

$$B_P = \frac{(170 \times 1.60) + (30 \times 0)}{200}$$

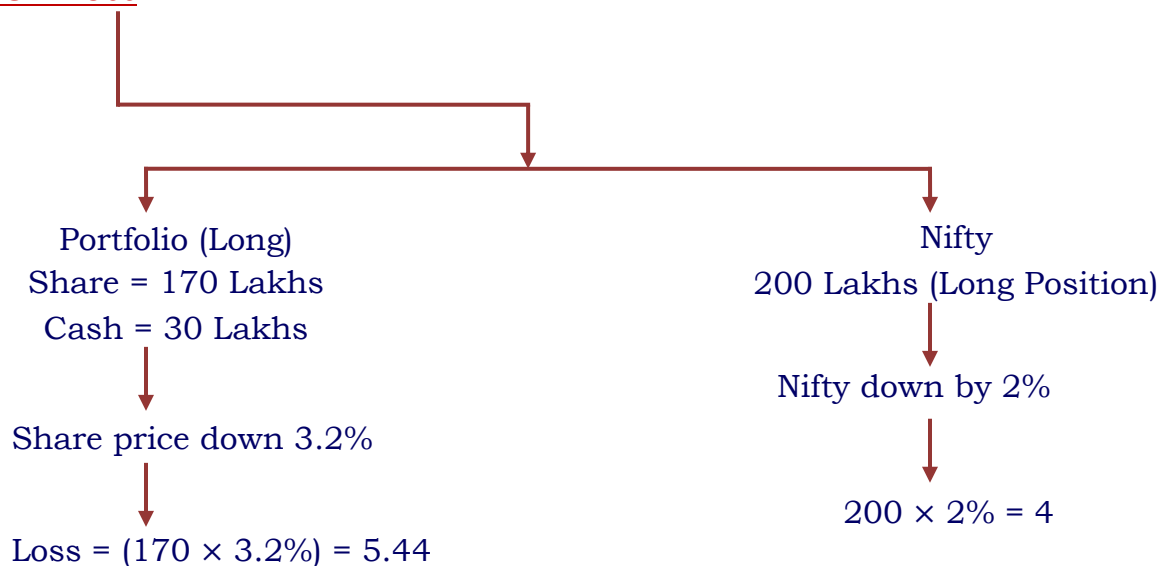
$$= 1.36$$

(II) Beta After 3 Months

Price of shares dropped by 3.2%, It means Nifty dropped by

$$\beta = \frac{\Delta \text{ Stock}}{\Delta \text{ Market}} = 1.6 = \frac{3.2}{2\%} = 2\%$$

Gain OR Loss



Overall Gain OR Loss = 5.44 + 4 = 9.44

$$\text{Loss in (\%)} = \frac{9.44}{200} \times 100 = 4.72\%$$

$$\text{Beta} = \frac{4.72\%}{2\%} = 2.36$$

Question – 33

Mr. SG sold five 4-Month Nifty Futures on 1st February 2020 for ₹ 9,00,000. At the time of closing of trading on the last Thursday of May 2020 (expiry), Index turned out to be 2100. The contract multiplier is 75.

Based on the above information calculate:

- (i) The price of one Future Contract on 1st February 2020.

- (ii) Approximate Nifty Sensex on 1st February 2020 if the Price of Future Contract on same date was theoretically correct. On the same day Risk Free Rate of Interest and Dividend Yield on Index was 9% and 6% p.a. respectively.
- (iii) The maximum Contango/Backwardation.
- (iv) The pay-off of the transaction.

Note: Carry out calculation on month basis.

(RTP November – 2020)

Solution:

(i) Price of One Future Contract

$$\text{Price} = \frac{\text{₹ } 9,00,000}{5} = \text{₹ } 1,80,000$$

$$F = \frac{\text{₹ } 1,80,000}{75} = 2,400$$

(ii) Spot Price

$$F = S [1 + (r - d)t]$$

$$2,400 = S [1 + (0.09 - 0.06)4/12]$$

$$S = 2,376$$

(iii) Contango/Backwardation

Generally, Future is more than Spot, if Future is more than Spot it is called “सीधा बदला” [Contango]. If $S > F$, उल्टा बदला [Backwardation]

$$\text{Basis} = S - F \quad \text{Negative} \rightarrow \text{Contango}$$

$$\text{Positive} \rightarrow \text{Backwardation}$$

$$\text{Maximum Contango} = (2,376 - 2,400)$$

$$= \text{₹ } 24$$

(iv) Gain or Loss

$$\begin{aligned} \text{Gain on Short Position} &= (2,400 - 2,100) \times 75 \times 5 \\ &= ₹ 1,12,500 \end{aligned}$$

Question – 34

A Mutual Fund is holding the following assets in ₹ Crores :

Investments in diversified equity shares	90.00
Cash and Bank Balances	<u>10.00</u>
	100.00

The Beta of the equity shares portfolio is 1.1. The index future is selling at 4300 level. The Fund Manager apprehends that the index will fall at the most by 10%. How many index futures he should short for perfect hedging? One index future consists of 50 units.

Substantiate your answer assuming the Fund Manager's apprehension will materialize.

(SM TYK – 07)

Solution:

No. of Contracts

$$\begin{aligned} &= \frac{V_p(B_T - B_P)}{F \times M \times B_F} \\ &= \frac{₹ 90 \text{ Cr. } (0 - 1.10)}{4,300 \times 50 \times 1} = 4,605 \text{ Contracts Short} \end{aligned}$$

Substantiate

If Nifty by 10%

Loss on Equity	(90 × 10% × 1.1)	9.90 Cr.
Gain on Nifty	(4,300 × 50 × 4,605) × 10%	9.90 Cr.
		<hr/>
		0

Question – 35

Shyam buys 10,000 shares of X Ltd., @ ₹ 25 per share and obtains a complete hedge of shorting 400 Nifty at ₹ 1,100 each. He closes out his position at the closing price of the next day when the share of X Ltd., has fallen by 4% and Nifty Future has dropped by 2.5%.

What is the overall profit or loss from this set of transaction?

(Exam January – 2021)

Solution:**Today Investment**

Long Position in X Ltd. (10,000 × 25) = 2,50,000

Short Position in Nifty (400 × 1,100) = 4,40,000

Calculation of Profit/Loss

Loss on Long Position of X Ltd (2,50,000 × 4%) = 10,000

Gain on Short Position of Nifty (4,40,000 × 2.5%) = 11,000

Overall Gain = 1,000

Alternative**Cash Flow Today (Initial Cashflows)**

Buy X Ltd share (2,50,000)

Sell Nifty + 4,40,000

Net Cash Inflow 1,90,000

Cash Flow Next Day (Cashflow @ Closes Out)

Sell X Ltd. (10,000 × 25 × 96%) + 2,40,000

Buy Nifty (4,40,000 × 97.5%) (4,29,000)

Net Cash Outflow 1,89,000

Gain or Loss = 1,90,000 – 1,89,000 = 1,000 Profit.

Question – 36

Which position on the index future gives a speculator, a complete hedge against the following transactions:

- (i) The share of Right Limited is going to rise. He has a long position on the cash market of ₹ 50 lakhs on the Right Limited. The beta of the Right Limited is 1.25.
- (ii) The share of Wrong Limited is going to depreciate. He has a short position on the cash market of ₹ 25 lakhs on the Wrong Limited. The beta of the Wrong Limited is 0.90.
- (iii) The share of Fair Limited is going to stagnant. He has a short position on the cash market of ₹ 20 lakhs of the Fair Limited. The beta of the Fair Limited is 0.75.

(SM TYK – 09)

Solution:

Statement Showing Position in Nifty

Company	Position in Cash Market	Amount	Beta	Position in Future
Right Ltd.	Long	50,00,000	1.25	62,50,000 Short
Wrong Ltd.	Short	25,00,000	0.9	22,50,000 Long
Fair Ltd.	Short	20,00,000	0.75	15,00,000 Long
Net Position in Future				25,00,000 Short

Question – 37

Ram buys 10,000 shares of X Ltd. at a price of ₹ 22 per share whose beta value is 1.5 and sells 5,000 shares of A Ltd. at a price of ₹ 40 per share having a beta value of 2. He obtains a complete hedge by Nifty futures at ₹ 1,000 each. He closes out his position at the closing price of the next day when the share of X Ltd. dropped by 2%, share of A Ltd. appreciated by 3% and Nifty futures dropped by 1.5%.

What is the overall profit/loss to Ram?

(SM TYK – 10)

Solution:

Statement Showing Net Position in Nifty

Company	Position in Cash Market	Amount	Beta	Position in Future
X Ltd.	Long	2,20,000	1.5	3,30,000 Short
A Ltd.	Short	2,00,000	2	4,00,000 Long
Net Position in Nifty				70,000 Long

$$\text{No. of Contract} = \frac{70,000}{1,000} = 70 \text{ Contracts Long}$$

Overall Profit/Loss

Loss in Long Position of X Ltd. (2,20,000 × 2%)	= 4,400
Loss on Short Position of A Ltd. (2,00,000 × 3%)	= 6,000
Loss on Long Position of Nifty (70,000 × 1.5%)	= 1,050
Overall Loss	<u>= 11,450</u>

Question – 38

On 1 April 2015, Sunidhi was holding a portfolio of 10 securities whose value was ₹ 9,94,450, the weighted average of beta of 9 securities was 1.10.

Since she was expecting a fall in the prices of the shares in near future to hedge her portfolio she sold 5 contract of NIFTY Futures (Multiplier of 25) expiring in May 2015, which was trading at 8767.07 on 1 April.

- Calculate the beta of the 10th security.
- Reconcile the reasons in spite of 2% fall in the market as per Sunidhi's apprehension if she would have earned some profit on her cash position.

(MTP March – 2018)

Solution:

- To compute the beta of 10th security first we shall compute overall weighted beta as follows:

Let weighted β be w , then

$$5 = \frac{9,94,450}{8,767.07 \times 25} \times w$$

$$w = 1.102 \text{ approximately}$$

Let beta of 10th security is β then,

$$1.102 = 0.90 \times 1.10 + 0.10 \times \beta$$

$$\beta = 1.12$$

- (ii) The main reason for the profit in cash position might due to reason that contrary to her expectation fall in the value of cash position there may be increase in value of cash position.

(VIII) COMODITY FUTURE

Question – 39

The following information is available about standard gold.

Spot Price (SP)	₹ 15,600 per 10 gms.
Future Price (FP)	₹ 17,100 for one year future contract
Risk free interest Rate (R) ^f	8.5%
Present Value of Storage Cost	₹ 900 per year

From the above information you are requested to calculate the Present Value of Convenience yield (PVC) of the standard gold.

Solution:

$$\text{Future Price} = (\text{Spot Price} + \text{Present Value of Storage Cost} - \text{Present Value of Convenience Yield}) (1 + r)$$

$$17,100 = (15,600 + 900 - x) (1.085)$$

$$\text{PVCY} = 740$$

Question – 40

A company is long on 10 MT of copper @ ₹ 534 per kg (spot) and intends to remain so for the ensuing quarter. The variance of change in its spot and future prices are 16% and 36% respectively, having correlation coefficient of 0.75. The contract size of one contract is 1,000 kgs.

Required:

- (i) Calculate the Optimal Hedge Ratio for perfect hedging in Future Market.
- (ii) Advice the position to be taken in Future Market for perfect hedging.
- (iii) Determine the number and the amount of the copper futures to achieve a perfect hedge.

(RTP November – 2021)**Solution:**

- (i) The optional hedge ratio to minimize the variance of Hedger's position is given by:

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

Where,

 σ_S = Standard deviation of ΔS (Change in Spot Prices) σ_F = Standard deviation of ΔF (Change in Future Prices) ρ = Coefficient of correlation between ΔS and ΔF

H = Hedge Ratio

 ΔS = Change in spot price. ΔF = Change in Future price.

Accordingly

Standard deviation of $\Delta S = \sqrt{16\%} = 4\%$ andStandard deviation of $\Delta F = \sqrt{36\%} = 6\%$ and

$$H = 0.75 \times \frac{0.04}{0.06} = 0.5$$

- (ii) Since the company is long position in Spot (Cash) Market it shall take Short Position in Future Market.
- (iii) Since contract size of one contract is 1,000 Kg,

$$\text{No. of contract to be short} = \frac{10,000 \text{ Kgs}}{1,000 \text{ Kgs}} \times 0.50 = 5 \text{ Contracts}$$

$$\text{Amount} = ₹ 5,000 \times 534 = ₹ 26,70,000$$

Question – 41

A Rice Trader has planned to sell 22,000 kg of Rice after 3 months from now. The spot price of the Rice is ₹ 60 per kg and 3 months Future on the same is trading at ₹ 59 per kg. Size of the contract is 1000 kg. The price is expected to fall as low as ₹ 56 per kg, 3 months hence.

Required:

- (i) To interpret the position of trader in the Cash Market.
- (ii) To advise the trader the trader should take in Future Market to mitigate its risk of reduced profit.
- (iii) To demonstrate effective realized price for its sale if he decides to make use of future market and after 3 months, spot price is ₹ 57 per kg and future contract price for closing the contract is ₹ 58 per kg.

(RTP Nov – 2020 & MTP May – 2019)

Solution:

- (1) Rice Trader hold the stock for 3 months & expects that price rise. Hence, he has Long Position in cash market.
- (2) He should take Short Position in future market to hedge risk of price fall.
- (3) Effective Realized Price per kg.

Sell (22,000 kg × ₹ 57)	= ₹ 12,54,000
(+) Gain on short position (59 – 58) × 22,000	= ₹ 22,000
Total	= ₹ 12,76,000
(÷) Quantity	= ₹ 22,000
Effective Price	= ₹ 58/kg

Question – 42

A call option on gold with exercise price ₹ 26,000 per ten gram and three months to expire is being traded at a premium of ₹ 1,010 per ten gram. It is expected that in three months time the spot price might change to ₹ 27,300 or 24,700 per ten gram. At present this option is at-the-money and the rate of

interest with simple compounding is 12% per annum. Is the current premium for the option justified?

Evaluate the option and comments.

Solution:

Risk Neutral

Step 1: Risk Neutral Probability

$$R = 1.03$$

$$u = \frac{27,300}{26,000} = 1.05$$

$$d = \frac{24,700}{26,000} = 0.95$$

$$P = \frac{R - d}{u - d}$$

$$= \frac{1.03 - 0.95}{1.05 - 0.95} = 0.8$$

Step 2: Value of Call

$$C_0 = \frac{(1,300 \times 0.8) + (0 \times 0.2)}{1.03}$$

$$= 1,010$$

REAL OPTION

Question - 43

IPL already in production of Fertilizer is considering a proposal of building a new plant to produce pesticides. Suppose the PV of proposal is ₹ 100 crore without the abandonment option. However, if market conditions for pesticide turns out to be favorable the PV of proposal shall increase by 30%. On the other hand, market conditions remain sluggish the PV of the proposal shall be reduced by 40%. In case company is not interested in continuation of the project it can be disposed of for ₹ 80 crore.