NATIONAL TAIWAN UNIVERSITY
Department of International Business

Options and Futures

Professor Jr-Yan Wang (王之彥) **Spring 2020**
Room 205, Building 2, College of Management **Monday 13:20-16:20**
jryanwang@ntu.edu.tw **02-33664987**

COURSE DESCRIPTION

The major goal of this course is to equip students comprehensive understanding of **financial derivatives** (金融衍生性商品). A derivative instrument is a contract between two parties whose payoff depends on the values of the **underlying variables on a future specified date**. The prices of any commodity assets (such as gold or oil) or financial assets (such as equity shares or bonds) can be the underlying variables, and these assets are called **underlying assets (標的物)**.

Four categories of derivatives will be covered in this course, including **forwards (遠期合約)**, **futures (期貨合約)**, **swaps (交換合約)**, and **options (選擇權)**. Students will learn how and where to trade these derivatives. In addition, the methods to calculate the **theoretical values (理論價值) of these derivatives** are also introduced. Moreover, the **trading and hedging strategies (交易與避險策略)** associated with these financial derivatives will be discussed.

It is strongly recommended that students who are interested in this course should already learn some basic Finance courses before, such as **Investments (投資學)**, **Financial Management (財務管理)**, or **Corporate Finance (公司理財)**. To maintain the fluency of my lecture, I assume students know the basic knowledge in Finance, e.g., the time value of money, the simple vs. compound interest calculation, the term structure of interest rates, the present vs. future values, the fundamental classes of financial assets, etc. The last thing should be noted is that this course is designed for undergraduate students. For graduate students, if you never learned similar courses before, welcome to attend this course. However, you need to keep in mind that the content and exams in this course may be too simple to satisfy your appetite for knowledge.

TEXT AND REFERENCES

Lecture Notes: http://homepage.ntu.edu.tw/~jryanwang/ → Course Information → Options and Futures (undergraduate level).

(The most updated PowerPoint files for the lecture each week are available after 9:00 p.m. every Sunday.)

(DO NOT access CEIBA for the syllabus and lecture notes.)

Required Text: Fundamentals of Futures and Options Markets (global edition), by John C. Hull, 8th ed., 2017. (The representative bookstore of this book in Taiwan is 雙葉書局. If you intend to purchase the text book together, you can contact 雙葉書局 via (02) 2368-4198.)

EXAMS AND GRADING

Midterm Exam	45% (April 20th)
Final Exam	45% (June 15th)
Homework (option trading strategies)	10% (due on June 29th)

※ The exam dates are regulated by NTU. Please ensure that you will be available to attend these two exams before you decide to take this course.

※ The need of travel or leaving Taiwan before the final exam cannot be the excuse to miss the exams.

※ If you cannot attend the exams due to other reasons, you must notify me in advance and show me some proofs, e.g., a medical diagnosis. Any late notification is not acceptable.

※ The range for each exam depends on the speed of my lecture. On average, I will teach one chapter in a three-hour lecture. The range is not accumulative for the final exam.

※ The format for the two exams: 30% for term explanation and 70% for calculation problems. All calculation problems are collected from the quizzes and questions at the end of each chapter in the required text with minor modifications.

※ Students should prepare your personal calculators for the two exams. Note the calculators should at least be able to compute the exponential and natural log functions, but the calculators cannot have the memorizing function.

※ To maintain the fairness in the class, there are no make-up exams or other alternatives. I will ignore all e-mails asking for any alternative way to make up your

grades.

※ The rule of ALTERNATE SEATING is enforced if possible. Any dishonesty in the exams will lead to a failed result.

※ Graded examination sheets will be returned to students on Apr. 27th, but grades of the final exam will not be released.

※ I will curve your final grades such that the average of the grades in this class is comparable to other courses offered by College of Management of NTU.

※ Special rules for this shorter semester: 1) To speed up the lecture, there is some simple, descriptive content (written in gray) in the PowerPoint lecture notes. Please study it by yourselves. 2) For the last two weeks in this semester, there will be no lecture except a homework assignment. The problem sheet will be handed out on the final exam day. You need to fill in the answers on the problem sheet and submit the answered homework assignment by scanning and emailing the problem sheet to the teaching assistant before June 29th.

RULES IN CLASS

※ DO NOT DISTRACT other students from listening to my lecture, e.g., do not chat with other students when I am talking.

※ If you have any questions during my lecture, FEEL FREE to INTERRUPT me by raising your hand.

COURSE SCHEDULE

Week	Date	Topic	Reading
1	Mar. 2	Course overview	Syllabus
		Introduction of different types of derivatives	Ch. 1
2	Mar. 9	Different traders and why derivatives are used	Ch. 1
		Mechanics of futures markets	Ch. 2
3	Mar. 16	Mechanics of futures markets	Ch. 2
		Hedging strategies using futures	Ch. 3
4	Mar. 23	Hedging strategies using futures	Ch. 3
5	Mar. 30	Interest rates	Ch. 4
6	Apr. 6	Interest rates	Ch. 4
		Determination of forward and futures prices	Ch. 5
7	Apr. 13	Determination of forward and futures prices	Ch. 5

8	Apr. 20	Midterm examination	
9	Apr. 27	Interest rate futures	Ch. 6
10	May 4	Mechanics of options markets	Ch. 9
11	May 11	Properties of stock options	Ch. 10
12	May 18	Introduction to binomial trees	Ch. 12
13	May 25	Valuing stock options: The Black-Scholes model	Ch. 13
14	June 1	Trading strategies involving options	Ch. 11
15	June 8	Swaps	Ch. 7
16	June 15	Final examination	
17	June 22	Self-studying and homework completion	
18	June 29	Self-studying and homework completion	

※ Note that the above schedule is an estimated version, I will dynamically adjust the speed of my lecture according to the feedback of students.

※ Chapter 8 (the credit crisis in 2007) and Chapter 14 (employee stock options) are skipped in order to introduce more content in the limited time of this semester.

※ How much content in Ch. 7 will be taught depends on the remaining time near the end of this semester.

OFFICE HOURS

Thursday 15:00-17:00

Room 712, Building 2, College of Management

※ It is not suggested to ask academic questions in emails. The face-to-face communication is the best way to make me understand your questions and give you the most accurate instruction to solve your problems.

※ If you have difficulties in solving exercise questions at the end of each chapter, please ask the teaching assistant first. It is preferred to make an appointment with the teaching assistant rather than ask him questions in e-mails.

※ Try to fully utilize the office hours before making an individual appointment.

TEACHING ASSISTANT

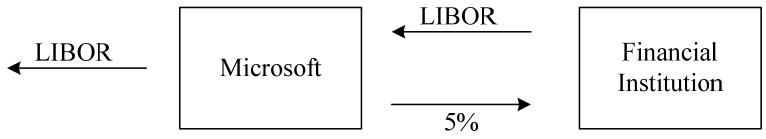
柯易辰 d97724012@ntu.edu.tw

Forward and futures contract (選期合約與期貨合約) (Chapters 2, 3, 5, 6)

- Definition on Slide 1.6: An agreement (with both the right and obligation for two trading parties) to buy or sell an asset (the underlying asset (標的物)) at a certain time point in the future (the delivery or maturity date (交割日或是到期日)) for an agreed price (the delivery price (交割價)).
- Examples:
  Agreement to buy 100 oz. of gold @ US$1750/oz. in December (long position).
  Agreement to sell 1,000 bbl. of oil @ US$85/bbl. in April (short position).
- Profit at maturity:
  If the gold price is US$1600/oz. in December, the profit is –$150×100 = –$15,000.
  US$1800/oz. in December, the profit is $50×100 = $5,000.
  If the oil price is US$75/bbl. in April, the profit is $10×1000 = $10,000.
  US$90/bbl. in April, the profit is –$5×1000 = –$5,000.
- Note that he delivery price is determined by the demand and supply of the futures contracts. Thus, for both buyers and sellers of futures, they cannot choose but only accept the current delivery price.

Swaps contract (交換合約) (Chapter 7)

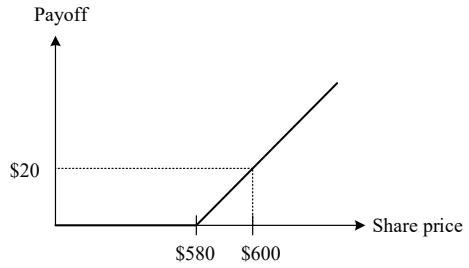
- An agreement to exchange a series of cash flows at specified future times according to certain specified rules.
- An example: Microsoft pays a fixed rate of 5% and receives 6-month LIBOR every 6 months for 3 years on a notional principal of $100 million. (Microsoft can convert a floating-rate liability to a fixed-rate liability.)



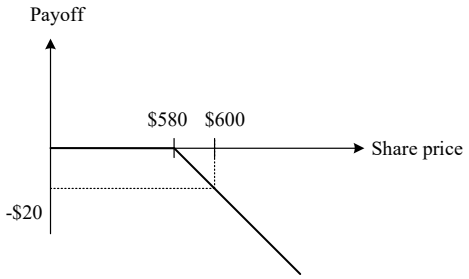
Options (選擇權) (Chapters 9-17)

- Definition on Slide 1.19: A right to buy or sell an asset (the underlying asset (標的物)) at a certain time point in the future (the maturity date (到期日)) for a specified price (the strike price (執行價)).
- The right to buy is termed “call option” (買權), and the right to sell is termed “put option” (賣權).
- Four different types of positions for trading options:

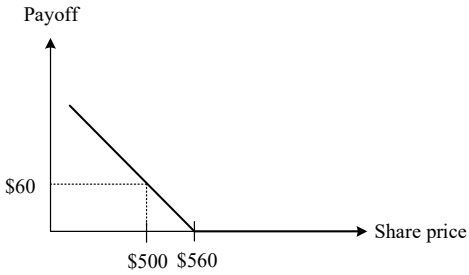
- Buy a call: purchase a right to buy 1 share of Google at $580/share in December. (purchase at the ask price $35.30)



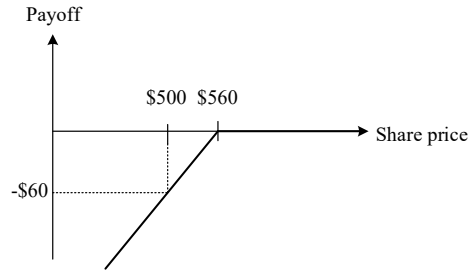
- Sell a call: sell a right such that the trading counterparty can buy 1 share of Google at $580/share in December. (sell at the bid price $34.50)



- Buy a put: purchase a right to sell 1 share of Google at $560/share in September. (purchase at the ask price $28.60)



- Sell a put: sell a right such that the trading counterparty can sell 1 share of Google at $560/share in September. (sell at the bid price $28.10)



- For options, in addition to different maturities, there are several strike prices for each maturity date that traders can choose.