Financial Risk Management

Term: Module I – Fall 2014

Lectures: Mondays and Thursdays 10:30 – 12:20 AM

Classroom: Room 403

Instructor: Lu, Jun (Timothy) (junlu@phbs.pku.edu.cn)

Office: Room 725

Office hour: Mondays 2:00 – 4:00 PM

Teaching Assistant: Ms. Xiang, Jiang (相姜) (xiangjiang@sz.pku.edu.cn)

Course Description

This course is designed to apply the theories and methodologies to the complex needs of managing financial risk in financial institutions. With the development of the financial market and the current financial crisis, it is extremely important for today's financial professionals to understand the types of financial risks that they are facing. This course will introduce several risk management models to measure and manage various types of risks, including equity risk, interest-rate risk, and credit risk. We develop and critique theoretical models for each type of risk, while emphasis is strongly placed on the implementation of the models. Furthermore, we relate this course to the ongoing financial crisis by discussing the measurements and tests of risk.

This course is intended for students who consider a career in the finance industry. This is a highly quantitative course, and students are required to have basic knowledge of finance, probability and statistics, and working knowledge of Excel.

Upon completion of this course, students will be able to:
- Dynamically hedge trading risks, utilizing financial derivatives
- Summarize the equity risk exposure using simulation and various measures of risk including Value-of-Risk
- Test the accuracy of risk models, including EWMA and GARCH models
- Understand dependence measures (copulas) beyond linear correlation and its importance for portfolio risk
- Provide a detailed description of the meaning and interpretation of the output from these models using the terminology and concepts of risk management

      - Make and evaluate recommendations related to a firm's equity, interest rate,
       and credit risk management programs

Grading

Grading of this course will be based on a final exam, a mid-term exam, and a group project:

1. Group project (30%)
2. Mid-term exam (30%)
3. Final exam (40%)

Textbook

John C. Hull, ***Risk Management and Financial Institutions: 3rd Edition***, Wiley, 2012

Other course notes and readings.

Note: The textbook covers a broad range of risk management concepts and tools, and serves as a good reference of the course. However, the course will cover many topics and techniques that are not in the textbook. Hence, class attendance is highly recommended.

Tentative Schedule

Class 1 - 8 & Class 10: Equity Risk Management
    - Risk model for asset and portfolio returns, sample estimates, normally
      distributed returns
    - No-arbitrage asset pricing, including one-period and multi-periods
    - Forwards, futures, and swaps
    - Front office trading risk management, including Delta and Gamma hedging
      (Chapter 7)
    - Risk measures, including VaR and expected shortfall (Chapter 9)
    - Time-dependent volatility models, including GARCH, parameter estimation
      through Maximum Likelihood Method (Chapter 10)
    - Correlations and Copulas (Chapter 11)
    - Monte Carlo simulation, bootstrapping, and Cholesky factorization (Chapter
      14 & 15)

Class 9: Mid-term Exam in class (September 29, 2014).

Class 11 - 13: Interest-rate Risk Management (Chapter 8)
    - Overview of fixed income securities

- Derivation and application of term-structure models, including Ho & Lee
   model, and Heath, Jarrow, & Merton model
- Duration and convexity
- Yield curve shifts

Class 14 - 17: Credit Risk Management
- Overview of credit risk
- Derivation and application of credit risk models, including Merton's model,
   and Jarrow & Turnbull's model
- Credit default swaps (CDS), CDS spreads, risk neutral valuations (Chapter 16)
- Credit risk mitigation, credit risk VaR, Moody's KMV, and Vasicek's model
   (Chapter 17 & 18)
- Understanding the credit crunch of 2007 (Chapter 6)

Class 18: Regulations in reaction to the financial crisis
- Regulation, Basel II, Basel III, and Dodd-Frank (Chapter 13)
- Stress testing (Chapter 19)