

Unit -1

1. Define the term “Financial derivatives”. Elucidate the key features of financial derivatives.
2. Compare and contrast the similarities and differences between the cash market and derivative market.
3. Elucidate the merits and demerits of financial derivatives
4. Name different types of derivatives and describe what makes each type unique in terms of its features.
5. Outline the similarities and dissimilarities between Forwards, Futures, Options and Swaps.
6. Differences between forward contract and future contracts
7. Discuss the advantages and disadvantages of forward contract.
8. Who are the key participants in the derivatives market? Explain their roles.
9. Compare and contrast between hedging, speculation, and arbitrage.
10. Discuss the evolution and growth of derivative market in india
11. Differentiate between exchange-traded and over the counter (OTC) derivatives.
12. Enumerate the factors contributing to the growth of financial derivatives.
13. Discuss the various types of financial derivatives.
14. What do you mean by Derivatives? Discuss the various types of Derivatives available in India.

Unit-2

1. Define the concept “futures contracts”. State its features.
2. What is a future contract? Discuss various types of future contracts.
3. Distinguish between forwards and futures.
4. What is margin money? What are the different forms of margin money?
5. Classify the various types of orders in futures trading.
6. What is the role of clearing houses in future contracts? Elucidate the purpose of a margin requirement in future trading.
7. Who are the different types of members in Indian stock exchanges? Explain each.
8. Suppose that on January 1 price of Reliance is ₹450 and two parties enter a forward contract for delivery of 1000 shares on April 15 at a price of ₹ 460. Find out the profit\Loss profile of seller if the price of reliance share turns out to be 1) ₹ 470 2) ₹400 on April 15.
9. Consider a three-month futures contract on a stock index. Assume that the stock index provides a continuous dividend yield of 3% per annum. The current value of the stock index is ₹900, and the continuously compounded risk-free interest rate is 8% per annum. Determine the futures price of the index.
10. Consider a three-month forward contract on a stock. the underlined stock is available ₹ 70. With continuously compounding risk-free of 8% p.a Find out Forward price for each of the scenarios.
 - When the stock does not pay dividend.
 - When the stock pays a dividend of 5%
 - When the stock pays a dividend of ₹ 1.50/-
11. On 1st April 2018, a stock is expected to pay dividends of ₹2.10 per share at $t = 2$ months and again at $t = 5$ months. The current spot price of the stock at time $t = 0$ is ₹50. The continuously compounded risk-free interest rate is 24% per annum for all maturities. Calculate the no-arbitrage forward price of a 6-month forward contract on this stock.
12. A stock index futures contract is set to expire in six months. Given the following information:
 - The stock index provides a dividend yield of 4% per annum.
 - The current value of the stock index is ₹1,200.
 - The continuously compounded risk-free interest rate is 6% per annum.

Determine the futures price of the stock index for this contract.

Unit-3

1. Distinguish between option and future contracts.
2. What is a covered call? Draw the pay-off diagram with suitable example.
3. Recall and explain the key terminology used in option contracts.
4. Compare and contrast options and futures. Discuss with examples and highlight their respective advantages.
5. Discuss any two trading strategies involving options. Illustrate with examples and payoff structures.
6. Discuss the margining system in options trading. How is it different from futures margining?
7. What is a covered call? Draw the pay-off diagram with suitable example.
8. Distinguish between the straddle and strangle option trading strategies.
9. Why does an 'Option Contract Buyer' have less risk than a 'Future Contract Buyer'?
10. Enumerate the factors affecting option pricing
11. Calculate the pay-off of a Call option Buyer (long Call) from the following data and draw the Pay-off diagram.

Underlying Reliance stock

Type of option Call option

Style of options European

Position Long (Buyer)

Exercise Price ₹ 140

Option Premium ₹ 10 per share

Assume spot price at expiration is ₹120, ₹130, ₹140, ₹150, ₹160, ₹170 Per share.

12. Calculate the pay-off of a Put option Buyer (long Put) from the following data and draw the Pay-off diagram.

Underlying Reliance stock

Type of option Put option

Style of options European

Position Long (Buyer)

Exercise Price ₹ 150

Option Premium ₹ 10 per share

Assume spot price at expiration is ₹120, ₹130, ₹140, ₹150, ₹160, ₹170 Per share.

13. The current market price of a share is ₹155. The volatility of the share is measured at 20%. The risk-free interest rate is currently 8% per annum. There is a call option and a put option on the share. The time to expiration is 6 months, with an exercise price of ₹150. Calculate the price of the put option using the put-call parity, given that the call option price is ₹12.

14. Calculate the pay-off of long call option from the following data and draw the pay-off diagram.

Underlying asset Reliance stock

Type of option Call option

Style of option European

Position long (Buyer)

Exercise price ₹ 150 Per share

Option Premium ₹ 5 Per Share

Spot Price at expiration say: ₹ 130, ₹140, ₹150, ₹160, ₹ 170, ₹ 180 Per share

Unit-IV

1. What are the advantages and limitations of Black-Scholes option pricing model? Discuss
2. Draw a one -step binominal tree, show the stock prices at each node and calculate the option price.
3. Elucidate the Factors Affecting Options pricing
4. “Greeks can help the option traders to better understand the potential risk and reward of an option position”, Elucidate.
5. From the following data, determine call option price.
Current stock price ₹ 1260
Strike price ₹ 1280
Time to Expiration 3 months
Volatility 30% Per annum
Annual Risk-free rate 12%
Use black-Scholes formula
6. From the following data, Calculate the value of the Call option under Black -Scholes model
Current market price Rs 165.
Exercise price Rs 150.
Risk free rate 6 % p.a
Period 2 years
Standard deviation 15%
7. From the following data
Type of option Call Option
Style of Option European
Current Stock Price Rs 150
Exercise Price Rs 160
Up factor 20%
Down Factor 10%
Risk free interest rate 9 %
8. Find out put option price from the following data.
Current stock price Rs 160
Strike price Rs 150
Call option price 18.73
Risk-Free interest rate 8 % p. a
Time to expiration 6 months
Use put -call parity relation formula.
9. The following details
Stock Price (S_0): ₹100
Up Factor (u): 1.2 (20% increase)
Down Factor (d): 0.9 (10% decrease)
Risk-Free Rate (r): 5% per period
Strike Price (K): ₹100
Option Type: European Call Option
Time Steps: 2
calculate the price of a European call option using a two-step binomial option pricing model.
10. From the following data, determine the price of a call option using the Black-Scholes formula:
Current stock price: ₹1500
Strike price: ₹1550
Time to Expiration: 6 months

Volatility: 25% per annum
Annual Risk-free rate: 10%.

UNIT-5

1. Define the concept “SWAP”. Discuss the features of interest rate Swap.
2. Describe the nature of the currency swaps and interpret different types of currency swaps.
3. Describe the concept of currency swaps and explain their advantages and disadvantages.
4. Illustrate the main features of interest rate swaps and how they are used in financial markets.
5. Explain the different types of swaps and their applications in real-world financial scenarios.
6. Distinguish between interest rate swaps and currency swaps.
7. What is an interest rate swap? Explain different types of interest rate swaps
8. Elucidate commodity swaps and explain its process.
9. Describe the currency swaps and explain its advantages and disadvantages
10. Identify and explain the three most commonly used swap instruments in the Indian swap market.
11. Describe the main economic motives behind the use of swap derivatives by businesses and financial institutions.
12. What is Currency swap? Discuss the features of Currency swaps.
13. Companies X and Y face the following interest rates (adjusted for the differential impact of taxes):

	X	Y
US Dollars (Floating rate)	LIBOR+1%	LIBOR+1.5 %
Canadian dollars (Fixed rate)	6.0%	7.5%

Assume that X wants to borrow U.S. dollars at a floating rate of interest and Y wants to borrow Canadian dollars at a fixed rate of interest. A financial institution is planning to arrange a swap and requires a 50-basis-point spread. If the swap is equally attractive to X and Y, what rates of interest will X and Y end up paying?

14. Companies A and B face the following interest rates (adjusted for the differential impact of taxes):

	A	B
US Dollars (Floating rate)	LIBOR+0.5%	LIBOR+1.0%
Canadian dollars (Fixed rate)	5.0%	6.5%

Assume that A wants to borrow U.S. dollars at a floating rate of interest and B wants to borrow Canadian dollars at a fixed rate of interest. A financial institution is planning to arrange a swap and requires a 50-basis-point spread. If the swap is equally attractive to A and B, what rates of interest will A and B end up paying?

15. ABC Ltd. wishes to borrow ₹10,00,000 for one year. It can borrow at an 8% fixed rate or LIBOR + 1% floating rate. There is another company, XYZ Ltd., which also requires the same amount but has a lower credit rating. XYZ Ltd. can borrow at either a 12% fixed rate or LIBOR + 3% floating rate. However, due to its existing debt portfolio, ABC Ltd. prefers to

borrow at a floating rate, while XYZ Ltd. prefers to borrow at a fixed rate of interest. A financial institution is planning to arrange a swap and will require a 1% commission spread. If the swap is equally attractive to both ABC and XYZ, what will be the effective rate of interest that ABC and XYZ end up paying?

Case Studies

Case :1

Infosys Ltd., a global leader in information technology services based in India, earns a substantial portion of its revenues from international clients, particularly in the United States. Consequently, a significant share of its income is denominated in US dollars and other foreign currencies. However, the company incurs most of its operating expenses — including salaries, utilities, and local operational costs — in Indian Rupees (INR). This mismatch in the currency of inflows and outflows exposes Infosys to what is known as currency risk or foreign exchange risk.

In 2020, Infosys anticipated receiving approximately \$1 billion in revenues over the next six months from its overseas clients. While this would generally be good news, the company faced a major concern: the possibility of a weakening US dollar against the Indian rupee. If this occurred, the amount of rupees that Infosys would receive for each dollar would decline, thereby eroding its profit margins and financial projections. Even a small change in exchange rates could lead to significant losses due to the large volume of foreign currency involved.

To manage this risk, Infosys turned to the financial derivatives market and specifically opted for currency futures contracts traded on the National Stock Exchange (NSE). By selling USD-INR futures, Infosys effectively locked in a predetermined exchange rate for the US dollars it was expecting to receive. This strategy is known as hedging, and it helps eliminate uncertainty regarding future cash flows.

Here's how it works: if the value of the US dollar did indeed fall, Infosys would lose money on currency conversion when converting the revenue into rupees. However, the loss would be offset by the profit made from its futures position, where it would benefit from selling dollars at the higher locked-in rate. This balanced out the financial impact and provided earnings stability.

As it turned out, the dollar did weaken during that time period. Without any hedging, Infosys would have experienced a considerable drop in revenue when converted to rupees. But thanks to its strategic use of currency futures, the gains from the futures contracts compensated for the reduced conversion rate, thus preserving the company's expected income. This case highlights how derivatives, when used prudently, serve as powerful tools for risk management rather than speculative gain.

This decision also demonstrated Infosys' proactive financial planning and commitment to maintaining consistent financial performance in the face of global uncertainties, such as fluctuating exchange rates.

Discussion Questions

- a. What is currency risk and why is it important for companies like Infosys?
- b. How does a futures contract help hedge against such risks?
- c. Is hedging using derivatives risk-free? Why or why not?

- d. Can small exporters or importers also use currency futures? How?

Case 2

Reliance Industries, one of the largest players in the Indian oil and petrochemical sector, is directly impacted by fluctuations in crude oil prices. As a company that deals in refining and petrochemical production, it faces a risk where rising crude oil prices can increase input costs, which can erode profit margins if they cannot be passed onto consumers.

In 2021, Reliance's management anticipated a rise in crude oil prices due to recovering global demand post-COVID-19. However, a significant increase in crude prices would raise their operational costs and put pressure on profits. Therefore, they decided to hedge against the possible rise in crude prices.

Reliance used commodity futures contracts on crude oil, entering into a contract to buy crude oil at a fixed price for a future date, thus locking in the price at which they would purchase oil. By doing so, Reliance ensured that even if crude oil prices went up, their costs would not rise beyond the agreed-upon price.

As expected, crude oil prices increased significantly in the second half of 2021. Reliance benefited from its futures contracts, as it was able to purchase oil at a lower price than the market rate, thus maintaining its profit margins. The cost of buying oil was stable, and the volatility in input prices was managed effectively.

Discussion Questions:

- a. What would have happened if Reliance had not used futures contracts to hedge against rising crude oil prices?
- b. How do commodity futures differ from financial futures like currency or stock futures?
- c. What are the potential drawbacks of using futures to hedge against commodity price risks?
- d. Can a company like Reliance also use options to hedge its crude oil exposure? How might this strategy differ from using futures?

CASE 3

Tata Motors, a major automobile manufacturer in India, has borrowed funds to finance its domestic and international operations. A portion of this debt carries floating interest rates, which means the cost of borrowing can increase if interest rates rise. With global economic uncertainty and fluctuating central bank policies, this poses a significant risk to the company's cost structure and profitability.

In 2021, with indications that global interest rates might increase in the coming years due to inflationary pressures, Tata Motors was concerned that its future interest payments could become higher and unpredictable. This volatility in borrowing costs could affect both cash flow planning and financial performance. To mitigate this interest rate risk,

Tata Motors entered into an interest rate swap agreement with a financial institution. In this swap, the company agreed to exchange its floating-rate payments for fixed-rate payments over a specified period. This way, Tata Motors locked in a known interest rate, making future cash flows more predictable. Interest rate swaps do not reduce the total amount of debt, but they provide certainty in financial planning and shield the company from unfavourable market changes.

Over the swap term, interest rates indeed began to rise. However, because of the swap, Tata Motors continued paying at the fixed rate agreed upon, thus avoiding higher costs. The company was able to better manage its financial position and reduce its exposure to

macroeconomic fluctuations. This showcases how interest rate derivatives can play a crucial role in corporate financial risk management.

Discussion Questions

- a. What are interest rate swaps, and how do they help in managing financial risk?
- b. What are the benefits and limitations of using interest rate swaps?
- c. How would Tata Motors have been impacted if it had not used the swap agreement?
- d. In what situations might a company prefer a floating rate over a fixed rate?

Case 4

In 2022, Arvind Limited, one of India's largest textile exporters, faced a significant challenge due to the fluctuating value of the Indian rupee (INR) against the U.S. dollar (USD). As an exporter, Arvind earned a large portion of its revenue in U.S. dollars but had to pay for domestic expenses, such as wages and raw materials, in Indian rupees. The company was concerned about the rupee's appreciation, which would reduce the value of its dollar-denominated earnings when converted into rupees. This potential scenario could negatively impact the company's profit margins.

To mitigate this risk, Arvind opted to use currency options, specifically put options on the USD/INR exchange rate. A put option is a financial contract that gives the holder the right, but not the obligation, to sell a currency at a predetermined price (strike price) on or before a specified expiration date. By purchasing put options, Arvind aimed to protect itself from the risk of the rupee strengthening. If the rupee appreciated and the value of the dollar decreased, Arvind would be able to sell its U.S. dollar earnings at the strike price, thus maintaining the value of its revenues in INR.

Arvind purchased the options and paid a premium for them, a small cost compared to the potential losses that could arise if the rupee appreciated significantly. The company was confident that this hedging strategy would provide protection during the period of volatility in the foreign exchange market.

In mid-2022, the rupee did appreciate against the U.S. dollar, driven by global economic factors, including inflationary pressures and interest rate changes. However, because Arvind had purchased the put options, it was able to sell its dollar earnings at the higher strike price, effectively shielding itself from the impact of the stronger rupee. This allowed Arvind to maintain stable profit margins despite the unfavourable movement in the exchange rate.

Had the rupee weakened instead, Arvind's strategy would have been less effective, as the options would have expired worthless. In such a scenario, the company would have benefited from the depreciation of the rupee, as it would receive more INR for its dollar-denominated earnings. However, the loss of the premium paid for the options would have been the only downside.

This case demonstrates how currency options can be an effective tool for companies, especially exporters like Arvind Limited, to hedge against the uncertainties of foreign exchange markets. By using options, Arvind was able to manage the risk of exchange rate fluctuations, ensuring a level of certainty and stability in its revenue stream. While currency options come at a cost (the premium), they offer flexibility and limited downside, making them an ideal strategy for managing currency risk in volatile markets.

Questions:

- Why does currency risk a significant concern for Indian exporters like Arvind Limited?
- How did Arvind use put options to hedge against the potential appreciation of the Indian rupee? What benefits did this strategy provide?
- What are the advantages and disadvantages of using currency options for hedging compared to other methods like futures or forwards?
- If the rupee had depreciated instead of appreciating, how would Arvind's hedging strategy have impacted on its profits, and what would the company have lost in this case?

Case 5 :

The following details

Stock Price (S_0): ₹100

Up Factor (u): 1.2 (20% increase)

Down Factor (d): 0.9 (10% decrease)

Risk-Free Rate (r): 5% per period

Strike Price (K): ₹100

Option Type: European Call Option

Time Steps: 2

calculate the price of a European call option using a two-step binomial option pricing model.

Case 6 :

Find out put option price from the following data.

Current stock price Rs 160

Strike price Rs 150

Call option price 18.73

Risk-Free interest rate 8 % p. a

Time to expiration 6 months

Use put -call parity relation formula.

Case 7 :

Companies A and B face the following interest rates (adjusted for the differential impact of taxes):

	A	B
US Dollars (Floating rate)	LIBOR+0.5%	LIBOR+1.0%
Canadian dollars (Fixed rate)	5.0%	6.5%

Assume that A wants to borrow U.S. dollars at a floating rate of interest and B wants to borrow Canadian dollars at a fixed rate of interest. A financial institution is planning to arrange a swap and requires a 50-basis-point spread. If the swap is equally attractive to A and B, what rates of interest will A and B end up paying?

CASE 8 : From the following data, determine call option price.

Current stock price ₹ 1260

Strike price ₹ 1280

Time to Expiration 3 months

Volatility 30% Per annum

Annual Risk-free rate 12%
Use black-Scholes formula