling technical aspects, such as copulas, micro correlations, and tail dependences. Next, the course turns to credit risks and their measurement (CVaR). We discuss how to manage credit risk using credit derivatives. The program ends with a review of operational risk measures (OVaR) and implementation issues.

The emphasis of the course is on modeling and measuring financial risk. The course deals with the interest rate, exchange rate, commodity price, equity, credit, and systemic and operational risks. The course draws heavily on mathematics, statistics, econometrics, and financial theory. The practice sessions require applying standard Econometric techniques such as GARCH modeling and Machine Learning and Deep Learning techniques such as Regression Trees and Long Short-Term Memory Networks (LSTM). The course involves a command of Matlab and, especially, LiveScripts.

DESCRIPTION OF CONTENTS: PROGRAMME

PROGRAM:

Chapter 1:   Introduction

¿   What is this course about?
¿   What is financial risk?
¿   Risk evaluation, measurement, and management
¿   Risk factors
¿   Risk profile: Economic Theory vs Regression trees
¿   Hedging risk: vanilla derivatives and ETF
¿   Assignment #1

Chapter 2: Risk Management and Firm Value

¿   Why should firms hedge?
¿   Creating value with risk management: bankruptcy costs, taxes, and investment opportunities.
¿   Optimal capital structure and risk management
¿   How should firms hedge?
¿   Optimal hedging strategies: Price risk
¿   Optimal hedging strategies: Price and quantity risk

Chapter 3: International Capital Accords

¿   Why banking regulation?

¿ Banking regulation tools
¿ Financial Risks: The Basel Framework
¿ Basel I, II, III, IV¿.
¿ The limitations of conventional banking regulation

Chapter 4: Market Risk

¿ Risk measures
¿ Forecasting and Backtesting VaR: Garch models vs LSTM
¿ Forecasting and Backtesting ES
¿ Model Risk
¿ Copulas
¿ Stress testing
¿ Micro correlations, Fat tails, and Tail dependence
¿ Assignment #2

Chapter 5: Credit Risk

¿ Retail credit risk
¿ Corporate credit risk
¿ Estimating default probabilities
¿ Measuring Corporate Default
¿ Portfolio loss distribution
¿ RAROC
¿ CVA
¿ Credit Risk VaR

Chapter 6: Credit Derivatives

¿ Credit Transfer Markets
¿ What is a Credit Derivative?
¿ Credit Default Swap
¿ CDS Index
¿ Total Return Swap
¿ Credit Spread Option
¿ Collateralized Debt Obligations (CDO)

Chapter 7: Operational Risk

¿ Definition of operational risks:
¿ Internal risks: system failures, theft, fraud, and mistakes
¿ External risks: weather events, accidents, and terrorism
¿ Measuring Operational VaR

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LEARNING ACTIVITIES AND METHODOLOGY
Regular class, case discussions and individual presentations

ASSESSMENT SYSTEM
Course requirements:
Practices and Assignments: 60 points
Groups (maximum four persons)
Practice session PDF reports : 11 x 3 = 33 points
Assignment 1: 13 points
Assignment 2: 14 points
Individual Final Exam: 40 points. The exam will be a personal live presentation of individual assignments.

% end-of-term-examination: 40

% of continuous assessment (assigments, laboratory, practicals…): 60

BASIC BIBLIOGRAPHY

- Christoffersen, P.F. Elements of Financial Risk Management, Academic Press., (2012)
- Crouhy, M. , D. Galai and R. Mark The Essentials of Risk Management, Wiley, (2014)
- Jorion, P. Financial Risk Manager Handbook., Wiley, (2011)
- McNeil, A.J., R. Frey and P. Embrechts Quantitative Risk Management. , Princeton University Press., (2005)