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Financial Institutions and Markets

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Derivatives Market-I

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What is Derivative?

- Derivative is a financial instrument or security whose payoffs depend on a more primitive or fundamental good.
- Financial derivative is a financial instrument whose payoffs depend on the financial instruments or security
- Examples: grains, coffee, orange, gold, silver, foreign exchange, bonds and stocks

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Use of Derivatives

- To hedge risks
- To speculate (take a view on the future direction of the market)
- To lock in an arbitrage profit
- To change the nature of a liability
- To change the nature of an investment without incurring the costs of selling one portfolio and buying another

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Factors Contributing Growth of Derivatives

- Increased volatility in asset prices in financial markets
- Increased integration of national financial markets with the international markets
- Marked improvement in communication facilities and sharp decline in their costs
- Development of more sophisticated risk management tools, providing economic agents a wider choice of risk management strategies
- Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets leading to higher returns, reduced risk as well as transactions costs as compared to individual financial assets.

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Derivative Instruments

- **Forwards**: A forward contract is a customized contract between two entities, where settlement takes place on a specific date in the future at today's pre-agreed price.
- **Futures**: A futures contract is an agreement between two parties to buy or sell an asset at a certain time in the future at a certain price. Futures contracts are special types of forward contracts in the sense that the former are standardized exchange-traded contracts
- **Options**: Options are of two types - calls and puts. Calls give the buyer the right but not the obligation to buy a given quantity of the underlying asset, at a given price on or before a given future date. Puts give the buyer the right, but not the obligation to sell a given quantity of the underlying asset at a given price on or before a given date.
- **Swaps**: Swaps are private agreements between two parties to exchange cash flows in the future according to a prearranged formula. They can be regarded as portfolios of forward contracts.

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Forward Contracts vs Futures Contracts

Forward

- Private contract between two parties
- Not standardized
- One specified delivery date
- Settled at maturity
- Credit risk exists

Future

- Exchange traded
- Standardized
- Range of delivery data
- May closeout prior to maturity
- No credit risk

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Options vs Futures/Forwards

- A futures/forward contract gives the holder the obligation to buy or sell at a certain price

- An option gives the holder the right (no obligation) to buy or sell at a certain price

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Concepts Used in Derivatives Market

- **Open Interest:** Open interest is the total number of outstanding contracts that are held by market participants at the end of each day. It is a measure of how much interest is there in a particular option or future. Increasing open interest means that fresh funds are flowing in the market, while declining open interest means that the market is liquidating.
- **Implied Interest Rate:**In the futures market, implied interest rate or cost of carry is often used inter-changeably. Cost of carry is more appropriately used for commodity futures, as by definition it means the total costs required to carry a commodity or any other good forward in time. The costs involved are storage cost, insurance cost, transportation cost and the financing cost. . In case of equity futures, the carry cost is the cost offinancing minus the dividend returns.

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Concepts Used in Derivatives Market Cont…

- **Implied volatility:** It can be measured entering all parameters into an option pricing model and then solving it for volatility. For example, the Black-Scholes model solves for the fair price ofthe option by using the following parameters-days to expiry, strike price, spot price, and volatility ofunderlying, interest rate, and dividend.
- **Basis:** The Difference between spot price of an asset and its future price. Even through the spot and future prices generally move in tandem with each other, the basis is not constant.
- **Contango:** Under normal market condition, futures contracts are priced above the expected future spot price. This is known as contango.
- **Backwardation:** When futures price prevail below the expected future spot price, it is known as backwardation.

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Concepts Used in Derivatives Market Cont…

- **Settlement price:** Daily settlement price is the closing price of the futures contracts for the trading day and the final the final settlement price is the closing price of underlying asset on the last trading day.
- **Option Premium:** The price paid by the buyer to the seller to acquire the right to buy or sell.
- **Strike price:** The pre-decided price at which the option may be exercised. It is also known as the exercise price.
- **Expiration date:** The date on which the option expires is known as the expiration date. On the expiration date, either the option is exercised or it expires worthless.
- **Exercise date:** The date on which the option is actually exercised. In case of European options, the exercise date is same as the expiry date while in case of American options, the options contract may be exercised any day between the purchase of contract and its expiry date.

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References

- Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017.
- Hull, John C. *Options, Futures, and Other Derivatives*, 9th Edition, Pearson, 2014.

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Derivatives Market-II

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Futures Contracts

- Available on a wide range of underlyings
- Exchange traded
- Specifications need to be defined:
  - What can be delivered,
  - Where it can be delivered, &
  - When it can be delivered
- Settled daily

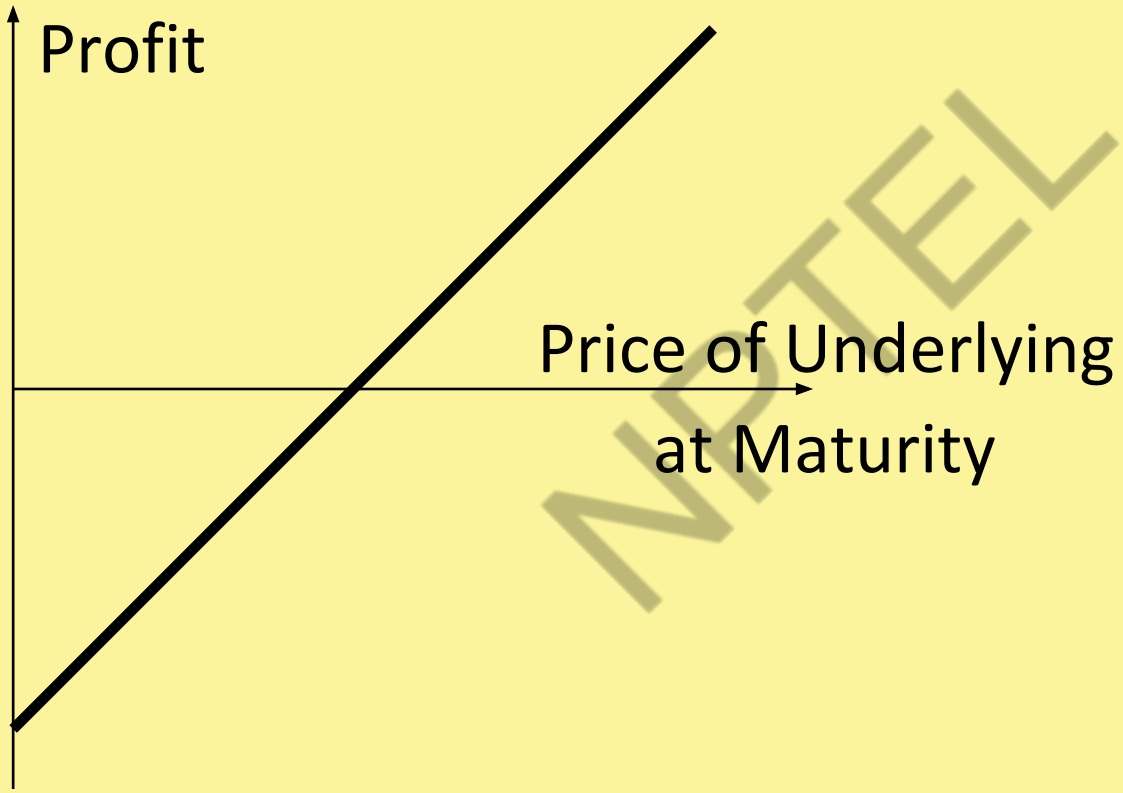
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Standardized Contract Term

- Tick size: Minimum price fluctuation
- Daily Price Limit: Restriction for the price movement in a single day
- Delivery Date
- Strike Price
- Sum of all outstanding long and short future market positions is always equal to zero

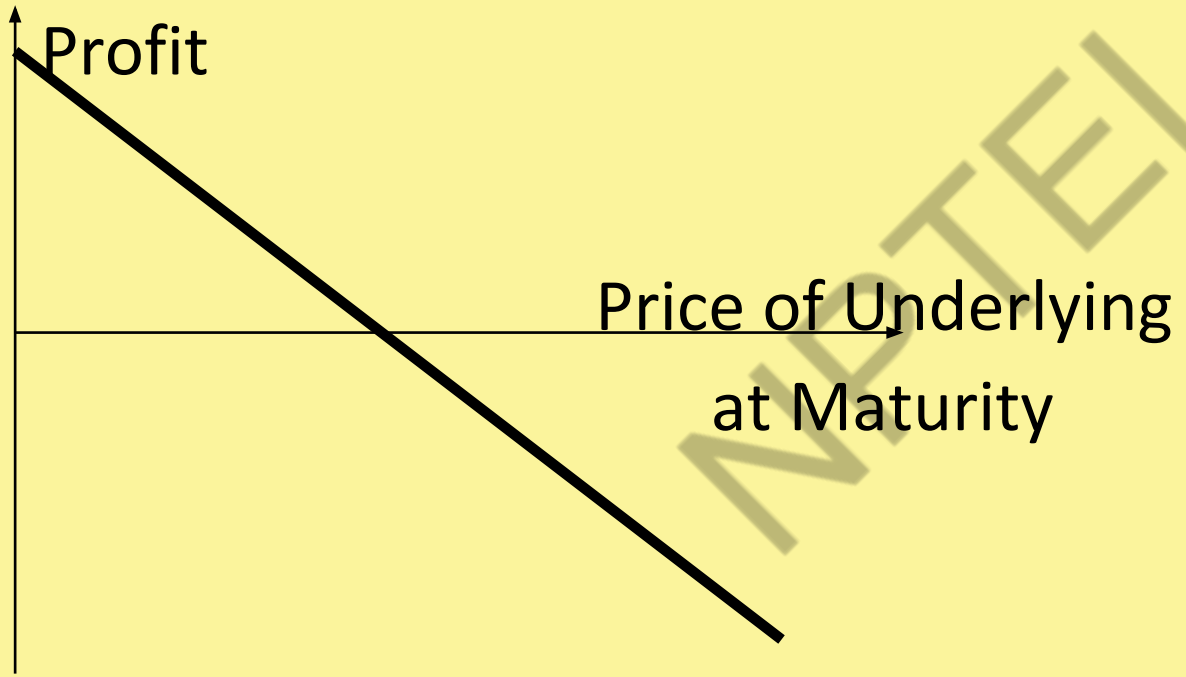
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Profit from a Long Forward or Futures Position



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Profit from a Short Forward or Futures Position



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Relationship between Future Price and Spot Price

- Basis is the relationship between the spot price and future price of the asset.
- Basis =Current Spot Price – Future Price
- Normal Market: Prices for more distant futures are higher than for nearby futures. Future Price > Spot Price
- Inverted Market: Distant Futures prices are lower than the prices for contracts nearer to the expiration. Future price < Spot Price
- When the future contract is at expiration, the future price and the spot price of asset must be same. Basis is zero. This behaviour of basis over time is known as **convergence**

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Spread

- Spread is the difference between two future prices
- If the two prices are for the future contracts on the same underlying good, but with different expiration dates, the spread is an **intra commodity spread**
- If the two future prices that form a spread are future prices for two underlying goods then the spread is an **inter commodity spreads**

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Long, Short Hedges and Optimal Hedge Ratio

- A long futures hedge is appropriate when you know you will purchase an asset in the future and want to lock in the price
- A short futures hedge is appropriate when you know you will sell an asset in the future & want to lock in the price
- **Optimal hedge ratio:** Proportion of the exposure that should optimally be hedged is

$$h = \rho \frac{\sigma_S}{\sigma_F}$$

where

σ_S is the standard deviation of ΔS, the change in the spot price during the hedging period,

σ_F is the standard deviation of ΔF, the change in the futures price during the hedging period

ρ is the coefficient of correlation between ΔS and ΔF.

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Hedging Using Index Futures

- To hedge the risk in a portfolio the number of contracts that should be shorted is

$$\beta \frac{P}{A}$$

- Where P is the value of the portfolio, β is its beta, and A is the value of the assets underlying one futures contract

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Choice of Contract

- Choose a delivery month that is as close as possible to, but later than, the end of the life of the hedge
- 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.

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Options

- Options are of two types – call option and put option
- Call Option: It give the holder the right but not the obligation to buy a given quantity of the underlying asset, at a given price on or before a given future date.
- Put Option: give the holder the right to sell a given quantity of the underlying asset at a given price on or before a given date.

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American vs European Options

- An American option can be exercised at any time during its life

- A European option can be exercised only at maturity

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Positions of the Buyer and Seller in Call and Put Options

Option Type	Buyers of Option (Long Position)	Writer of Option (Short Position)
Call	Right to Buy Asset	Obligation to Sell Asset
Put	Right to Sell Asset	Obligation to Buy Asset

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Call and Put Options at Expiration

- If the price of the underlying asset is lower than the exercise price on the expiration of a call option, the call would expire unexercised.
- When at expiration the price of the underlying asset is greater than the exercise price, the put will expire unexercised.

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Concept of Money ness

Condition	Call Option	Put Option
S > E	In-the-Money	Out-of-the Money
S < E	Out-of-the Money	In-the-Money
S = E	At-the-Money	At-the-Money

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Concept of Money ness

- Option Premium = Intrinsic Value (Parity Value) + Time value (Premium over parity)
- Intrinsic value refers to the amount by which it is in-the-money
- Option which is out-of-the money has a zero intrinsic values
- For a call option which is in the money, the intrinsic value is the excess of stock price over the exercise price
- For a put option which is in the money, the intrinsic value is the excess of exercise price over the stock price

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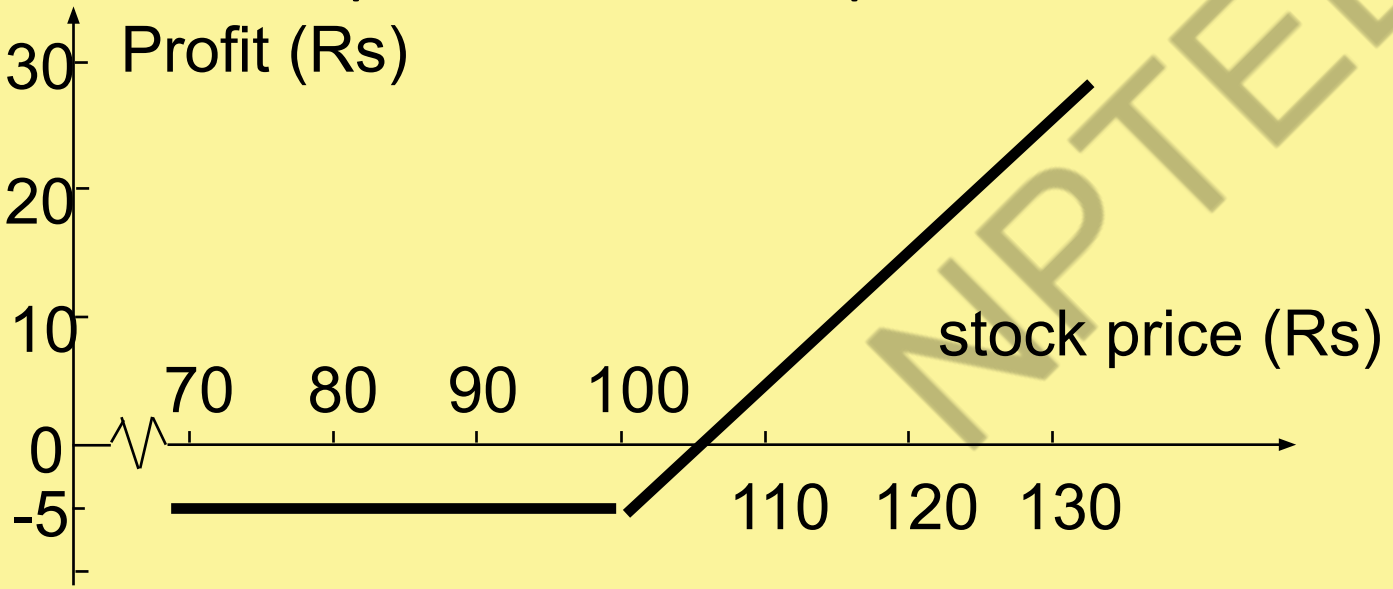
Example

Option	Exercise price	Stock price	Call Option price	Classification	Intrinsic value
1	80	83.5	6.75	In-the-money	3.5
2	85	83.5	2.5	Out-of the money	0

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Long Call

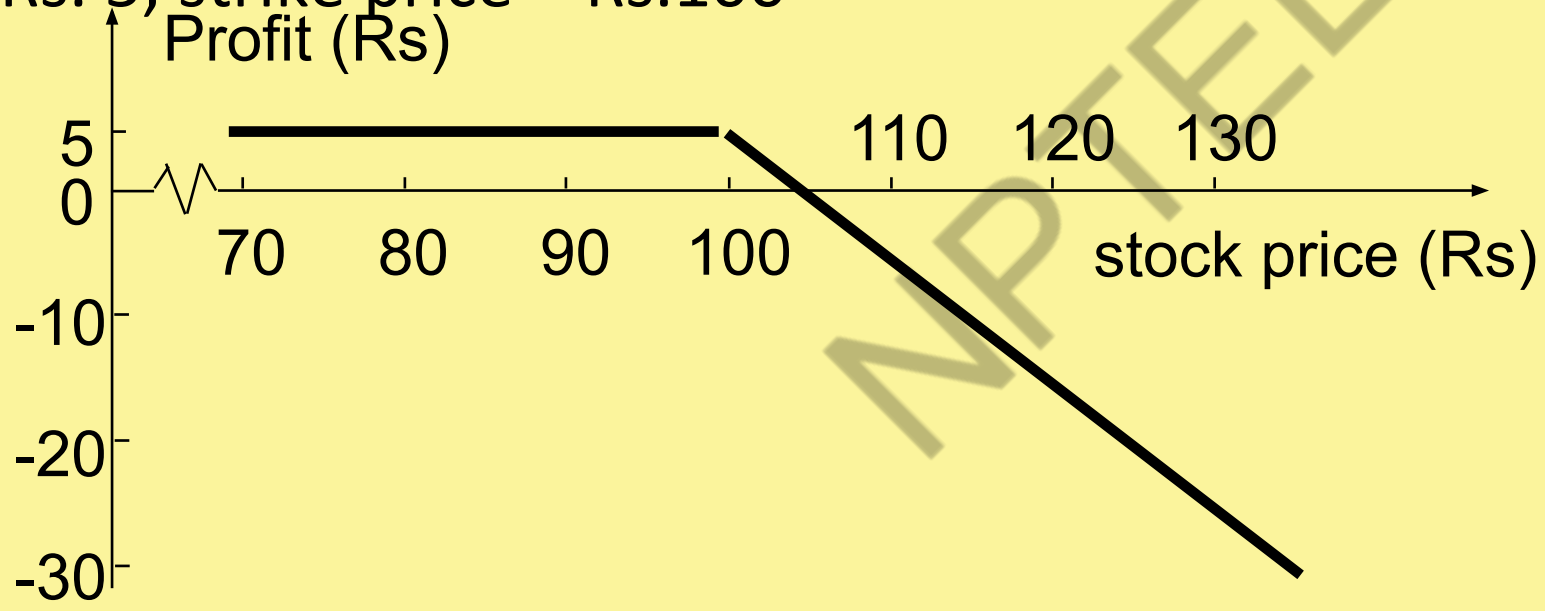
Profit from buying one European call option: option price = Rs.5, strike price = Rs.100, option life = 2 months



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Short Call

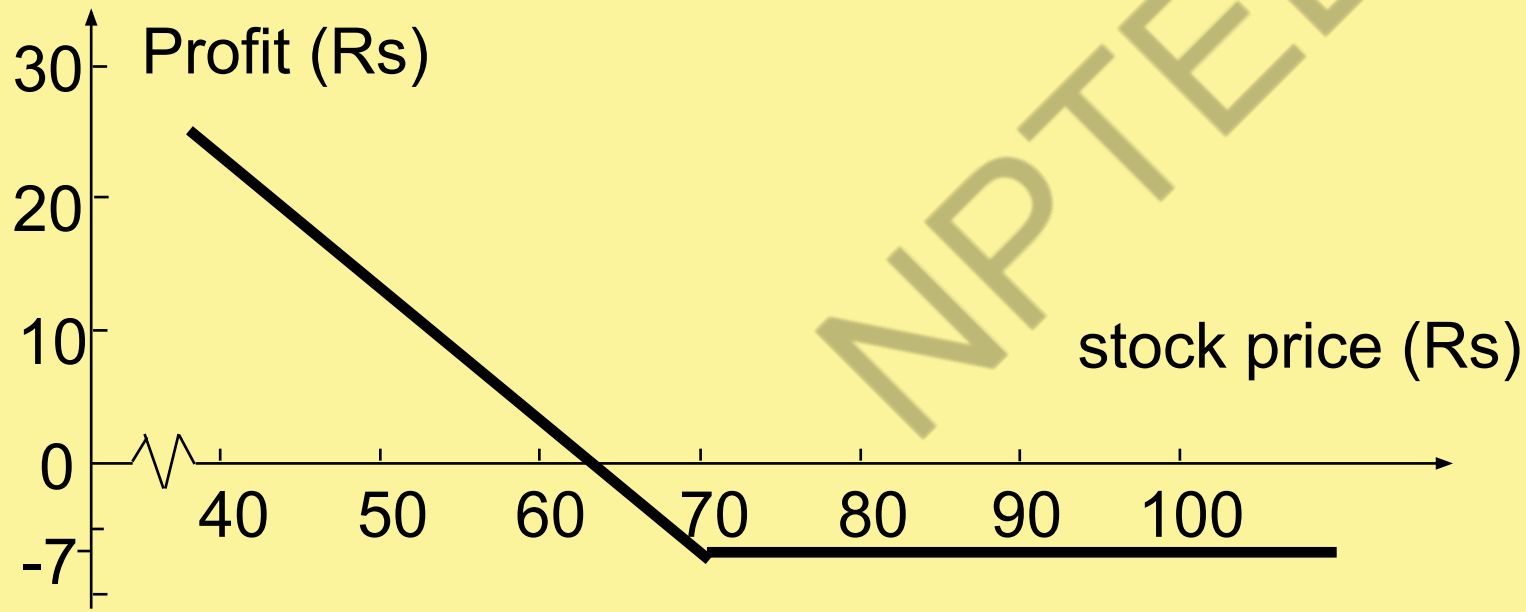
- Profit from writing one European call option: option price = Rs. 5, strike price = Rs.100



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Long Put

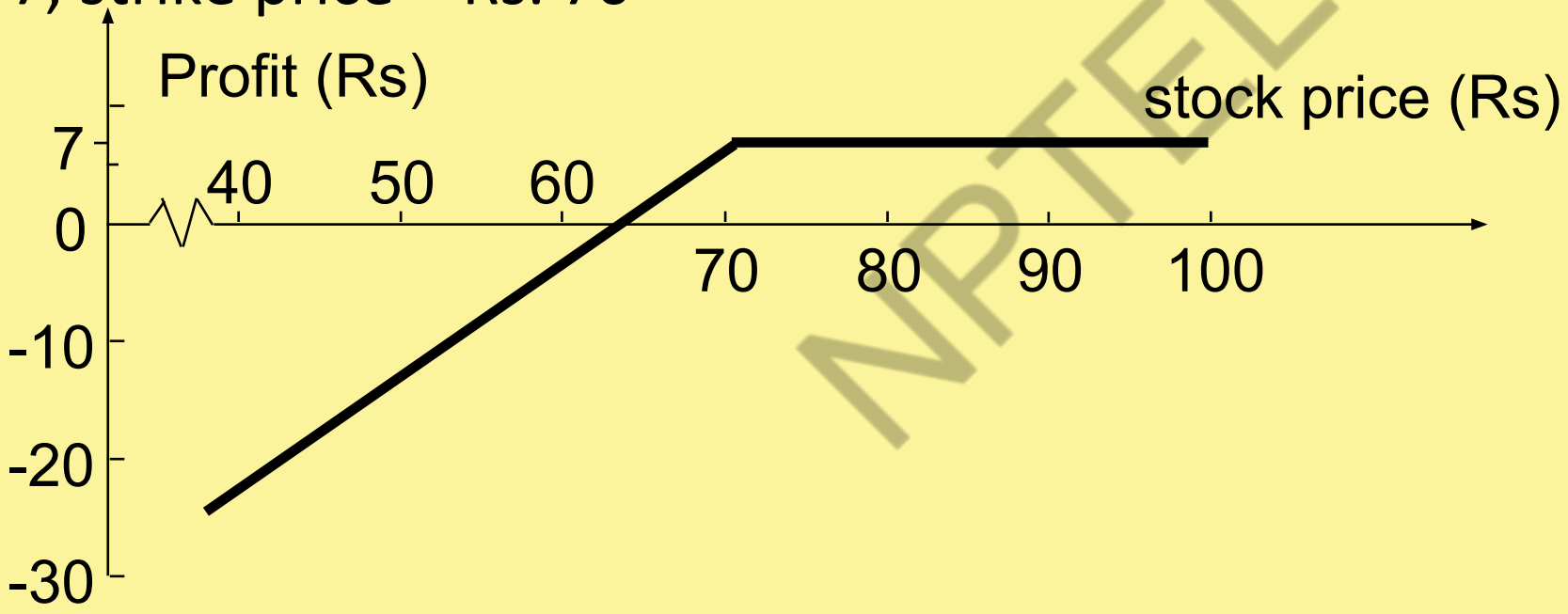
- Profit from buying an European put option: option price = Rs.7, strike price = Rs.70



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Short Put

- Profit from writing an European put option: option price = Rs. 7, strike price = Rs. 70



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References

- Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017.
- Hull, John C. *Options, Futures, and Other Derivatives*, 9th Edition, Pearson, 2014.

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Derivatives Market-III

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Carry Pricing Model

- Forward or Future Price = Spot price + Carry Costs – Carry Return
- Carry Cost: Holding costs including interest charges on borrowings, Insurance cost storage cost etc.
- Carry Return: Incomes such as dividends on shares etc.

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Pricing of Forward Contracts

- For securities providing no income
- For securities providing a given amount of income
- For securities providing a known yield

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Securities Providing No Income

If the spot price of is S & the futures price is for a contract deliverable in T years is F, then

$$F = S\,(1+r\,)^T$$

where r is the 1-year risk-free rate of interest.

Let S=300, T=2, and r=0.07 so that

$F = 300\,(1.07)^2 = 343.47$

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Interest Rates are Measured with Continuous Compounding

$$F = Se^{rT}$$

This equation relates the forward price and the spot price for any investment asset that provides no income and has no storage cost.

Let S = Rs. 50, r= 0.07, T = 0.50, $F = 50e^{0.07 \times 0.50}$ = Rs. 51.78

If $F > Se^{rT}$: Investor may buy the asset by borrowing an amount equal to S for a period of T at the risk free rate, and take a short position in forward contract. At the time of maturity, the assets will be delivered for a price of F and amount borrowed will be repaid by paying an amount equal to Se^{rT} and the deal would result in a net profit of $F - Se^{rT}$

If $F < Se^{rT}$: Investor would short the assets, invest the proceeds for the time period T at an interest arte r and long a forward contract. When the contract matures the asset would be purchased for a price of F and the short position in the asset would be closed out. This would result in a profit of $Se^{rT} - F$

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Other types of securities

Investment Asset Provides a Known Income (preference Share):

$$F = (S - I)e^{rT}$$

where I is the present value of the income received from the assets

Let S = Rs. 50, r= 0.07, T = 0.50, I = Rs. 5, F = $(50-5)e^{0.07 \times 0.50}$ = Rs.46.60

Investment Asset Provides a Known Yield:

$$F = S\, e^{(r-y)T}$$

where y is the average yield during the life of the contract.

Example: Stocks with paying dividends, Futures or Forwards on Currencies (y=foreign risk free rate)

Example: Let S_0 = Rs. 50, r= 0.07, T = 0.50, y = 0.03, $F_0 = (50)^{e(0.07 - 0.03)\times 0.50}$ = Rs. 51.01

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Arbitrage

- When $F > Se^{(r-y)T}$ an arbitrageur buys the stocks underlying the index and sells futures
- When $F < Se^{(r-y)T}$ an arbitrageur buys futures and shorts or sells the stocks underlying the index
- Index arbitrage involves simultaneous trades in futures and many different stocks

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Futures on Consumption Assets

$$F = S\,\mathrm{e}^{(r+c)T}$$

where c is the storage cost per unit time as a percent of the asset value.

Alternatively: $F = (S+C)e^{rT}$

where C is the present value of the storage costs.

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Valuing a Forward Contract

Suppose that

K is delivery price in a forward contract &

F is forward price that would apply to the contract today

The value of a long forward contract, f, is $f = (F - K)e^{-rT}$

Similarly, the value of a short forward contract is $f = (K - F_0)e^{-rT}$

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Factors Affecting Option Prices

- Spot price (S)
- Strike price (K)
- Time period (T)
- Risk free rate (r)
- Volatility of price (σ)
- Dividend or any other income (D)

Variables	Call	Put
S	+	-
K	-	+
T	+	+
R	+	-
σ	+	+
D	-	+

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Upper Bounds for Option Prices

- If an option price is above the upper bound and below the lower bound, there are profitable opportunities for arbitrageurs.
- Upper Bounds (Call Option): $c \leq S$ and $C \leq S$, if these relationship does not hold then an arbitrageurs can easily make risk less profit by buying the stock and selling the call option (c=European call option, C= American call option, S= price of underlying asset)
- Upper Bound (Put Option): $p \leq K$ and $P \leq K$, for European option $p \leq Ke^{-rt}$, If this is not true then risk less profit can be made by writing the option and investing the proceeds of the sale at the risk-free interest rate. (p=European put option, P= American put option, k= strike price)

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Lower Bounds for Call Option (Non-Dividend paying Stocks)

Call Option: $c \geq S - Ke^{-rT}$

Example for call Option:

Let:

c = Rs. 3 S = Rs. 20

T = 1 r = 10%

K = Rs. 18 D = 0

Is there an arbitrage opportunity?

$S_0 - Ke^{-rt}$ = Rs. 3.71

Arbitrageur can buy the call and short the stock , Cash Inflow = 20-3 = 17, Invest for one year at 10% per annum, Total money = $17e^{0.1}$=Rs. 18.79

If stock price is greater than 18 he can exercise the option to buy the stock and close the short position and profit will be : Rs. 18.79 – Rs. 18 = 0.79

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Lower Bounds for Put Option (Non-Dividend paying Stocks)

Put Option: $p \geq Ke^{-rT} - S$

Suppose that

p = Rs. 1 S = Rs. 37

T = 0.5 r =5%

K = Rs. 40 D = 0

Is there an arbitrage opportunity?

$Ke^{-rt} - S$ = Rs. 2.01, It is more than the put price. The arbitrageurs can borrow Rs. 38 for six months to buy both put and the stock. He is required to pay $38e^{0.05*0.5}$= Rs. 38.96

If the stock price is below 40, the arbitrageur exercises the option to sell the stock for Rs. 40 repays the loan and makes a profit of Rs 40 – Rs. 38.96 = Rs. 1.04

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Impact of Dividends on Lower Bounds to Option Prices

Call Option: $c \geq S - D - Ke^{-rT}$

Put Option: $p \geq D + Ke^{-rT} - S$

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Put-Call Parity

$$c + Ke^{-rT} = p + S$$

Arbitrage Opportunities

Suppose that

c = Rs. 3 Rs. S = 31

T = 0.25 r = 10%

K =Rs. 30 D = 0

- What are the arbitrage possibilities when p = Rs. 2.25 ?

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Example

$$c + Ke^{-rT} = p + S$$

$3+ 30e^{-0.1*3/12}$= Rs.32.26

P + S = 2.25 + 31 = Rs. 33.25

Arbitrage Strategy: Buying call and shorting both put and stock generating a positive cash flow of: -3 + 2.25 +31 = Rs. 30.25

Invest it at risk free interest rate, amount grows to $30.25e^{0.1*0.25}$=Rs.31.02

Is stock price at expiration of option is greater than 30 the call will be exercised and if it is less than 30, then the put will be exercised.

Net profit = 31.02 -30 = Rs 1.02

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References

- Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017.
- Hull, John C. *Options, Futures, and Other Derivatives*, 9th Edition, Pearson, 2014.

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Derivatives Market-IV

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Option Pricing Models

- Binomial Tree Model
- Black-Scholes Model (BSM)

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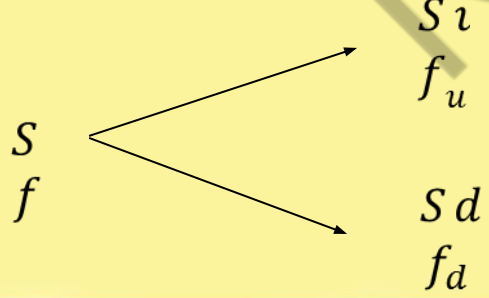
Binomial Tree Model

- Proposed by Cox, Ross and Rubinstein in 1979
- Underlying assets follow a random walk
- There is no arbitrage opportunity exists in the market

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Binomial Tree Model Cont…

- We construct a portfolio having a long position in Δ amount of stocks and short position in an option.
- Assume that the current value of stock is S and current price of the option on stock is f.
- The option get matured on time T and during the life of the option the value of underlying stock may move up to $S\ u$ or goes down to $S\ d$.
- The percentage increase in stock price when it moves up is u-1 (as u>1) and the percentage decrease in stock price when it comes down is 1-d (where d<1).
- We expect the payoff from the option is f_u when the stock value is $S\ u$ and the payoff is f_d when the price of the stock moves down to $S\ d$.



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Binomial Tree Model Cont…

•

We need to calculate the value of Δ which makes our portfolio riskless. If the stock price goes up, then the payoff from the portfolio will be$S \quad d\Delta - \ f_d$. And if the value of the stock moves down, then the payoff from the portfolio will be$S \quad u\Delta - \ f_u$. The two payoffs are equal when

$$S \quad u\Delta - \ f_u = \ S \quad d\Delta - \ f_d$$

Solving the above equation, we can derive the value of Δ as

$$\Delta = \frac{f_u - f_d}{S \quad u - S \quad d}$$

Δ implies the ratio of change in the option prices to the change in the value of the stock

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Binomial Tree Model Cont…

Assume that our portfolio is risk free and there is no arbitrage opportunity exists in the market. Hence, the portfolio must earn at risk free rate of return 'r' if invested for time 'T'. The present value of portfolio will be:

$$(S\ \ u\Delta - f_u)e^{-rT}$$

The cost of the portfolio is

$$S\ \ \Delta - f$$

For, risk-neutrality of the portfolio

$$S\ \ \Delta - f = (S\ \ u\Delta - f_u)e^{-rT}$$

Substituting the value of Δ and the solving the equation, we will get

$$f = \frac{f_u\left(1 - de^{-rT}\right) + f_d\left(ue^{-rT} - 1\right)}{u - d}$$

$$f = e^{-rT}\left[Pf_u + (1 - P)f_d\right]$$

Where $P = \frac{e^{rT} - \mathrm{d}}{u - d}$

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Example

Example The current price of a stock is ₹30, and it is known that at the end of 3 months it will be eithe ₹33 or ₹27. The strike price of the call option of this stock is ₹31. After 3 months if the stock price turn out to be ₹33, the value of the option will be ₹1; if the stock price turns out to be ₹27, the value of th option will be zero. The risk free rate of interest is 10 percent. Determine the value of the call option. W have

$S(0) = ₹30$, $T = 0.25$ (3 months), $f(u) = 1$ if $S(0)u = ₹33$ and $f(d) = ₹0$ if $S(0)d = ₹27$. From this we find tha $u = 1.1$ and $d = 0.9$. The diagrammatic representation will be as follows:



Using equation (20.15), we can obtain the value of P as follows:

$$P = \frac{e^{0.10 \times 0.25} - 0.9}{1.1 - 0.9} = 0.626$$

Now, compute the value of P in equation (20.14) to get the value of option

$$f = e^{-0.10 \times 0.25} [0.626 \times 1 + (1 - 0.626) \times 0] = 0.6111$$

Source: Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017 , Page 20.17.

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Black-Scholes Model (BSM)

The Black-Scholes option pricing model was developed by Fisher Black, Myron Scholes and Robert Merton in 1973.

Assumptions

- The call option is the European option
- The underlying stock (asset) does not pay any dividend
- The asset price is continuous and is distributed lognormally
- Taxes and transactions costs are absent
- The restrictions on or penalties for short selling are absent
- The risk-free interest rate is known and constant
- There is no arbitrage opportunities exist in the market

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Black-Scholes Option Pricing Formula

- Value of the call option depends :
  - The current market price of the asset
  - Exercise price of the option
  - Time to maturity or time remaining to the expiration of the option contract
  - Level of market interest rates
  - Volatility or variability of the underlying asset price

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Black-Scholes Option Pricing Formula

- The following formula can be used to determine the price of a call option and a put option.

$$c = S \quad N(d_1) - Ke^{-rT}N(d_2)$$

$$p = Ke^{-rT}N(-d_2) - S \quad N(-d_1)$$

$$d_1 = \frac{\ln(S \quad /K) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

- C = Price of call option
- K = Strike price or exercise price of an option
- r= Risk free rate of interest
- S = The current price of the stock
- T= Time to maturity
- N(d_1) and N(d_2) as the normal distributions of d_1 and d_2.
- σ= Standard deviation or volatility of a stock

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Example

Take a non-dividend paying stock of current market price Rs.52 which is the underlying asset of an option of maturity 6 months and strike price Rs.50. If the risk free rate of interest is 10% per annum and volatility is 20%, then determine the price of call option and put option.

$Answer$: S_0=Rs.52, K=Rs.50, r=0.1, σ=0.2, T=0.5,

$d_1 = \frac{\ln(52/50) + (0.1 + 0.2^2/2)0.5}{0.2\sqrt{0.5}}$ = 0.7015,

d_2= 0.7015 – 0.141=0.560, N(d_1)= 0.758, N(d_2)=0.712

The normal distribution can be calculated using NORMSDIST function in excel.

$c = 52 * 0.758 - 50e^{-0.1*0.5} * 0.712$ = 5.56

Similarly, using the above values the put option can be calculated as

$$p = Ke^{-rT}N(-d_2) - S_0 N(-d_1)$$

$p = 50e^{-0.1*0.5} * 0.287 - 52 * 0.241$ = 1.12

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Interest Rate Swap

- A company agrees to pay cash flows equal to interest at a predetermined fixed rate on a notional principal and in return it receives the interest at a floating on same principal for same period of time
- Swaps are used to transform the nature of assets and liabilities

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Example

- Let there is a 3 year swap started on 15 March 2012 between the companies ABC and XYZ
- Company ABC agrees to pay an interest rate of 7 % per annum on a principal of Rs. 100 crore
- In return XYZ agrees to pay ABC 6-month LIBOR rate on the same principal
- ABC is the fixed player and XYZ is the floating rate player

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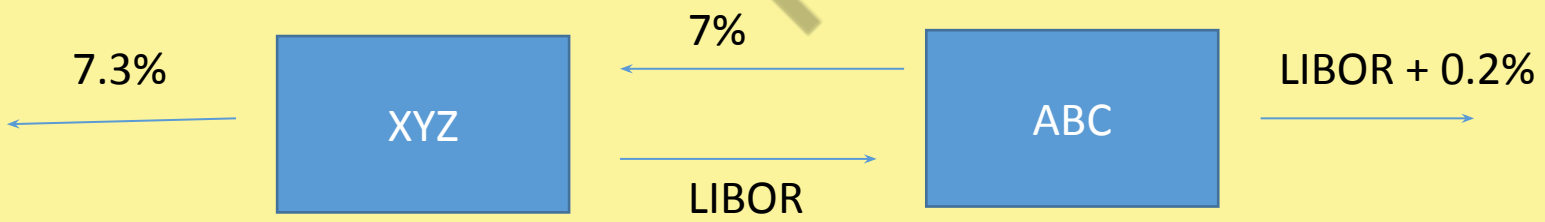
Cash Flow to ABC

Date	Six Month LIBOR rate	Floating Rate Cash Flow (Received)	Fixed Cash Flow (Paid)	Net Cash Flow
March 15, 2012	6.0			
Sept 15, 2012	6.2	3	-3.5	-0.5
March 15, 1013	7.4	3.1	-3.5	-0.4
Sept, 15, 2013	7.5	3.7	-3.5	0.2
March 15, 1014	7.8	3.75	-3.5	0.25
Sept, 15, 2014	8.0	3.9	-3.5	0.40
March 15, 2015		4.0	-3.5	0.50

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Using Swap to Transform a Liability

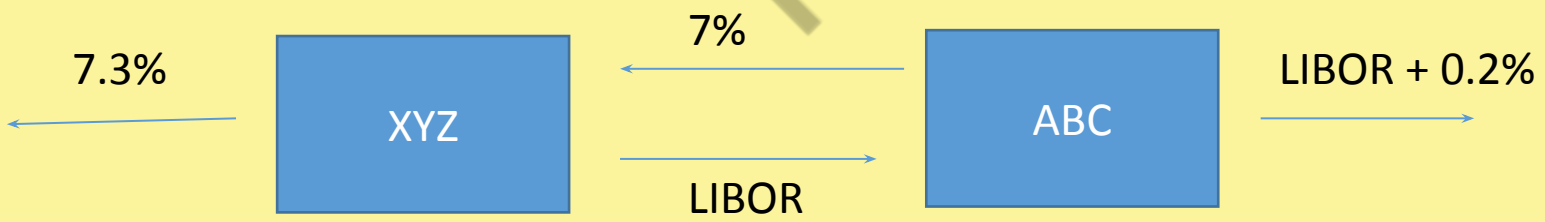
- For ABC this swap may be used to transform a floating rate loan into a fixed rate loan. How?
- Let ABC has borrowed Rs. 100 crore at LIBOR plus 20 basis point (from outside). After entering into swap the cash flows will be:
- It pays LIBOR plus 0.2% to the outside lender
- It receives LIBOR under the terms of swap
- It pays 7% under the terms of swap
- This arrangement makes the floating rate loan to fixed rate loan (7.2%)



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Using Swap to Transform a Liability

- Let ABC has borrowed Rs. 100 crore at 7.3% (from outside). After entering into swap the cash flows will be:
- It pays 7.3% to the outside lender
- It pays LIBOR under the terms of swap
- It receives 7% under the terms of swap
- This arrangement makes the fixed rate loan to floating rate loan (LIBOR + 0.3%)



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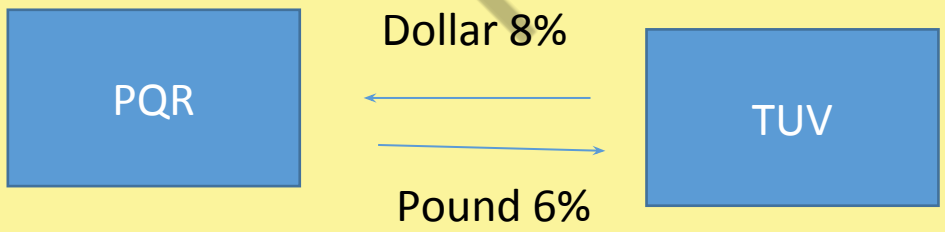
Currency Swap

- It involves exchanging principal and interest payments in one currency for principal and interest payments in another
- The principal amounts in each currency are usually exchanged at the beginning and at the end of the life of the swap
- Assume a currency swap between company PQR in USA and TUV in UK
- Entered into the contract on February 15, 2012
- It is a fixed vs fixed currency swap
- Interest payments are made once in a year
- Principal amounts are $20 million and £ 10 million
- PQR pays $20 million and receives £ 10 million

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Cash flow to PQR

Date	Dollar Cash Flow (Million)	Pound Cash Flow (Millions)
February 15, 2012	-20	+10
February 15, 2013	+1.60	-0.60
February 15, 2014	+1.60	-0.60
February 15, 2015	+1.60	-0.60
February 15, 2016	+1.60	-0.60
February 15, 2017	+21.60	-10.60



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References

- Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017.
- Hull, John C. *Options, Futures, and Other Derivatives*, 9th Edition, Pearson, 2014.

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Financial Institutions and Markets

Prof. Jitendra Mahakud
Department of Humanities and Social Sciences
Indian Institute of Technology Kharagpur

Derivatives Market-V

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Participants in Derivatives Market in India

- SEBI
- Stock Exchanges
- Financial Institutions
- Retail Investors

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Reforms in Derivatives Market in India

- L. C. Gupta Committee (1997)
  - Introduction of financial derivatives
- J. R. Varma Committee (1998)
  - Issues related to risk management and margin trading
- V. K. Sharma Commiittee (2007)
  - Development of interest rate future market

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Financial Derivatives Trading in India

- Three types of financial derivatives such as **equity linked derivatives**, **currency derivatives** and **interest rate derivatives** are traded in the Indian market
- The major financial derivative instruments which are traded in Indian market are (i) index futures, (ii) index options, (iii) stock futures, (iv) stock options, (v) interest rate futures and (vi) rupee currency.

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Financial Derivatives Trading in India Cont…

- Derivatives trading in India began in 2000 when both the NSE as well as the BSE commenced trading in equity derivatives.
- The currency derivatives segment at the NSE commenced operations on August 29, 2008 with the launch of currency futures trading in US Dollar-India Rupee (USD-INR). Other currency pairs such as Euro-INR, Pound Sterling-INR, and Japanese Yen-INR were made available for trading on February 1, 2010.
- Interest rate futures were introduced on August 31, 2009. Currency options trading in USD-INR was started on October 29, 2010.

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Financial Derivatives Trading in India Cont…

- The Futures & Options (F & O) trading system of NSE is called NEAT-F&O trading system. It supports an order-driven market and provides complete transparency of trading operations.
- The National Securities Clearing Corporation Limited (NSCCL) undertakes the clearing and settlement of all trades executed on the futures and options (F&O) segment of NSE.
- Index as well as stock options and futures are cash settled (i.e. through exchange of cash).

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Eligibility Criteria for Stocks for F&O Trading

- The stock is chosen from among the top 500 stocks in terms of average daily market capitalisation and average daily traded value in the previous six months on a rolling basis.
- The stock's median quarter-sigma order size over last six months should be not less than Rs.10 lakh.
- The market-wide position limit in the stock should not be less than Rs.300 crore. The market-wide position limit (number of trades) is valued taking the closing prices of stocks in the underlying cash market on the date of expiry of the contract in the month. The market-wide position limit of open position (in terms of the number of underlying stock) on futures and options contracts on a particular underlying stock shall be 20% of the number of shares held by non-promoters in the relevant underlying security)
- For an existing F&O stock, the continued eligibility criteria is that the market-wide position limit in the stock shall not be less than Rs.200 crore and stock's median quarter-sigma order size over last six months shall be not less than Rs.5 lakh.
- The stock's average monthly turnover in the derivative segment over last three months should not be less than Rs.100 crore.

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Eligibility Criteria for Indices for F&O Trading

- The exchange may consider introducing derivative contracts on an index if the stocks contributing to 80 % weightage of the index are individually eligible for derivative trading.
- No single ineligible stocks in the index should have a weightage of more than 5% of the index. This criterion is applied for every month. If the index fails to meet the eligibility criteria for three months consecutively, then no fresh contract would be issued on that index.

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Critique of Derivatives

- Speculative Nature
- Increase in Risk
- Instability of the Financial System
- Increase in Credit Risk
- Displacement Effect
- Increased Regulatory Burden

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Some Facts

- More than 70 per cent of the volume of turnover was accounted for by the NSE
- Index futures, stock futures and index options are the major derivatives in India at present. These three types of derivatives instrument accounted for more than 95 percent of total turnover in the equity derivative segment of the derivatives market in India.
- All derivative contracts are currently cash settled.
- The interest rate and currency derivatives market in India have not grown in the same pace with equity derivative segment.
- In terms of trading value NSE has dominated both the segments. For interest rate derivatives it has accounted for more than 90 percent and for currency derivatives also it was more than 90 percent up to 2013-14 and in the year 2014-15 the share of BSE has increased to 38.7 percent

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- Bhole, L. M., and Mahakud, J. *Financial institutions and markets: structure, growth and innovations, 6e*. Tata McGraw-Hill Education, 2017.

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