



Shanghai Jiao Tong University

BU463 Risk Management and Derivatives (Postgraduate)

Instructor Information	Ying Wang Home Institution: East China Normal University Email: ywang@fem.ecnu.edu.cn Office Hours: Determined by Instructor		
Term	December 17, 2020 - January 8, 2021	Credits	4 units
Class Hours	Sunday through Thursday, 135 mins per teaching day		
Discussion Sessions	2 hours each week, conducted by teaching assistant(s)		
Total Contact Hours	64 contact hours (1 contact hour = 45 mins, 2880 mins in total)		
Required Texts (with ISBN)	<p>Financial Enterprise Risk Management, Sweeting, Paul, 2nd Edition, 2017. ISBN: 9781107184619</p> <p>Value at Risk: The New Benchmark for Managing Financial Risk, Jorion, Philippe, 3rd Edition, 2007. ISBN: 0-07-135502-2</p> <p>Options, Futures and Other Derivatives, John C. Hull, 6th Edition, Pearson Education, 2005. ISBN: 9787111484370</p> <p>Value-at-Risk: Evolution, Deficiencies and Alternatives Basel Committee - Developments in Modelling Risk Aggregation Aggregation of Risks and Allocation of Capital Strategic Risk Management Practice, Andersen and Schroder, 2010, Ch. 7: Strategic Risk Analyses</p> <p>Derivatives: Practice and Principles, Recommendations 9-24 & Section III Key Rate Durations: Measures of Interest Rate Risks Economic Capital – Practical Considerations, Milliman • Measurement and Modelling of Dependencies in Economic Capital, Ch. 3</p>		
Prerequisite	Foundations of Finance Statistics		
The course might be moved to online delivery due to COVID-19 pandemic. The anticipated date is November 6, 2020.			



Course Overview

This course will introduce the main steps and corresponding techniques in risk management as well as the basic knowledge of advanced theories about derivatives. Firstly, we will learn the risk definitions which will help you identify the different categories of risks faced by an entity. Secondly, the risk quantification for risk modeling and aggregation will be interpreted to you, and you will learn how to construct approaches to modeling various risks and evaluate how an entity makes decisions about techniques to model, measure and aggregate risks including but not limited to stochastic processes. Moreover, the risk measures such as VaR and their properties or advantages and disadvantages will be illustrated. Further, we will analyze the applicability of derivatives, synthetic securities and financial contracting may be used to reduce risk and other risk mitigation strategies or tools for a given situation. Finally, the theories about economic capital and derivatives will be developed, and so students will understand the concept of economic capital and techniques to allocate the cost of risks within business units and apply the derivatives introduced to the risk management practice.

Learning Outcomes

- Analytical skills and an eye for details
- Ability to understand broader business issues
- Numerical skills
- Communication and presentation skills

Upon completion of this course, students will be able to:

- Understand the types of risks faced by an entity and be able to identify and analyze the risks
- Identify how each of the financial and non-financial risks faced by an entity can be amenable to quantitative analysis
- Adopt economic capital for risk aggregation and capital allocation
- Explain the advantages and disadvantages of VaR as a risk measure and identify whether the risk measure is coherent or satisfies other properties
- Describe and apply the basic statistic models and Monte Carlo method
- Understand ORSA and apply the strategic risk management



Grading Policy

Class participation	10%
Assignments	10%
Mid-term	30%
Final	50%

Grading Dissemination

Graded tests and materials in this course will be returned individually only by request.

Late Assignment

Assignments are due **at the date and time indicated in the syllabus**. Missed assignments will be earn an F. Exceptions can be made only with the prior approval of the instructor. The late penalty for the final paper/project is one third of a letter grade per day. So, an ‘A’ project that is one day late will be graded an ‘A⁻’, two days late a ‘B⁺’, three days late a ‘B’, etc.

Grading Scale is as follows

Number grade	Letter grade	GPA
90-100	A	4.0
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3.0
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2.0
62-64	C-	1.7
60-61	D	1.0
≤59	F (Failure)	0



Class Schedule

Date	Lecture	Readings
Day 1	<p>Risk Identification</p> <ul style="list-style-type: none"> - Risk concepts and risk definitions - Risk taxonomy and its application to different framework <p>Risk definitions for the market risk, currency risk, credit risk, counterparty risk, spread risk, liquidity risk, interest rate risk, equity risk, hazard/insurance risk, inflation risk, environmental risk, pricing risk, product risk, legal risk, operational risk, project risk and strategic risk</p>	FERM Chapter 8 VaR Chapter 13
Day 2	<p>Risk quantification</p> <ul style="list-style-type: none"> - Extreme Value Theory - Quantifying Particular Risks - Key Rate Durations (interest rate) 	FERM Chapter 12 14
Day 3	<ul style="list-style-type: none"> - Unquantifiable Risks - Value at Risk - Computing VaR <p>- VaR evolution, deficiencies, and alternatives</p>	FERM Chapter 15 VaR Chapter 5
Day 4	<p>Risk Measures</p> <ul style="list-style-type: none"> - Coherent measure of risk - Other properties and examples 	TBA
Day 5	<p>Risk Management Tools and Techniques</p> <ul style="list-style-type: none"> - Portfolio Risk: Analytical Methods 	VaR Chapter 7
Day 6	<ul style="list-style-type: none"> - Forecasting Risk Correlations 	VaR Chapter 9
Day 7	<ul style="list-style-type: none"> - Risk aggregation - Capital allocation - Modelling and principals - Properties 	Basel Committee
Day 8	<p>Some useful Statistics Monte Carlo Methods</p>	FERM Chapter 9 VaR Chapter 12
Day 9	<p>Mid-term Exam (60 mins)</p> <ul style="list-style-type: none"> - Liquidity Risk 	Mid-term Assignment 1 due VaR Chapter 13
Day 10	<ul style="list-style-type: none"> - Credit Risk management 	VaR Chapter 18



Day 11	<ul style="list-style-type: none"> - Responses to Risk - Strategic Risk Management Practice 	FERM Chapter 16 SRMP Chapter 7
Day 12	<p style="text-align: center;">Capital Management</p> <ul style="list-style-type: none"> - Economical Capital - Measurement and Modelling of Dependencies in Economic Capital 	TBA
Day 13	<ul style="list-style-type: none"> - S&P Enterprise Risk Management Criteria - ORSA – An International Requirement 	TBA
Day 14	<p style="text-align: center;">Derivatives</p> <ul style="list-style-type: none"> - Nature of derivatives - Derivatives Markets <ul style="list-style-type: none"> - Forward - Futures - Options: European, American, and other types <ul style="list-style-type: none"> - Swaps - Types of Traders - Hedging example - Hedge Funds 	John Hull Chapter 1
Day 15	<ul style="list-style-type: none"> - Interest Rates <ul style="list-style-type: none"> - Types of rates - Bond yield Par yield - Bootstrap Method - Duration and Convexity 	John Hull Chapter 4 11
Day 16	<ul style="list-style-type: none"> - Wiener Process and Ito’s Lemma - Black-Scholes-Merton Model - Martingales and Measures 	John Hull Chapter 12 13 25
Day 17	<ul style="list-style-type: none"> - Volatility Smiles - Estimating Volatilities and Correlations 	John Hull Chapter 16 19
Day 18	Final	Assignment 2 due Final