

## INTEREST RATE RISK MANAGEMENT

Topics covered:

- Interest rate swaps
- Structuring of swaps
- Forward rate of Interest
- Forward rate of Agreement (FRA)
- Interest rate caps, floors and collars
- Interest rate futures



### Interest Rate Swaps

Q.1 Fox Ltd wants to raise fixed rate capital and Flax Ltd wants to raise floating rate capital. Both the companies intend to borrow \$10 million. Upon enquiry with their respective bankers, they were able to extract the following quotes:

Company	Fixed rate	Floating rate
Fox Ltd	8.00%	LIBOR + 0.5%
Flax Ltd	6.50%	LIBOR

SCB Bank arranges a swap between Fox Ltd and Flax Ltd wherein Fox Ltd, Flax Ltd and SCB bank share the net gain arising out of the swap in the ratio of 4:4:2.

You are required to design the swap and quantify the amount of gains.

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Q.2 Flip Ltd and Flop Ltd need to borrow  $\gtrless$  100 crores and they have been offered the following rates by their lenders:

	Fixed	Floating
Flip Ltd	15%	LIBOR + 3%
Flop Ltd	14%	LIBOR + 4%

There is another company Lucky Ltd which is into speculation business. Lucky Ltd is of the view that the LIBOR over the next one year is going to be 9.75%.

Flip Ltd thinks that the LIBOR over the next one year is going to be 12.25% and this being above the breakeven LIBOR of 12% it has decided to borrow on a fixed basis. A bilateral swap with Flop Ltd is possible under which Flip Ltd will receive LIBOR from Flop Ltd and pay 11.50% to Flop Ltd.

BOB Bank, a big bank which is an active player in the swap markets is providing a one-year open swap with a contract size of  $\gtrless$  1 crore at LIBOR vs 11% with settlement on quarterly basis.

The following are the actual LIBOR at the end of each quarter:

Quarter 1	9%
Quarter 2	15%
Quarter 3	13%
Quarter 4	11%

Required:

- a. Evaluate various options available to Flip Ltd. Advise Flip Ltd on the best course of action and also show the actual settlement at the end of each quarter; and
- b. Decide the best strategy for Lucky Ltd and show the profit / loss if any at the end of each quarter per year of contract.

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- Q.3 ABS Bank has entered into a plain vanilla swap through on Overnight Index Swap (OIS) on a principal of Rs. 5 crore and agreed to receive MIBOR overnight floating rate for a fixed payment on the principal. The swap was entered into on Monday, 24th July 2017 and was to commence on 25th July, 2017 and run for a period of 7 days.
  Respective MIBOR rates for Tuesday to Monday were: 8.70%, 9.10%, 9.12%, 8.95%, 8.98% and 9.10%. If Punjab Bank received Rs. 266 net on settlement, calculate Fixed rate and interest under both legs. Notes:

  i. Sunday is a Holiday.
  ii. Workout in rounded rupees and avoid decimal working.
  - iii. Consider a year consists of 365 days.









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## Forward Rate of Interest

# Q.4 Consider the following data for Government Securities:

Face value	Coupon rate (%)	Maturity (Years)	Current Price (Rs.)
1,00,000	0	1	91,000
1,00,000	12	2	97,000
1,00,000	12.50	3	97,500
1,00,000	12	4	97,900











### Forward Rate Agreements (FRAs) and Arbitrage

Q.5 The following market data is available:

Spot 1 \$ = ¥ 116

Deposit	USD	Yen
3 months	4.50%	0.25%
6 months	5.00%	0.25%

Forward Rate Agreement (FRA) for ¥ is Nil.

- 1. What should be 3 months FRA at 3 months forward?
- 2. The 6 & 12-month LIBORS are 5% and 6.5% respectively. A bank is quoting 6/12 FRA at 6.50 6.75%. Is any arbitrage opportunity available? Calculate profit in such case.

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Q.6 Good Ltd and Bad Ltd are two companies listed on the National Stock exchange. Both the companies' approach ANZ Bank for Forward Rate Agreement. Both the companies are looking to borrow a sum of ₹ 100 crores after 2 years for a period of 1 year. Good Ltd has a better credit rating than Bad Ltd. The Bank has conducted its own research and derived the yield curve of both the companies as under:

Year	Good Ltd	Bad Ltd
1	3.86%	4.12%
2	4.20%	5.48%
3	4.48%	5.78%

(i) What is the rate that the Bank should quote to Good Ltd and Bad Ltd for a 24/36 FRA?

Suppose bank offers interest rate guarantee for a premium of 0.1% of the amount of loan, you are required to calculate the interest payable by Good Ltd if interest rate in 2 years turns out to be (a) 4.50% or (b) 5.50%











#### **Interest Rate Caps, Floors and Collars**

Q.7 Starwell Finance Ltd is a company engaged in consumer finance. It issues a £ 10 million floating rate loan on July 1, 2013 with resetting of coupon rate every 6 months equal to LIBOR + 50bps. The company is interested in creating a collar strategy by buying a cap and selling a floor. Starwell buys the 3 years cap and sells 3 years Floor as per the following details on July 1, 2013:
National amount

Notional amount	£ 10 million
Reference rate	6-month LIBOR
Strike rate	4% for Floor and 7% for Cap
Premium	0 (it is to be presumed that premium paid for $cap = premium$
	received on the floor)

The LIBOR on Various reset dates are as under:

Reset date	LIBOR (%)
31-12-2013	6.00
30-06-2014	7.50
31-12-2014	5.00
30-06-2015	4.00
31-12-2015	3.75
30-06-2016	4.25

Using the above data, you are required to determine:

- a. Effective interest paid out at each reset date.
- b. The average overall effective rate of interest p.a.













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Q.8 XYZ Ltd borrows £ 20 million for a period of 24 months at a floating rate of 6M LIBOR + 10%. The company anticipates a rise in LIBOR; hence it proposes to buy a cap option from its bankers at the strike rate of 9%. The lumpsum premium is 1% for the entire reset periods and the fixed rate of interest is 8%. The actual position of LIBOR during the forthcoming reset periods are as under:

Reset period	LIBOR
1	10.00%
2	10.50%
3	11.00%

You are required to show how far interest rate risk is hedged through cap option. For calculation work out figures at each stage up to four decimal points and amount nearest to £. It should be part of working notes.











## **Interest Rate Futures**

Q.9 Agrifoods India Ltd is engaged in a highly seasonal business. It is expecting that it is likely to have a surplus of ₹ 100 crores in 2 months' time (i.e. June 2020) and the company is likely to have this surplus for a period of 3 months. As per the policy of the company, the surplus amount will be kept invested for the duration of the surplus. However, it is worried that the interest rates will fall in the intervening period. Currently the interest rates are 5%. To protect itself from the falling rates of interest the company wishes to use interest rate futures which are being traded on the exchange. The following information is available from the exchange:

3-month June 2020 futures	7% (₹ 93.00)
3-month Sept 2020 futures	8% (₹ 92.00)

The contract size is ₹ 5,00,000. The following assumptions may be made:

- a. all the future contracts expire on the last day of the future month; and
- b. The borrowing date coincides with the expiry date of the futures.

Explain how Agrifoods India Ltd can hedge its interest rate exposure using interest futures if in 2 months' time the interest rate has fallen to 2%.











## Interest Rate Risk Management

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- Q.10 Today is 1<sup>st</sup> January 2020. On preparing the cash flow forecast for the year 2020, the Chief Financial Officer (CFO) of Bright Ltd realises that the company would be required to borrow a sum of ₹ 10 crores on 31<sup>st</sup> March 2020 for a period of 3 Months. Currently the interest rates are being quoted at 8%. However, the CFO is worried that the interest rates might rise in the intervening period beginning today up to the date of borrowing. 3-Month Interest futures expiring on 31<sup>st</sup> March (henceforth referred to as March futures) are being traded in the market at 14%. The contract size is ₹ 10 lakhs. You are required to:
  - a. Show how the CFO can hedge his position using interest rate futures.
  - b. Illustrate your answer if the actual interest for 3 months borrowing on 31<sup>st</sup> March is (a) 12%
     (b) 14% and (c) 16%

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## Interest Rate Risk Management

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Q.11 Apollo Ltd is likely to need £ 72 million in two months' time for a period of 4 months. The company is of the opinion that interest rates could rise in the intervening period. Currently the LIBOR is at 8.5%. The company can borrow money at LIBOR + 0.75. The company fears that the interest rates could rise by 190 bps (1.90%) by the time of the date of borrowing. Pound Interest futures are traded on the London International Financial Futures and Options Exchange (LIFFE) and the following 3-month future quotes are available:

3-month December futures	£ 91.40 (8.60%)
3-month March futures	£ 91.10 (8.90%)
3-month June futures	£ 90.75 (9.25%)

The future contracts expire at the end of the contract month. The contract size is £ 500,000. It is Jan 1st, 2020 today and the borrowing is due on 29 Feb 2020.

You are required to advise the company on the strategy to be adopted and show the financial effect if by 29th Feb 2020, LIBOR increases by 190 bps (1.90%) and the March futures increases by 170 bps (1.70%).







