THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

ANALYSIS AND MANAGEMENT OF FINANCIAL RISK (FM202)

Course duration: 54 hours lecture and class time (Over three weeks)

Summer School Programme Area: Finance

LSE Teaching Department: Department of Finance

Lead Faculty: Dr Georgy Chabakauri and TBC (Dept. of Finance)

Pre-requisites: Basic mathematics and statistics. Introductory Finance (to the level of FM250) **or** Introductory Microeconomics (to the level of EC101).

Course Objectives:

Companies must take risks if they are to survive and prosper and the risk management function's primary responsibility is to understand the portfolio of risks that the company is currently taking and the risks it plans to take in the future. It must then decide whether the risks are acceptable and, if they are not acceptable, what action should be taken. The objective of the course is to develop the knowledge and understanding of risk management practices for participants aiming to advance their careers in financial risk management. While the main focus of the course is on the management of financial risks, many of the ideas and approaches are equally applicable to nonfinancial corporations. Moreover, the concepts we will discuss apply across various sectors, such as banking, insurance, asset management, hedge funds, regulation and supervision. Participants will become familiar with the main tools and practices needed to assess and evaluate financial risks, they will understand the risk management practices in an industry setting and will be able to critically assess risk management reports and research. Furthermore, they will also be aware of the limitations of quantitative risk management in real life situations.

The course starts with an introduction to the classification of risk and the basic principles of diversification and hedging, optimal portfolio choice, as well as the Capital Asset Pricing Model, widely applied for the equilibrium pricing of risks. Then, we will discuss the methods to manage market risk for fixed income and equity portfolios. The students will learn about Value at Risk (VaR) and its applications to risk management practices. Furthermore, the course introduces the concept of endogenous risks and demonstrates how financial risks originate within the financial system. The course also highlights behavioural aspects of risk and discusses important limitations of current risk management practices. Next, we turn to credit risk, with a focus on ratings based and structural models. In addition, credit risk on portfolios and credit derivatives will be covered. Finally, we will discuss the recent credit crisis and the ensuing regulatory responses.

Throughout, a significant amount of time will be spent on practical applications of the theories that are introduced. Five out of twelve classes will be held in the computer lab.

Assessment:

Two written examinations. In formative preparation for the examinations, the students will be given problem sets, the solutions to which will be discussed in class.

Summative assessment format:

Format and weighting: Two hour mid-session examination (40%)

Date: Wednesday of week two

Results due: By Monday of week three

Format and weighting: Two hour final examination (60%)

Date: Friday of week three

Results due: Within a week of the exam

The precise time and location of the exams will be circulated during the programme.

Readings:

Much of the relevant material will be covered in the lecture notes. In addition, the following two books deal with a substantial part of the material covered in this course:

- John C. Hull, *Risk Management and Financial Institutions*, Wiley, 2015, 4th edition.
- Zvi Bodie, Alex Kane and Alan J. Marcus, *Investments and Portfolio Management*, McGraw-Hill, 2014, 10th edition.

Other recommended textbooks are:

- Michel Crouhy, Dan Galai and Robert Mark, *Risk Management*, McGraw-Hill, 2001.
- Jon Danielsson, *Financial Risk Forecasting*, Wiley, 2011.
- Philippe Jorion, *Value at Risk*, McGraw-Hill, 2007, 3rd edition.

A number of additional readings will be assigned for individual topics.

Outline

Topic 1- Foundations

- Risksharing and aggregate risk
- Basic principles of diversification and hedging
- The Capital Asset Pricing Model
- Why manage financial risk?
- Types of financial risks
- Overview of financial instruments
- Forwards and futures
- Swaps
- Options
- Risk management failures and key lessons

Supplementary reading:

- Hull, Chapters 1, 5, 23–25 and 28.
- Bodie, Kane and Marcus, Chapters 6, 7, 9.

Topic 2- Hedging in equity and fixed income markets

- The Black-Scholes formula and the Greeks
- Dynamic replication and delta hedging
- Practical issues and risk management of option portfolios
- Duration, convexity, DV01 and practical considerations
- Measurement and hedging of interest rate risk
- Mortgage-backed securities and other interest rate derivatives

Supplementary reading:

- Hull, Chapter 8 and 9.
- John C. Hull, Options, Futures, and Other Derivatives, Prentice Hall, 2011, 8th edition, Chapter 18 (in addition, Chapters 9, 10 and 14 give useful background for options).
- Bodie, Kane and Marcus, Chapters 14–16, 20–23.
- Perli, Roberto and Brian Sack, 2003, "Does Mortgage Hedging Amplify Movements in Long-term Interest
- Rates?" Journal of Fixed Income 13 (3): 7–17.
- Pietro Veronesi, Fixed Income Securities: Valuation, Risk, and Risk Management, Wiley, 2010. Chapters

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- 3, 4, 5, and 6. In general, this book is a great reference for fixed income securities.

Topic 3 Endogenous risk and limits to arbitrage

- Endogenous and exogenous sources of risk, and the Millennium Bridge
- Portfolio Insurance and the 1987 stock market crash
- Hedging of mortgage-backed securities
- Carry trades
- Market efficiency and empirical challenges
- Noise trader risk
- Outside capital and limits to arbitrage
- The technology "bubble"

Supplementary reading:

- Bodie, Kane and Marcus, Chapter 12.
- J´on Dan´ıelsson and Hyun Song Shin, 2003, "Endogenous Risk," in Modern Risk Management: A History, Risk Books.
- Andrei Shleifer, Inefficient Markets: An Introduction to Behavioral Finance, Oxford University Press, 2000. Chapters 2 and 4.
- Brunnermeier, Markus K. and Stefan Nagel, 2004, "Hedge Funds and the Technology Bubble," Journal of Finance 59: 2013–2040.
- Brunnermeier, Markus K., Stefan Nagel and Lasse H. Pedersen, 2008, "Carry Trades and Currency
    - Crashes," NBER Macroeconomics Annual 2008, Vol. 23: 313–347.
- Brunnermeier, Markus K. and Lasse H. Pedersen, 2005, "Predatory Trading," Journal of Finance, 60: 1825–1863.
- Dan´ıelsson, J´on, 2011, Financial Risk Forecasting, Wiley. Chapter 10.
- Gromb, Denis and Dimitri Vayanos, 2002, "Equilibrium and Welfare in Markets with Financially Constrained Arbitrageurs," Journal of Financial Economics, 66: 361–407.
- Plantin, Guillaume and Hyun Song Shin, 2011, "Carry Trades and Speculative Dynamics," unpublished paper, London Business School and Princeton University.
- Symposium on the "Brady Commission Report on the October 1987 Stock Market Crash," 1988, Journal of Economic Perspectives 2: 3–50.

Topic 4 Value-at-Risk

- Statistical properties of asset prices and volatility modeling
- Risk measures and definition of Value-at-Risk
- Implementing risk forecasts
- Backtesting and stress testing

Supplementary reading:

- Hull, Chapters 10–14.
- J´on Dan´ıelsson, Financial Risk Forecasting, Wiley, 2011. Chapters 4, 5 and 8.
- Nocera, Joe, 2009 (January 2), "RiskMismanagement," The New York Times. Retrieved from http://www.nytimes.com.
- Philippe Jorion, Value at Risk, McGraw-Hill, 3rd edition, 2007. Chapters 5 and 6.

Topic 5 Credit risk

- Ratings based models and Credit Value-at-Risk
- Structural form models and credit risk on portfolios
- Reduced form models

Supplementary reading:

- Hull, Chapters 11, 18–22.
- Michel Crouhy, Dan Galai and Robert Mark, Risk Management, McGraw-Hill, 2001. Chapters 8 and 9.
- Vasicek, Oldrich A., 2002, "The Distribution of Loan Portfolio Value," Risk Magazine.

Topic 6 Credit derivatives and asset-backed securities

- Credit default swaps
- Sovereign CDS
- Collateralized debt obligations
- Mortgage-backed securities
- Securitization

Supplementary reading:

- Hull, Chapters 6, 19 and 25.
- Pietro Veronesi, Fixed Income Securities: Valuation, Risk, and Risk Management, Wiley, 2010. Chapter 8.
- Coval, Joshua D., Jakub W. Jurek and Erik Stafford, 2009, "Economic Catastrophe Bonds," American Economic Review 99: 628–666.
- Coval, Joshua D., Jakub W. Jurek, and Erik Stafford, 2009, "The Economics of Structured Finance," Journal of Economic Perspectives 23: 3–25

Topic 7 Regulation and the credit crisis

- Originate and distribute and the housing bubble

- The credit crisis
- Existing regulation and proposals for regulatory reforms
- Basel III and Dodd-Frank

Supplementary reading:

- Hull, Chapters 6 and 15–17.
- Adrian, Tobias and Markus K. Brunnermeier, 2011, "CoVaR," unpublished paper, Federal Reserve Bank of New York and Princeton University.
- Brunnermeier, Markus K., 2009, "Deciphering the 2007-08 Liquidity and Credit Crunch," Journal of Economic Perspectives 23: 77–100.
- Dan´ıelsson, J´on, Paul Embrechts, Charles Goodhart, Con Keating, Felix Muennich, Olivier Renault and Hyun Song Shin, 2001, "An Academic Response to Basel II," Financial Markets Group Special Paper No 130, London School of Economics.
- Hanson, Samuel, Anil Kashyap, and Jeremy C. Stein, 2011, "A Macroprudential Approach to Financial Regulation," Journal of Economic Perspectives 25(1), 3–28.
- Kashyap, Anil, Raghuram Rajan and Jeremy C. Stein, 2008, "Rethinking Capital Regulation," in Maintaining Stability in a Changing Financial System, Federal Reserve Bank of Kansas City, 431–471.
- Gorton, Gary, 2008, "The Panic of 2007," in Maintaining Stability in a Changing Financial System, Proceedings of the 2008 Jackson Hole Conference, Federal Reserve Bank of Kansas City.
- The Squam Lake Report - Fixing the Financial System, Princeton University Press.

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Credit Transfer: If you are hoping to earn credit by taking this course, please ensure that you confirm it is eligible for credit transfer well in advance of the start date. Please discuss this directly with your home institution or Study Abroad Advisor.

As a guide, our LSE Summer School courses are typically eligible for three or four credits within the US system and 7.5 ECTS in Europe. Different institutions and countries can, and will, vary. You will receive a digital transcript and a printed certificate following your successful completion of the course in order to make arrangements for transfer of credit.

If you have any queries, please direct them to summer.school@lse.ac.uk