DSC5211C QUANTITATIVE RISK MANAGEMENT

AY2014-2015 Semester 2

Instructor: Associate Professor Jussi Keppo
Department: Decision Sciences
Office: Mochtar Riady Building, BIZ 1 #8-72
Contacts: keppo@nus.edu.sg

Course Description

The aim of this course is to provide an introduction to the probability and statistical methods to model market, credit and operational risk. Topics addressed include loss distributions, multivariate models, dependence and copulas, extreme value theory, risk measures, risk aggregation and risk allocation.

Learning Outcomes

- Learn the general concept of risk and risk management. Understand different sources of risk faced.
- Acquire quantitative tools for measuring risk and know how to apply these techniques.
- Understand the framework of Value-at-Risk (VaR). Understand the pros and cons of different VaR estimation methods.
- Know how to do back testing for VaR using historical data. Understand the limitation and flaws of VaR.

Topics

- Risk in Perspective
- Basic Concepts
- Multivariate Models
- Financial Time Series
- Copulas and Dependency
- Aggregate Risk
- Extreme Value Theory
- Credit Risk Management

Readings

Required

- John C. Hull: Risk Management and Financial Institutions (3rd edition), Wiley, 2012

Recommended

- AJ McNeil, R Frey and P Embrechts (MFE): Quantitative Risk Management: Concepts, Techniques and Tools, Princeton University Press, Princeton, 2005

Prerequisites

DSC4213 Analytical Tools for Consulting, or prior knowledge in analytical tools

Projects

There are 3 group projects. Each group has 3 - 5 students. There is also one in-class individual project. All projects can be done by Excel (or Matlab or R).

Assessment

Component	**Weight**
In-class project	40%
Group projects	40%
Homework	20%
Total	**100%**

Exception participation gives up to 5% to the final grading.

Tentative Schedule

Week	**Topic**	**Chapters (Hull)**
1	Introduction	1
2	Financial institutions	2, 3
3	Trading, risk sensitivity	5, 7
4	Value at risk	9
5	Volatility	10
6	Correlation and copulas	11
7	The credit crisis, banking regulation	6, 12, 13
8	Market risk VaR	14, 15
9	Credit risk	16 – 18
10	Scenario analysis, operation risk	19, 20
11	Liquidity risk	21
12	Model risk, risk management mistakes	22, 24
13	In-class project	