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FINLATICS CASE PROJECT 2/ ABDUL RAHMAN

QUESTION 1

A stock investor, Mr. B has many of his holdings in a chemical company. The sector has been facing constant pressure due to factors like supply issues and an increase in raw material prices. The stock can be categorized as a mid-cap segment share. Mr.B can be categorized as a Risk-Averse investor (A person who hates taking risks and would only take risks if the risk-reward ratio is favorable).

Due to the uncertainty in the sector, the stock-associated risk has increased and is going beyond the tolerance level of the investor. In a week, the quarter results of the company will be announced, and already the volatility has spiked in the share.

The investors are speculating over the margin improvement and the management guidance of the company as the peers delivered sub par and poor results. Considering the above situations, the investor is trying to evaluate how he can hedge his position so that when the results get announced and if the results are subpar, he can restrict his losses, but at the same time, he does not want to lose out on potential gains. His average cost of buying the stock is Rs. 95, and currently, the stock is trading at Rs. 100. An Option is available with a strike price of Rs. 100 and option premium of Rs. 3, slated to expire in a week, coinciding with the result announcement of the company.

Based on the market expectation and volatility, if the company's results are sub-par, then the market price is expected to be around Rs. 90 - 95, while if the results are above expectation, the price is expected to be around Rs. 105 - Rs. 110. The probability of a sub-par result is 0.6, while the probability of an above-par result is 0.4.

Consider the following conditions:

- 1.Mr. B buys a call option by paying a premium of Rs. 3 with a strike price of Rs. 100.
- 2.Mr. B buys a put option by paying a premium of Rs. 3 with a strike price of Rs. 100.

For both conditions, create a tree stating a bullish and bearish scenario. Indicate when he would exercise the option and when would let it expire. If possible, share the expected payoff of exercising the option today

SCENARIO ANALYSIS FOR MR. B'S OPTIONS

Market Expectations

- Probability of sub-par result (Bearish) = 0.6
- Probability of above-par result (Bullish) = 0.4

A.) CALL OPTION

- Premium Paid: Rs. 3
- Strike Price: Rs. 100

Call option in Bullish Scenario (Rs 105-110) (Above-par results)

Action : Exercise the option

- Market Price = Rs. 105
 - Gain = Market Price - Strike Price - Premium = $105 - 100 - 3 = \text{Rs.}2$
- Market Price = Rs. 110
 - Gain = Market Price - Strike Price - Premium = $110 - 100 - 3 = \text{Rs.}7$

Expected Gain for Call Option in Bullish Scenario

$$\text{Expected Gain (Bullish)} = (0.4) \times \left(\frac{2+7}{2} \right) = 0.4 \times 4.5 = \text{Rs.}1.8$$

Call option in Bearish Scenario (Sub-par results)

Action : Do not Exercise the option

Expected Gain/Loss for Call Option in Bearish Scenario

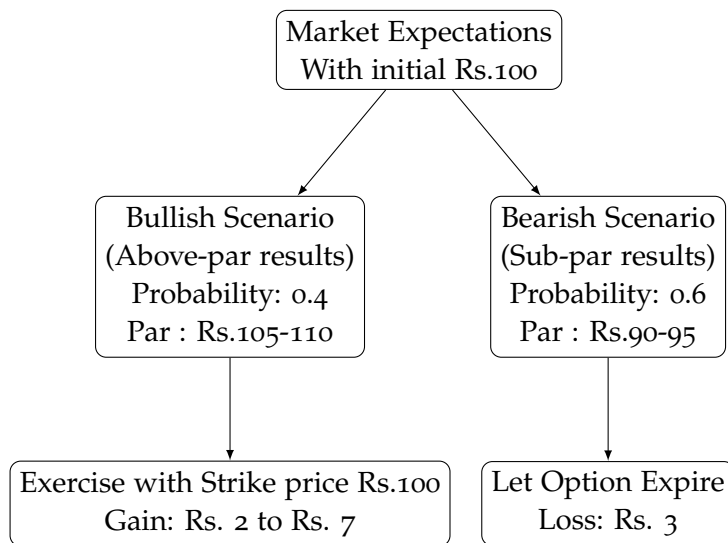
Pay only option price(premium) : Loss Rs.3

$$= 0.6 \times (-3) = -\text{Rs.}1.8$$

Expected Total Payoff in call option

$$= 0.4(4.5) + 0.6(-3) = 0$$

DECISION TREE FOR CALL OPTION



Expected Payoff:
Call Option: Rs.0.00

B.) PUT OPTION

- Premium Paid: Rs. 3
- Strike Price: Rs. 100

Put Option in Bullish Scenario(Rs.105-110)

Action: Do not exercise the option

- Market Price = Rs. 105 - Rs. 110
 - Action: Let the option expire
 - Loss = Premium paid = Rs. 3
 - Expected Loss = $0.4 \times (-3) = -Rs.1.2$

Put option in Bearish Scenario (Rs.90-95)(Sub-par results)

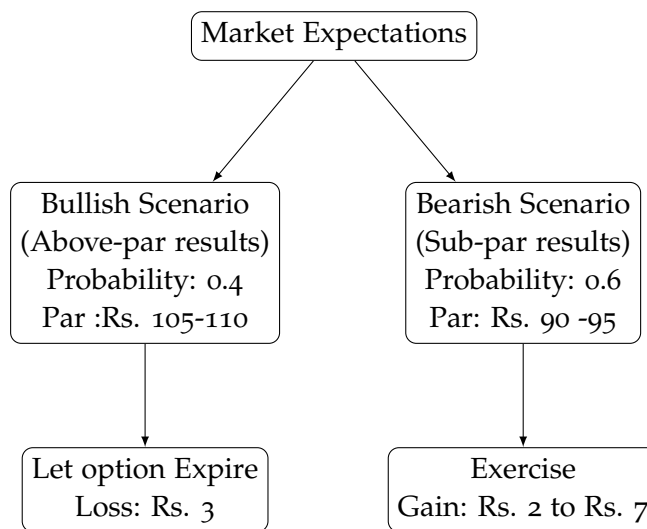
- Market Price = Rs. 90
 - Gain = Strike Price - Market Price - Premium = $100 - 90 - 3 = Rs.7$
- Market Price = Rs. 95
 - Gain = Strike Price - Market Price - Premium = $100 - 95 - 3 = Rs.2$

Expected Gain for Put Option in Bearish Scenario

$$\text{Expected Gain (Bearish)} = (0.6) \times \left(\frac{7+2}{2} \right) = 0.6 \times 4.5 = \text{Rs.}2.7$$

Expected total payoff for Put option

$$\text{Expected Payoff (Put Option)} = (0.6) \times 4.5 + (0.4) \times (-3) = 2.7 - 1.2 = \text{Rs.}1.5$$

DECISION TREE FOR PUT OPTION

Expected Payoff:
Put Option: Rs.1.50 (profit)

QUESTION 2**SOLUTION****Hedging Currency Risk for ABC Ltd.**

ABC Ltd is a trading company in India which deals in plastic manufacturing. They source their material from China and sell it in the USA and European Union. Material sourcing is done in Yuan, and sales are done in Dollars and Euros. As their business is international, they are exposed to currency fluctuations and currency risk on both the purchasing and sales sides. The typical business cycle of the company is:

- **Day 1:** ABC Ltd. orders with the Chinese vendor and pays 30%.
- **Day 30:** The Chinese vendor loads cargo, and ABC Ltd makes 70% of the payment to the Chinese vendor.

- **Day 45 - 50:** ABC Ltd. receives orders from US and European customers for its products and gets 10% as advance payment.
- **Day 60 :** The goods are received in India.
- **Day 90:** Goods are shipped to the US and Europe after value addition at ABC Ltd's factory near Mumbai.
- **Day 135:** Goods are delivered in Europe, and the balance of 90% of the payment is received.
- **Day 180:** Goods are delivered in the US, and the balance 90% of payment is received.

The finance team of the company is trying to work out a plan of action or strategy to use futures & options to mitigate the currency risk associated with the business.

SOLUTION

Rather , than being theoretical , I think assuming certain prices in real market makes the scenario more lively and easy to explain.

POINTS OF CURRENCY RISK EXPOSURE

1. Day 1 & Day 30: Payment to Chinese Vendor (Yuan Exposure)

Example:

- Total order cost in Yuan: CNY 1,000,000.
- That is ABC ltd show pay CNY : 1,000,000 (total payment)
- Current exchange rate: 1 CNY = 11 INR.

Risk: If the Yuan (CNY) appreciates against the Indian Rupee (INR), ABC Ltd. will have to pay more in INR to settle their payments.

Hedging with Yuan Futures Contracts

- Initial Payment (Day 1): 30% of CNY 1,000,000 = CNY 300,000. At 1 CNY = 11 INR, ABC Ltd. pays $300,000 \times 11 = \text{INR } 3,300,000$.
- Remaining Payment (Day 30): 70% of CNY 1,000,000 = CNY 700,000.
- To hedge, ABC Ltd. enters into a futures contract to buy CNY 700,000 at the rate of 11 INR.

If the Yuan appreciates to 12 INR by Day 30:

- Without hedging: $700,000 \times 12 = \text{INR } 8,400,000$.
- With futures contract: $700,000 \times 11 = \text{INR } 7,700,000$.
- Savings: $\text{INR } 8,400,000 - \text{INR } 7,700,000 = \text{INR } 700,000$.

Drawback of future contract

What if, the exchange rate instead of appreciating ,starts to depreciate? That is becomes less than 11 INR per yuan . So we need option contract for building up the strategy.

Hedging with Yuan Call Options

ABC Ltd. buys a call option to purchase CNY 700,000 at a strike price of 11 INR per CNY, paying a premium (e.g., say , 0.5 INR per CNY).

Premium cost: $700,000 * 0.5 = \text{INR } 350,000$.

If the Yuan appreciates to 12 INR:

- Exercise the option, paying $700,000 * 11 = \text{INR } 7,700,000$ (plus the premium INR 350,000).
- Total cost: $\text{INR } 7,700,000 + \text{INR } 350,000 = \text{INR } 8,050,000$.
- Savings: $\text{INR } 8,400,000 - \text{INR } 8,050,000 = \text{INR } 350,000$.

2. Day 45 - 50: Receipt of Advance Payments (USD and EUR Exposure)**Example:**

- Order value in USD: USD 200,000.
- Current exchange rate: 1 USD = 83 INR.

Risk: If the USD or EUR depreciates against the INR, the value of the advance payments received will be lower when converted to INR.

Hedging with USD Futures Contracts

- Advance Payment (Day 45): 10% of USD 100,000 = USD 10,000. At 1 USD = 83 INR, ABC Ltd. receives $10,000 * 83 = \text{INR } 8,30,000$.
- Final Payment (Day 180): 90% of USD 100,000 = USD 90,000. To hedge, ABC Ltd. enters into a futures contract to sell USD 90,000 at the rate of 83 INR per USD.

If the USD depreciates to 80 INR by Day 180:

- Without hedging: $90,000 * 83 = \text{INR } 7,470,000$.
- With futures contract: $90,000 * 80 = \text{INR } 7,200,000$.
- Savings: $\text{INR } 7,470,000 - \text{INR } 7,200,000 = \text{INR } 270,000$

Hedging with USD Put Options

ABC Ltd. buys a put option to sell USD 90,000 at a strike price of 83 INR per USD, paying a premium (e.g., 2 INR per USD).

Premium cost: $90,000 * 2 = \text{INR } 180,000$.

If the USD depreciates to 80 INR:

- Exercise the option, receiving $90,000 * 83 = \text{INR } 7,470,000$ (minus the premium $\text{INR } 180,000$).
- Total revenue: $\text{INR } 7,470,000 - \text{INR } 180,000 = \text{INR } 7,290,000$
- Savings: $\text{INR } 7,290,000 - \text{INR } 7,200,000 = \text{INR } 90,000$.

3. Day 135: Receipt of Final Payment from European Customers (EUR Exposure)

Example:

- Order value in EUR: $\text{EUR } 150,000$.
- Current exchange rate: $1 \text{ EUR} = 85 \text{ INR}$.

Risk: If the EUR depreciates against the INR, the value of the final payment received will be lower when converted to INR.

Hedging with EUR Futures Contracts

- Final Payment (Day 135): $\text{EUR } 150,000$. To hedge, ABC Ltd. enters into a futures contract to sell $\text{EUR } 150,000$ at the rate of 85 INR .

If the EUR depreciates to 80 INR by Day 135:

- Without hedging: $150,000 * 80 = \text{INR } 12,000,000$.
- With futures contract: $150,000 * 85 = \text{INR } 12,750,000$.
- Savings: $\text{INR } 12,750,000 - \text{INR } 12,000,000 = \text{INR } 750,000$.

Hedging with EUR Put Options

ABC Ltd. buys a put option to sell $\text{EUR } 150,000$ at a strike price of 85 INR per EUR, paying a premium (e.g., 1.5 INR per EUR).

Premium cost: $150,000 * 1.5 = \text{INR } 225,000$.

If the EUR depreciates to 80 INR:

- Exercise the option, receiving $150,000 * 85 = \text{INR } 12,750,000$ (minus the premium $\text{INR } 225,000$).
 - Total revenue: $\text{INR } 12,750,000 - \text{INR } 225,000 = \text{INR } 12,525,000$.
 - Savings: $\text{INR } 12,525,000 - \text{INR } 12,000,000 = \text{INR } 525,000$.
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