

8. Derivative (Future).

① Future is a contract to buy/sell an underlying on specified future date at a price agreed today.

② Initial margin

(a) For Stock Future

$$\left[\text{Average daily absolute change} + (3.5 \times \sigma) \right]$$

(b) For Index Future

$$\left[\text{Average daily absolute change} + (3 \times \sigma) \right]$$

③ Long position $\rightarrow$ Buy (beneficial when price of underlying is expected to move up)

Short position $\rightarrow$ Sell (beneficial when price of underlying is expected to move down)

④ Investment value = Initial margin + Commission paid for Contract

$$\text{⑤ Gain \%} = \frac{\text{Gain}}{\text{Investment}} \times 100$$

⑥ Fair price of stock future

(a) In case of normal compounding $\rightarrow [\text{Spot price} \times (1+i)^n] - \text{Future value of dividend}$

(b) In case of Continuous compounding $\rightarrow [\text{Spot price} \times e^{rt}] - \text{Future value of dividend}$

⑦ Fair price of Index future

(a) In case of normal compounding $\rightarrow \text{Spot price of Index} \times (1 + (r - DY)^n)$

(b) In case of Continuous compounding $\rightarrow \text{Spot price of Index} \times e^{(r - DY) \times t}$

here $DY = \text{Dividend yield}$

⑧ Contango $\rightarrow$ If future price is more than spot price.

⑨ Backwardation $\rightarrow$ If spot price is more than future price.

$$(10) \text{ Beta of Security} = \frac{\% \text{ Change in Security Price}}{\% \text{ Change in Nifty}}$$

(or)

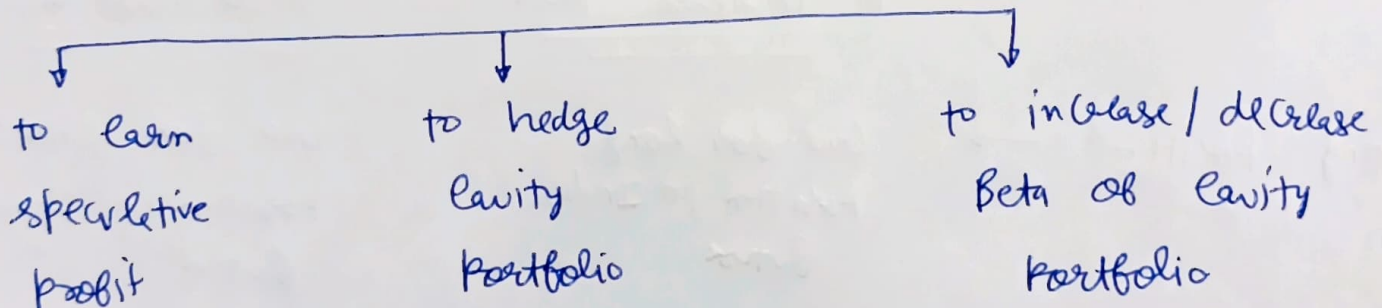
$$\frac{\sigma_{\text{Spot price}} \times \gamma_{(S,F)}}{\sigma_{\text{Future price}}}$$

here

$\gamma_{(S,F)}$ = Correlation between spot price & future price

$$(11) \text{ Beta of Portfolio} = \frac{\% \text{ Change in Portfolio value}}{\% \text{ Change in Nifty}}$$

(12) use of Index future



(13) How to hedge Equity portfolio using Index future

↓
We can hedge Equity portfolio by taking opposite position.

For example → Existing position in Equity = Long

↓
then take short position in Index future for hedging

$$\text{Value of Index future to be short} = \text{Value of Equity portfolio} \times \text{Beta of portfolio}$$

(14) How to Increase/Decrease Beta of Equity portfolio using Index future

<u>Existing position</u>	Action to be taken to <u>increase beta</u>	Action to be taken to <u>decrease beta</u>
Long position →	Go for long position in Index future	Go for short position in Index future
Short position →	Go for short position in Index future	Go for long position in Index future

(15) value of $e \rightarrow 2.71828$

(16) Beta of Cash & Cash equivalent is 0.

(17) Arbitrage is not possible for Index future.

(18) How to convert annually compounded rate into
Continuously Compounded rate

For example $\rightarrow$ 2% p.a. compounded annually

$$e^{rt} = (1+i)^t$$

$$e^{r \times 1} = (1+2\%)^1$$

$$e^r = 1.02$$

Taking log on both side -

$$r \cdot \log e = \log 1.02$$

$$r \times 1 = \log 1.02$$

$$r = \log 1.02$$

$$r = 1.98\%$$

Hence rate of interest is 1.98% compounded continuously.