



Shanghai Jiao Tong University

BU463 Risk Management and Derivatives

Instructor Information:	<p>Lin Mi Home Institution: The University of Queensland Email: l.mi@business.uq.edu.au Office Hours: Determined by Instructor</p>		
Term:	December 16, 2019- January 7, 2020	Credits:	4 units
Classroom:	TBD	Teaching Assistant(s):	TBD
Class Hours:	Monday through Friday, 160 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>No prescribed textbook. Lecture notes, lecture slides and other relevant supporting materials are sufficient.</p> <p>Recommended Resources:</p> <p>Students who need additional reading materials can refer to the following books:</p> <ul style="list-style-type: none"> • Hull, J.C., 2012, Options, Futures, and Other Derivatives, sixth/seventh/eighth/ninth edition, Prentice Hall or • Hull, J.C., 2014, Fundamentals of Futures and Option Markets, sixth/seventh/eighth edition, Prentice Hall • McDonald, R.L., 2006, Derivatives Markets, second edition, Addison Wesley 		
Prerequisite:	Students are expected to have a thorough knowledge of all material covered in an introductory finance course.		



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Course Overview

In the last three decades, there have been some remarkable losses seen in the financial markets; for example, the October 1987 market crash, 1998 LTCM crisis and the 2007-2008 subprime mortgage crisis, to name but a few. Accordingly, organizations have embraced sound risk management practices to avoid exposing themselves to unnecessary financial risks on the one hand, and taking calculated risks on the other. In particular, organizations have embraced derivatives as a risk management and hedging vehicle to the extent that many corporations now feature risk management divisions. It is likely that risk management issues will continue to arise in the majority of business scenarios. With these in mind, this course is designed to equip students with the essential frameworks and tools needed to understand and effectively manage financial risks. The primary focus will be on pricing derivatives, particularly forward, futures, options and swaps, using various state-of-the-art techniques.

Course Goals

After successfully completing this course you should be able to:

1. Understand the operation of derivatives markets (options, futures, forwards and swaps)
2. Identify different derivative products that are available in the financial market
3. Master the fundamental concepts in pricing derivative instruments using various state-of-the-art techniques
4. Demonstrate how a range of derivative products can be used to hedge and speculate market risk



Grading Policy

Mid-semester Exam	40%
Final Exam	60%

Grading Scale is as follows

Number grade	Letter grade	GPA
90-100	A	4
85-89	A-	3.7
80-84	B+	3.3
75-79	B	3
70-74	B-	2.7
67-69	C+	2.3
65-66	C	2
62-64	C-	1.7
60-61	D	1
≤59	F (Failure)	0



Class Schedule

Date	Lecture	Readings
Day 1	Introduction, hedging with forwards and futures (1)	Lecture notes and supporting material
Day 2	Hedging with forwards and futures (2)	Lecture notes and supporting material
Day 3	Pricing forwards and futures	Lecture notes and supporting material
Day 4	Introduction to options	Lecture notes and supporting material
Day 5	Option valuation and hedging	Lecture notes and supporting material
Day 6	Mid-semester exam review	Lecture notes and supporting material
Day 7	Mid-semester exam	
Day 8	Implied volatility	Lecture notes and supporting material
Day 9	Exotic derivatives	Lecture notes and supporting material
Day 10	Binomial pricing	Lecture notes and supporting material
Day 11	Swaps and other fixed income securities (1)	Lecture notes and supporting material
Day 12	Swaps and other fixed income securities (2)	Lecture notes and supporting material
Day 13	Monte-Carlo simulation	Lecture notes and supporting material
Day 14	Course review	Lecture notes and supporting material
Day 15	Final Exam	



Teaching Content

Day 1 Introduction, hedging with forwards and futures (1)

This topic first introduces the concept of a derivative security, a brief history of derivatives trading, types of traders in derivatives markets, short selling, and continuous compounding and discounting. It then discusses forwards and futures contracts, including the basics of forward contracts, trading forward contracts over the counter, basics of futures contracts, and settlement procedures of futures contracts.

Day 2 Hedging with forwards and futures (2)

This lecture continues the topic of forwards and futures contracts by discussing the differences between forward and futures contracts, contracts available in Australia, convergence of futures price to spot price at expiry, and hedging using forwards and futures.

Day 3 Pricing forwards and futures

This topic discusses the valuation of forward and futures contracts, including forward contract on asset with known income, forward contract on asset with continuous dividend yield, forward contract on a physical commodity, and forward contract on a foreign currency.

Day 4 Introduction to options

This topic introduces the concept of an options contract, types of options, exercising an option, short option positions, bounds on option prices, and put-call parity.

Day 5 Option valuation and hedging

This topic discusses how to price options using the Black-Scholes option pricing model, factors influencing option value, and hedging with option contracts.

Day 6 Mid-semester exam review

This lecture will review the first five topics.

Day 7 Mid-semester exam

The mid-semester exam covers the first five topics. It includes a number of multiple choice and short-answer/calculation questions. See the Assessment Details Section for further information.

Day 8 Implied volatility

This topic discusses currency options and its pricing, how to use Bloomberg to price European options, implied volatility and the VIX.

Day 9 Exotic derivatives

This topic discusses the pricing of exotic derivatives as ‘packages’ (cap, floor, collar, and exotic payoff structure), and how to construct some common trading strategies involving options.

Day 10 Binomial pricing



This topic discusses the general Binomial pricing framework, how to use the Binomial approach to price European options and American options.

Day 11 Swaps and other fixed income securities (1)

This topic introduces swaps and discusses the basic tools required to understand swaps, including fixed income securities, and the pricing of different types of bonds (e.g. zero coupon bond, coupon bond, floating rate coupon bond).

Day 12 Swaps and other fixed income securities (2)

This topic discusses the types of swaps with an emphasis on interest rate swap and currency swap. It also includes the pricing of these two types of swaps.

Day 13 Monte-Carlo simulation

This topic discusses the general concept in Monte-Carlo (MC) simulation option pricing method and use the MC approach to price call option, barrier option, Asian option and exotic option.

Day 14 Course review

This lecture reviews the topics covered throughout the course with a focus on the topics covered after the mid-semester exam.

Day 15 Final exam

The final exam covers topics taught from Days 8-14. It includes a number of multiple choice and short-answer/calculation questions. See the Assessment Details Section for further information.



Assessment Details

Assessment Task 1: Mid-semester Exam

Task Description	The mid-semester exam covers the first five topics. It includes two sections. Section A has 20 multiple choice questions, each worth 1 mark. Section B contains 4 short-answer/calculation questions, for a total of 20 marks. Overall, the exam has 40 marks weighting 40% towards the final grade.	
Criterion Number	Criterion Description	Measures
1	Understand forward contracts and its pricing	LO1, LO2, LO3
2	Understand futures contracts and its pricing	LO1, LO2, LO3
3	Understand options contracts and its pricing	LO1, LO2, LO3
4	Identify different derivative products that are available in the financial market	LO2
5	Understand how to hedge with different derivatives contracts	LO4
Task Length	Reading time: 10 minutes; Working time: 120 minutes; During reading time, write only on the rough paper	

Assessment Task 2: Final Exam

Task Description	The final exam covers mainly the topics after the mid-semester exam, i.e. from Days 8-14. It includes two sections. Section A has 10 multiple choice questions, each worth 1 mark. Section B contains 5 short-answer/calculation questions, for a total of 50 marks. Overall, the exam has 60 marks weighting 60% towards the final grade.	
Criterion Number	Criterion Description	Measures
1	Understand different types of options and how they can be used for hedging	LO1, LO4
2	Price options using Binomial approach	LO3
3	Understand currency options and its pricing	LO1, LO3
4	Construct trading strategies involving options	LO4
5	Understand different types of swaps and how they can be used for hedging	LO1, LO4
6	Price interest rate swap	LO3
7	Price currency swap	LO3
Task Length	Reading time: 10 minutes; Working time: 120 minutes; During reading time, write only on the rough paper	