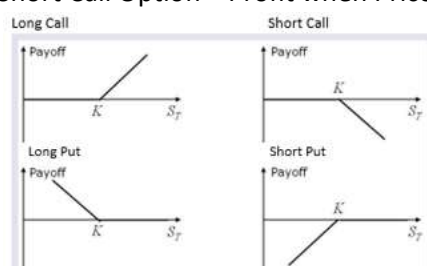


Lecture 1 - Introduction to Derivatives

- The Nature of derivatives - A derivative is an instrument whose price depends on, or is derived from, the price of another asset. Examples:
 - Futures contracts – is an agreement to buy/ sell an asset at a certain time in the future at an agreed price. Traded using electronic trading (computer matches buyer and seller).
 - Forward contracts - Forward contracts are similar to futures except that they trade in the over-the-counter market (see below)
 - Swaps
 - Options
- Derivatives are used to:
 - Hedge risks
 - Speculate
 - Lock in an arbitrage profit
 - Change the nature of a liability
 - Change the nature of an investment without incurring the costs of selling one portfolio and buying another
- An American option can be exercised at any time during its life, while a European option can be exercised only at maturity
- Hedge fund managers are not subject to the same rules as mutual funds and cannot offer their securities publicly
- Types of investors:
 - Hedgers – look to reduce risk through
 - Speculators -
 - Arbitrageurs - Arbitrage involves locking in a riskless profit by simultaneously entering into transactions in two or more markets
- Convergence of futures price to spot price - when the delivery period is reached, the futures price equals, or is very close to, the spot price
- Note – when calculating arbitrage opportunity, if there is a cost other than the interest rate you have to take it into consideration
 - If the cost is given as a percentage add it to the interest rate to find the future price
 - If given as an amount add it to the spot price to find the future price
- A margin is a sum of money deposited by an investor with his or her broker. It acts as a guarantee that the investor can cover any losses on the futures contract.
 - The balance in the margin account is adjusted daily to reflect gains and losses on the futures contract. If losses are above a certain level, the investor is required to deposit a further margin.
- Future contracts are hence seen to settle daily, as the investors gains and losses are added or subtracted from the margin account, whereas forward contracts settle at the end of its life.
- Payoff of Option Contracts
 - Normal Contract
 - Long Put Option – Profit when Price < (Strike Price – Option Price)
 - Long Call Option – Profit when Price > (Strike Price – Option Price)
 - Writers of contracts – Maximum payoff for them is the contract price
 - Short Put Option – Profit when Price > (Strike Price – Option Price)
 - Short Call Option – Profit when Price < (Strike Price – Option Price)



- The clearinghouse keeps track of all the transactions that take place so that it can calculate the daily net position of each of its members

Forward	Futures
<ul style="list-style-type: none"> • Private contract between two parties • Not standardised • Usually one specified delivery date • Settled at end of contract • Delivery or final cash settlement usually take place • Some credit risk 	<ul style="list-style-type: none"> • Traded on an exchange • Standardised • Range of delivery dates • Settled daily • Contract is usually closed out prior to maturity • Virtually no credit risk

- Brokers are required to maintain margin accounts with clearinghouse members and clearinghouse members are required to maintain a margin account with the clearinghouse
- Note: when answering questions look out for:
 - Who is the writer of the contract.
 - How many contracts there are. E.g. For 2 future contracts to withdraw \$2,000, each contract only needs to increase by \$1,000
 - Margin call on the other hand is calculated by each contract separately, it doesn't depend on the number of contracts
 - Whether it is a call or put option or a short or long future contract
 - As each contract will make a profit if the price moves in a different direction

Lecture 2 – Hedging Strategies using Futures

- Short hedge – involves a short position in futures contracts and is appropriate when the hedger already owns an asset and expects to sell
- Long Hedge – involves taking a long position in futures contract and is appropriate when a company knows it will have to purchase a certain asset in the future and wants to lock in a price now
- You hedge the future sale of an asset by entering into a short futures contract

$$\text{Price realised} = S_2 + (F_1 - F_2) = F_1 + b_2$$
- You hedge the future purchase of an asset by entering into a long futures contract

$$\text{Cost of asset} = S_2 - (F_2 - F_1) = F_1 + b_2$$
 - Note: b_2 = Basis at Time t_2 ; $b_2 = S_2 - F_2$
 - F_2 = Future price at time t_2
 - S_2 = Spot price at time t_2
- Choose a delivery month that is as close as possible to, but later than, the end of the life of the hedge
- Basis Risk:
 - The asset whose price is to be hedged may not be exactly the same as the asset underlying the futures contract
 - The hedger may not be certain of the exact date the asset will be bought or sold
 - The hedge may require the futures contract to be closed out before its delivery month
 - Basis = Spot price of asset to be hedged – future price of contract used
 - If the asset to be hedged and the asset underlying the future contract are the same, then the basis should be zero at the expiration of the futures contract.
- When there is no futures contract on the asset being hedged, choose the contract whose futures price is most highly correlated with the asset price
- Reasons for hedging an equity portfolio - Changing the beta in a portfolio
 - Desire to hedge systematic risk
 - Desire to be out of the market for a short period of time
 - Hedging may be cheaper than selling the portfolio and buying it back
- Cross Hedging – occurs when 2 assets are different.
 - The hedge ratio is the ratio of the size of the position taken in future contracts to the size of the exposure.