NATIONAL TAIWAN UNIVERSITY
College of Management

Options and Futures

Associate Professor Jr-Yan Wang — **Spring 2013**
Room 206, Building 2, College of Management — **Monday 14:20-17:20**
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COURSE DESCRIPTION

The major goal of this course is to provide students comprehensive understanding of many modern financial derivatives (金融衍生性商品). A derivative instrument is a contract between two parties whose payoff depends on resulting values of the underlying variables on a 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 is called underlying assets. Four categories of derivatives will be covered in this course, including forward, futures, swaps, and options. Students will learn how and where to trade these derivatives. In addition, students also learn the methods to calculate the theoretical values for these derivatives. Moreover, the trading and hedging strategies associated with these financial derivatives will be mentioned.

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 the area of 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).

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

Required Text: Fundamentals of Futures and Options Markets, by John C. Hull, 7th ed., 2010.

(The representative bookstore of this book in Taiwan is 東華書局. If you decide to purchase the text book together, you can contact Mr. 吳飛龍 via (02) 2331-7856.)

EXAMS AND GRADINGS

Midterm Exam 50% (on April 15th) Final Exam 50% (on June 17th)

* The range for each exam depends on the speed of my 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 and modified from the quiz and questions at the end of each chapter in the required text.
* The need of travel 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 get my permission. The late notification is not acceptable.
* To maintain the fairness in the class, there are no make-up exams or other alternatives for exams.
* The dishonesty in the exams will lead to a failed result for this course.
* I will curve your final grades such that the average and standard deviation of the grades in this class are comparable to other classes in College of Management.

RULES IN CLASS

* DO NOT disturb other students from listening to my lecture.
* If you have any questions about my lecture, just raise your hand to interrupt me.

COURSE OUTLINE

1. Introduction (Chapter 1)
2. Forward and Futures (Chapters 2-3)
3. Interest Rates (Chapter 4)
4. Forward and Futures Prices and Values (Chapter 5)
5. Interest Rate Futures (Chapter 6)
6. Swaps (Chapter 7)
7. Options Markets (Chapter 9)
8. Basic Properties and Trading Strategies of Stock Options (Chapters 10-11)
9. Stock Options Pricing-Binomial Tree and Black-Scholes Models (Chapters 12-13)
10. Options on Stock Indices, Currencies, and Futures (Chapters 15-16)
11. The Greek Letters (Chapter 17)

* Chapter 8 (the credit crisis in 2007) and Chapter 14 (derivatives markets in developing countries, like China or India) are skipped in order to introduce more content in a limited time of this semester.

OFFICE HOURS

Thursday 13:30-15:30 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.
* Try to fully utilize the office hours before making an individual appointment.

TEACHING ASSISTANT

張碧娟 d95724014@management.ntu.edu.tw

* If you have difficulties to solve the quiz or questions at the end of each chapter, please contact and ask the teaching assistant first.

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 at a certain time point in the future (the delivery or maturity date) for an agreed price (the delivery price).
- 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 $-\$50\times100=-\$5{,}000$.
  US$1150/oz. in April, the payoff is $\$100\times100=\$10{,}000$.
  If the oil price is US$90/bbl. in December, the payoff is $\$10\times1000=\$10{,}000$.
  US$120/bbl. in December, the payoff is $-\$20\times1000=-\$20{,}000$.

Forward contract (遠期合約) (Chapter 2)

- Similar to futures except that they are traded in over-the-counter markets.
- There are dealers providing the bid and asked prices of forward contracts.
- Example for foreign exchange quotes of USD/GBP:

Quotes of Bank A	Bid	Offer (Asked)
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 2 parties.
  - 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; for forward contracts, the default risk of the trading counterparty cannot be ignored.

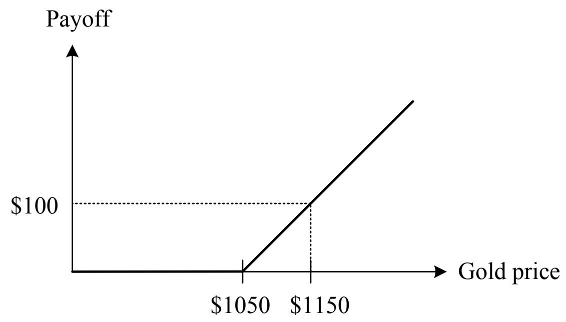
Swaps contract (交換合約) (Chapter 7)

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

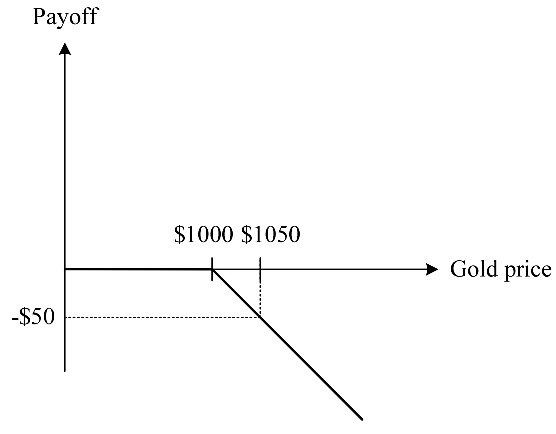
Options (選擇權) (Chapters 9-17)

- A right to buy or sell an asset at a certain time point in the future (the maturity date) for a specified price (the strike price).
- The right to buy is termed "call option", and the right to sell is termed "put option".
- Examples:

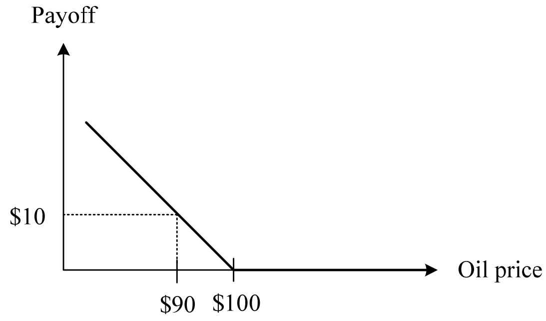
  Buy a call: purchase a right to buy 1 oz. of gold @ US$1050/oz. in April.



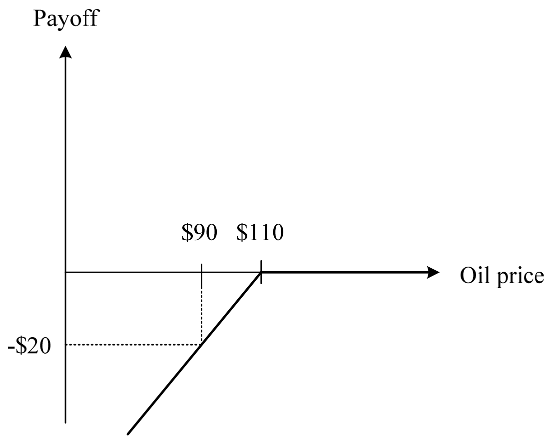
  Sell a call: sell a right such that the trading counterparty can buy 1 oz. of gold @ US$1000/oz. in June.



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$110/bbl. in January next year.



- 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.