

I. Derivative Markets and instruments

a. define a derivative and distinguish between exchange-traded and over-the-counter derivatives.

- A **derivative** contract is a financial instrument with a return that is obtained from or “derived” from the return of another **underlying** financial instrument.

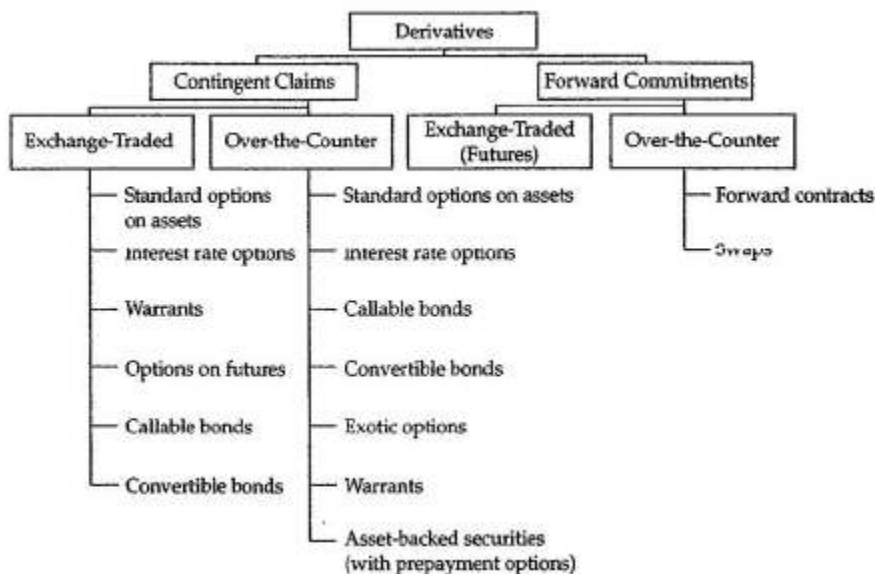
Over-the-counter derivative	Exchange-traded derivative
forwards/swaps/(*bond options)	options*/ futures
dealer market (no central location)	physical exchange
customized	standardized
default risk	guaranteed by clearinghouse
very limited liquidity	liquidity

\* Some options trade in the over-the-counter market, notably bond options.

b. contrast forward commitments with contingent claims

- A **forward commitment** is an agreement between two parties in which one party agrees to buy and the other agrees to sell an asset at a future date at a price agreed on today. The three types of forward commitments are **forward contracts, futures contracts, and swaps**.

- A **contingent claim** is a derivative contract with a payoff dependent on the occurrence of a future event. **Options** and **credit derivatives** are contingent claims.



---

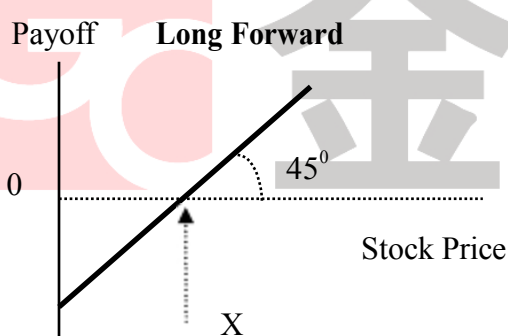
c. define forward contracts, futures contracts, options (calls and puts), swaps, and credit derivatives, and compare their basic characteristics

---

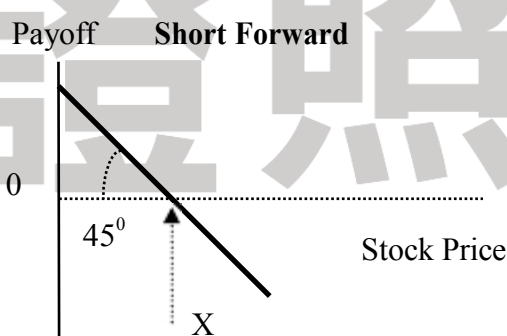
**Forward contracts**

- Forward contracts obligate one party to buy, and another to sell, a specific asset at a predetermined price on a certain date in the future.
  - The holder of a long forward contract (the “**long**”) is obligated to take delivery of the underlying asset and pay the forward price at expiration.
  - The holder of a short forward contract (the “**short**”) is obligated to deliver the underlying asset and accept payment of the forward price at expiration.
- Forward contracts are structured so that only the party owing the greater amount can default. (**default risk**). Since typically no money changes hands at the initiation of the contract, unlike futures contracts in which each party posts an initial deposit (margin) as a guarantee of performance.

- The payoff =  $S_T - X$



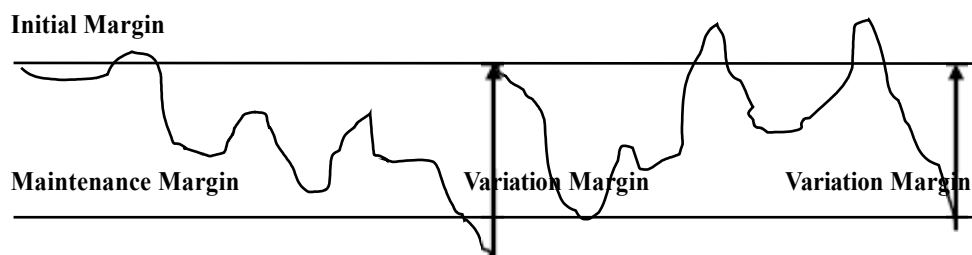
- The payoff =  $X - S_T$



- Settle the obligations of the parties at expiration:
  - **Delivery**  
The long will pay the agreed-upon price to the short, who in turn will deliver the underlying asset to the long.
  - **Cash settlement**  
The long and short pay the net cash value of the position on the delivery date. Cashed-settled forward contracts are sometimes called NDFs, for nondeliverable forwards.

### Futures contracts

- Futures contracts are forward contracts that are exchange-traded, quite liquid, and require daily settlement of any gains or losses.
  
- **Futures Margin**
  - Margin in the securities markets is the deposit of money, the margin, and a loan for the remainder of the funds required to purchase a stock or bond. There is interest charged on the borrowed amount, the margin loan.
  
  - Margin in the futures market is much smaller and does not involve a loan, consequently, no interest charges. Futures margin is more like a performance bond or down payment. Moreover, both the buyer and the seller of a futures contract must deposit margin.
  
  - **Initial margin** is the amount of money in a margin account on the day of a transaction or when a margin call is made. It has to exceed the minimum level required by the futures exchange.
  
  - **Maintenance margin** is the amount of money in a margin account on any day other than when the initial margin applies. Minimum requirements exist for the initial and maintenance margins, with initial margin requirement normally being less than 10% of the future price and the maintenance margin requirement being small than the initial requirement.
  
  - When the margin balance falls below the maintenance margin, **variation margin** is the amount of money that must be deposited into the account to bring the balance up to the initial margin requirement.
  
  - The **settlement price** is an average of the last few trades of the day and is used to determine the gains and losses marked to the parties' accounts.



- **Price limits** are exchange-imposed limits on how much the contract price can change from the previous day's settlement price. If the (equilibrium) price at which traders would willingly trade is above the upper limit or below the lower limit, trades cannot take place.

Previous settle price	Daily price limit	Limit move	
		Limit up	Limit down
1.04	0.02	1.06	1.02

If trades cannot take place because of a limit move, either up or down, the price is said to be **locked limit**.

- **Marking to market** is the process of adjusting the margin balance in a futures account each day for the change in the value of the contract assets from the previous trading day, based on the new settlement price.

Ex1.

- Initial futures price = 100
- Initial margin requirement = 5
- Maintenance margin requirement = 4

Holder of long position of 10 contracts

Day	Beginning Balance	Funds Deposited	Settlement Price	Future Price Change	Gain/Loss	Ending Balance
0	0	50	100.00			50
1	50	0	99.20	-0.80	-8	42
2	42	0	96.00	-3.20	-32	10
3	10	40	101.00	5.00	50	100
4	100	0	103.50	2.50	25	125
5	125	0	103.00	-0.50	-5	120
6	120	0	104.00	1.00	10	130

Holder of Short position of 10 contracts

Day	Beginning Balance	Funds Deposited	Settlement Price	Future Price Change	Gain/Loss	Ending Balance
0	0	50	100.00			50
1	50	0	99.20	-0.80	8	58
2	58	0	96.00	-3.20	32	90
3	90	0	101.00	5.00	-50	40
4	40	0	103.50	2.50	-25	15
5	15	35	103.00	-0.50	5	55
6	55	0	104.00	1.00	-10	45

■ **Type of trader**

- ✓ **Hedgers** use derivatives to reduce the risk that they face from potential future movements in a market variable.
- ✓ **Speculators** use them to bet on the future direction of a market variable.
- ✓ **Arbitrageurs** take offsetting positions in two or more instruments to lock in profit.

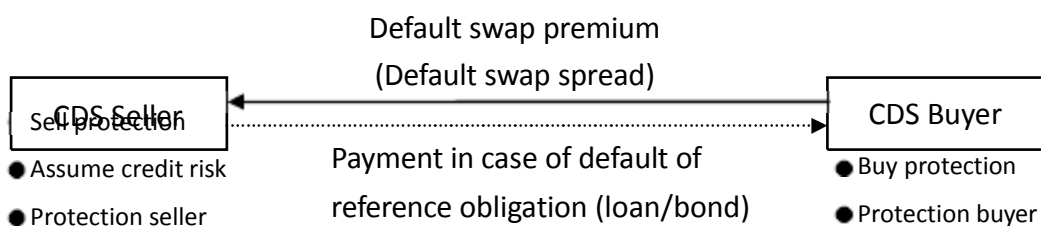
■ **Clearinghouse**

- Maintain an orderly and liquid market by acting as the counterparty to each long or short futures position – this allows traders to enter the market knowing that they will be able to reverse or reduce their position.
- Collateralized by clearinghouse members (i.e., mutualization of risk), ensuring that no default take place.

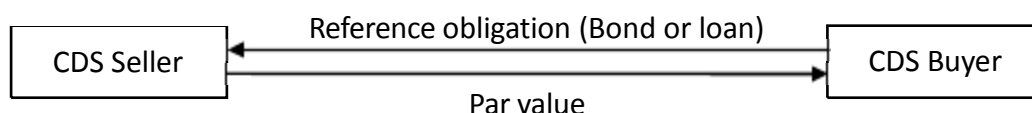
- **Open interest** is the total number of futures contracts outstanding. The open interest is the number of long positions or, equivalently, the number of short positions.

Credit derivatives

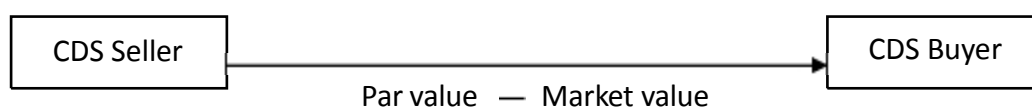
- **Credit Default Swap (CDS)**, in which the buyer makes a periodic or an upfront payment to the seller, who promises to make a payment in the event of default of reference obligation (e.g., bond or loan).
  - A CDS is essentially an insurance contract.
  - When there is a credit event, the CDS will settle in cash or physical delivery, with the latter being the usual case.



Physical settlement



Cash settlement



---

**d. describe purposes of, and controversies related to, derivative markets**

---

- The criticism of derivatives is that they are “too risk”.
- The benefits of derivatives markets are that they:
  - Provide price information.
  - Allow risk to be managed and shifted among market participants.
  - Reduce transactions costs.

---

**e. explain arbitrage and the role it plays in determining prices and promoting market efficiency.**

---

- **Arbitrage** is a process through which an investor can buy an asset or combination of assets at one price and concurrently sell at a higher price, thereby earning a profit without investing any money or being exposed to any risk (riskless return).
- The combined actions of many investors engaging in arbitrage results in rapid price adjustments that eliminate these opportunities, thereby bringing prices back in line and making markets more efficient.
- Two arbitrage arguments:
  - **Law of one price:** Two securities or portfolios that have identical cash flows in the future, regardless of future events, should have the same price.
  - Two securities with uncertain returns can be combined in a portfolio that will have a certain payoff.( i.e. If a portfolio consisting of A and B has a certain payoff, the portfolio should yield the risk-free rate.)