NATIONAL TAIWAN UNIVERSITY
Department of International Business

Options and Futures

Associate Professor Jr-Yan Wang **Spring 2015**
Room 201, Building 2, College of Management **Wednesday 14:20-17:20**
jryanwang@ntu.edu.tw **02-33664987**

COURSE DESCRIPTION

The major goal of this course is to provide students comprehensive understanding of many **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 specified date in the future. 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 is 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 of these derivatives are also introduced. Moreover, the trading and hedging strategies 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, Financial Management, or Corporate Finance. To maintain the fluency of my lecture, I assume students are equipped with the basic knowledge in Finance, e.g., the time value of money, the simple vs. compound interest, 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 take 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 modified PowerPoint files for each week lecture are available after 9:00 p.m. every Tuesday.)
(DO NOT access CEIBA for the syllabus and lecture notes.)

Required Text: Fundamentals of Futures and Options Markets, by John C. Hull, 8th ed., 2013. (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 Mr. 鄧兆淇 via (02) 2368-4198#15.)

EXAMS AND GRADINGS

Midterm Exam 50% (on April 22th) Final Exam 50% (on June 24th)

※ 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 need to notify me in advance and show me the evidence, 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 of both 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 function, but the calculators cannot have the memorizing function.

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

※ The rule of ALTERNATE SEATING is enforced. Any dishonesty in the exams

will lead to a failed result.

※ 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.

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	Feb. 25	Introduction of Options and Futures	Syllabus
2	Mar. 4	Overview of the required text book	Ch. 1
3	Mar. 11	Mechanics of futures markets	Ch. 2
4	Mar. 18	Hedging strategies using futures	Ch. 3
5	Mar. 25	Interest rates	Ch. 4
6	Apr. 1	No Lecture (Holiday for studying)	
7	Apr. 8	Determination of forward and futures prices	Ch. 5
8	Apr. 15	Interest rate futures	Ch. 6
9	Apr. 22	Midterm examination	
10	Apr. 29	Swaps	Ch. 7
11	May 6	Mechanics of options markets	Ch. 9
12	May 13	Properties of stock options	Ch. 10
13	May 20	Trading strategies involving options	Ch. 11
14	May 27	Introduction to binomial trees	Ch. 12
15	June 3	Valuing stock options: The Black-Scholes model	Ch. 13
16	June 10	Options on stocks indices and currencies	Ch. 15
17	June 17	Futures Options	Ch. 16
18	June 24	Final examination	

※ 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.

OFFICE HOURS

Thursday 14:00-16:00 Room 513, 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 to solve the quizzes or questions at the end of each chapter, please write an email to ask the teaching assistant first.
※ Try to fully utilize the office hours before making an individual appointment.

TEACHING ASSISTANT

張碧娟 d95724014@ntu.edu.tw

Futures contract (期貨合約) (Chapters 2, 3, 5, 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)).
- Futures are traded on exchanges, which are places at which traders meet together and trade with each other, for example, the Chicago Board of Trade (CBOT) is a famous futures and options exchange.
- Examples:
  Agreement to buy 100 oz. of gold @ US$1050/oz. in April (long position).
  Agreement to sell 1,000 bbl. of oil @ US$100/bbl. in December (short position).
- Payoff at maturity:
  If the gold price is US$1000/oz. in April, the payoff is –$50×100 = –$5,000.
  US$1150/oz. in April, the payoff is $100×100 = $10,000.
  If the oil price is US$90/bbl. in December, the payoff is $10×1000 = $10,000.
  US$120/bbl. in December, the payoff is –$20×1000 = –$20,000.

Forward contract (遠期合約) (Chapter 2)

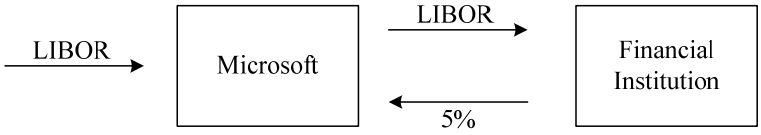
- Similar to futures except that they are traded in over-the-counter markets (櫃檯交易市場).
- There are dealers (交易商) providing the bid and ask prices of forward contracts.
- Example for foreign exchange quotes of USD/GBP:

Quotes of Bank A	Bid (買入價)	Ask (賣出價)
Spot (現貨) of GBP	$1.6382	$1.6386
1-month forward	$1.6380	$1.6385
3-month forward	$1.6378	$1.6384
6-month forward	$1.6376	$1.6383

- Major differences between futures and forward contracts:
  - To trade futures contracts on exchanges, you never know who is your trading counterparty; for a forward contract, you can trade with only dealers and it is a private contract between you and a dealer.
  - To trade futures contracts on exchanges, traders need to pay exchanges the transaction fee; to trade forward contracts, the cost of trading is the bid-asked spread.
  - To trade futures contracts on exchanges, the margin mechanism (introduced in Ch. 2) minimizes the default risk (違約風險); for forward contracts, the default risk of the trading counterparty cannot be ignored.

Swaps contract (交換合約) (Chapter 7)

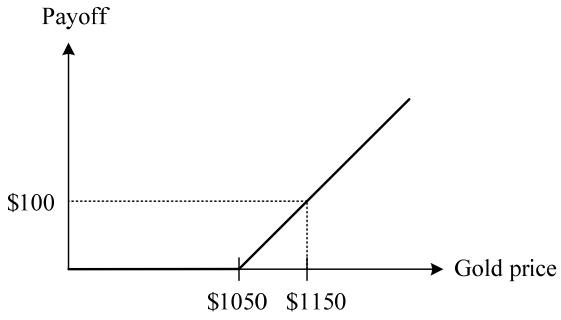
- An agreement to exchange a series of cash flows at specified future times according to certain specified rules.
- An example: Microsoft pays 6-month LIBOR and receives a fixed rate of 5% every 6 months for 3 years on a notional principal of $100 million.



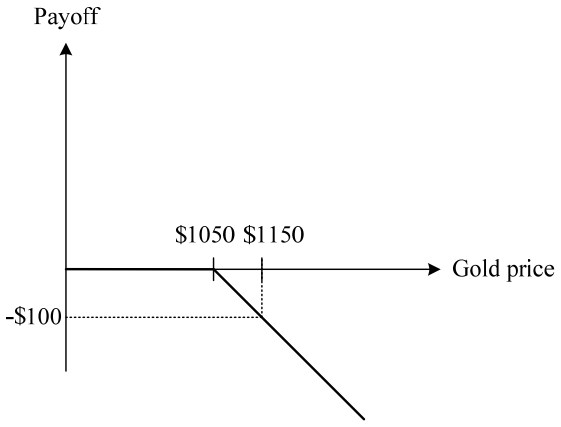
Options (選擇權) (Chapters 9-17)

- 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).
- Examples:

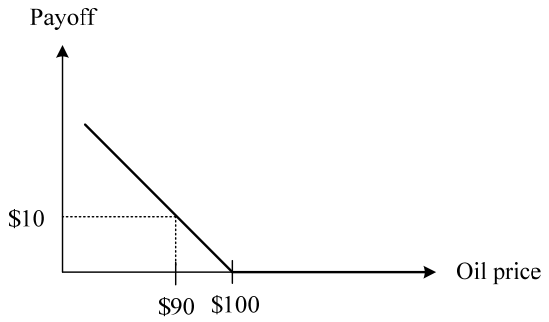
  Buy a call: purchase a right to buy 1 oz. of gold @ US$1050/oz. in April.



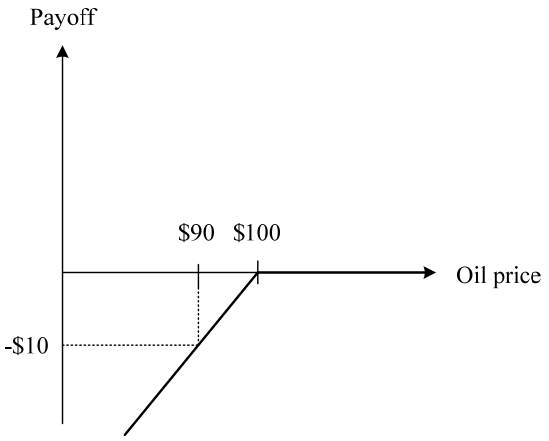
  Sell a call: sell a right such that the trading counterparty can buy 1 oz. of gold @ US$1050/oz. in April.



Buy a put: purchase a right to sell 1 bbl. of oil @ US$100/bbl. in December.



Sell a put: sell a right such that the trading counterparty can sell 1 bbl. of oil @ US$100/bbl. in December.



- Major differences between options and futures:
  - For futures, the delivery price is determined by the demand and supply of the futures contracts. So, for both buyers and sellers of futures, they cannot choose but only accept the current delivery price.
  - For options, in addition to the dimension of different maturities, there are a series of strike prices for each maturity date that traders can choose.