

Preliminary

FRE 6123 Course Outline

Re-engineering Risk Finance

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Motivation

- Why is this course on risk important and special?
- How different than other conventional approaches
- How Quantitative is it and what you should know?
- Why globalization and Gating contributing to Financial Risks
- Why Data Science has reframed statistics and thereby risks in a new format
- What are the consequences of Data Science to Risks and Risk management
- Why are there so many approaches to risks, risks modeling, risk management

What are we going to do? See the preliminary course outline

References: Lecture Notes and Reading Papers to be distributed

Reference Books:

1. Risk Finance and Assets Pricing, Wiley 2014, Charles S. Tapiero
2. Financial Data and Risk Finance (Charles and Oren Tapiero), in Process but lecture Notes will be distributed
3. Selected section from several sources

Numerous applications problems spanning financial risk management, insurance, credit risks, trading, etc. and financial data will be presented and submitted as homework problems. The course is based on both quantitative and statistical developments related to financial risk management and their transformation in light of current applications of data to these problems..

There will be a Mid-Term, and a Final Exam as well as a course project.

Lecture 1: Risks Everywhere and Re-Engineering the Future of Financial and Risks

- ▶ Risk Engineering everywhere. Today Finance is multivariate, complex, theory and practice have merged. Conventional assets Pricing and Risk management and theoretical definitions of risks, their analysis are far more practical.
- ▶ An appreciation financial economic theories, mathematical, computational and statistical finance to model, hedge, analyze and solve and manage financial risks and their consequences.
- ▶ An introduction to risk problems such as “risk and uncertainty”, “financial risks”, derivatives, financial models risks, financial data risks, and so on.

1.1 Lecture Note

1.2 Book reference reading

1.3 Power Point 1.1

Lecture 2: Statistics and Risks

- ▶ Measuring Risk, Volatility Risks, RS Chapter 3, parts of Chapter 4; ERS Parts of Chapter 6. Other risks and how we can quantify them, ex-ante and ex-post, dependence and others.
- ▶ 2.1 Lecture notes 2.1, 2.2. 2.3

Lecture 3: Risks and Financial Modeling

Pricing and other models (elements of stochastic

Lecture 4: Risk and Data Analysis

- ▶ Quant Risk: ERS Chapter 3 (a Refresher with Applications), Homework to be assigned (based on data analyses)
- ▶ Measuring Financial Risks; Statistical Risk Models and Risk Exposure in Finance. Measuring Historical Volatility and ARCH-GARCH Modeling; RS Chapter 4; Additional Notes etc.
- ▶ Valuation and Risk: Utility Theory pricing; Market Pricing. Pricing practice

Lecture 5: Data Simulation and Risks; Case problems: Wiener process,

Lecture 6: Credit Risk and Data and other financial applications

Lecture 7: VaR, RVaR, TVAR and Risk Finance

Lecture 8: Financial Compliance and Regulation Risks

- ▶ An Overview Compliance and Regulation: ERS Chapters 1 and 2; RS Chapter 2, p. 35; Homework, p. 57, 5/12 (additional note on Regulation)

Lecture 9: Globalization and Risks

Reference: My Book with Unra Nyamabu, Wiley, 2018, Notes will be distributed.

- ▶ **Lecture 10** Complete Markets; Risk models and derivatives; Options and Risk (Hedging) and The Greeks: RF Chapter 7: Homework to be assigned
- ▶ **Lecture 11** Default Bonds, Default Risks, Default Risk Models and Applications, pp. 339
- ▶ **Lecture 12** Strategic Risk Finance in a Global World
- ▶ **Lecture 13:** Review Problems and other applications
- ▶ **Lecture 14:** Review Problems and other applications; Students Projects Reports