

Forex Risk Management

Question 85

An importer requested his bank to extend for Forward contract of US \$ 25,000 which is due for maturity on 31.10.2015 for a further periods of six month. The other details are as under:

Contract rate US \$ 1 = ₹ 61.00

The US \$ quoted on 31-10-2015

Spot: ₹ 60.3200/60.6300

Six month premium: 0.86 %/0.98%

Margin money for buying and selling rate are 0.086% and 0.15 % respectively
Compute

1. Cost to importer in respect to extension of forward contract.
2. New Forward contract rate.

(May 17, 6 Marks)

Solution 85

- i. The contract is to be cancelled on 31-10-2015 at the spot buying rate of

US\$	₹ 60.3200
Less: Margin Money 0.086%	₹ 0.0519
	₹ 60.2681

Rounded off ₹ 60.2700

US\$ 25,000 @ ₹ 60.2700	₹ 15,06,750
US\$ 25,000 @ ₹ 61.0000	₹ 15,25,000
The difference in favour of the Bank/ Cost to the importer	₹ 18,250

- ii. The Rate of New Forward Contract

Spot Selling Rate US\$ 1	₹ 60.6300
Add: Premium @ 0.98%	₹ 0.5942
	₹ 61.2242
Add: Margin Money 0.15%	₹ 0.0918
	₹ 61.3160 or ₹ 61.3175

Question 86

If the present interest rate for 6 months borrowings in India is 9% per annum and the corresponding rate in USA is 2% per annum, and the US\$ is selling in India at ₹ 64.50/\$. Then:

1. Will US \$ be at a premium or at a discount in the Indian forward market?
2. Find out the expected 6 month forward rate for US\$ in India.
3. Find out the rate of forward premium/discount.

(Nov 17, 5 Marks)

Solution

- i. Under the given circumstances, the USD is expected to quote at a premium in India as the interest rate is higher in India.

ii. Calculation of the forward rate:

$$\frac{1 + R_h}{1 + R_f} = \frac{F_1}{E_0}$$

Where:

R_h = home currency interest rate,

R_f = foreign currency interest rate,

F_1 = end of the period forward rate

E_0 = the spot rate.

Therefore,

$$\begin{aligned} \frac{1 + (0.09/2)}{1 + (0.02/2)} &= \frac{1 + (0.09/2)}{1 + (0.02/2)} = \frac{F_1}{64.50} \\ \frac{1 + 0.045}{1 + 0.01} &= \frac{F_1}{64.50} \\ \frac{1.045}{1.01} \times 64.50 &= F_1 \\ \frac{67.4025}{1.01} &= F_1 \\ F_1 &= ₹66.74 \end{aligned}$$

iii. Rate of premium:

$$= \frac{66.74 - 64.50}{64.50} \times \frac{12}{6} \times 100 = 6.94\%$$

Question 87

The rate of inflation in USA is likely to be 3% per annum and in India it is likely to be 6.5%. The current spot rate of US \$ in India is ₹ 43.40. Find the expected rate of US\$ in India after one year and 3 years from now using purchasing power parity theory.

(Nov 17, 5 Marks)

Solution

The differential inflation is 3.5%. Hence the rate will keep changing adversely by 3.5% every year. Assuming that the change is reflected at the end of each year, the rates will be:

End of Year		₹ /USD
1	₹43.40 x 1.035	44.92
2	₹44.92 x 1.035	46.49
3	₹46.49 x 1.035	48.12

Alternative Answer

End of year 1

$$= ₹ 43.40 \times \frac{1 + 0.065}{1 + 0.03} = 44.87$$

End of year 2

$$= ₹ 44.87 \times \frac{1 + 0.065}{1 + 0.03} = 46.39$$

End of year 3

$$= ₹ 46.39 \times \frac{1 + 0.065}{1 + 0.03} = 47.97$$

Question 88

Given the following information:

Exchange rate – Canadian Dollar 0.666 per DM (Spot)

Canadian Dollar 0.671 per DM (3 months)

Interest Rates – DM 7.5% p.a.

Canadian Dollar 9.5% p.a.

What operations would be carried out to earn the possible arbitrage gains?

(May 2018, 8 Marks)

Solution

By formula,

$$\text{FFR} = \frac{S (1 + i_L)}{(1 + i_F)}$$

Where,

FFR = Fair Forward Rate

S = Spot Rate

i_L = Interest rate (Local)

i_F = Interest Rate (Foreign Country)

$$\begin{aligned} \therefore \text{FFR} &= \frac{0.666 (1 + 0.02375)}{(1 + 0.01875)} \\ &= \frac{0.666 (1.02375)}{(1.01875)} = 0.6693 \end{aligned}$$

\therefore FFR (3 months): DM 1 = CAD 0.6693

Arbitrage Strategy to earn possible arbitrage gain:

Fair Forward Rate (3 months): DM 1 = CAD 0.6693

Actual Forward Rate (3 months): DM1 = CAD 0.671

An arbitrage opportunity definitely exists as there is a mismatch between FFR and AFR

AFR > FFR

The 'DM' is overpriced in the forward market

It is advisable to 'sell DM' in the Forward Market

To take a counter position, one has to 'Buy DM' in the spot market

\therefore The Resulting Strategy is: **"Buy Spot Sell Forward"**

Complementary Strategy: **"Borrow in Canada Invest in DM"**

Arbitrage Process:

Step 1. Borrow CAD 1000 in Canada @ 9.5% p.a. for 3 months

Step 2. Sell CAD 1000 @ Spot rate i.e. Canadian Dollar 0.666 per DM and get DM 1501.50

Step 3. Invest DM 1501.50 in DM @ 7.5% p.a. for 3 months

Step 4. Sell Forward (3months) DM 1529.65 (1501.50 + 1.875%) @ DM 1 = CAD 0.671

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Enter into forward contract to sell DM 1529.65 after 3 months at contracted Forward Rate of DM 1 = CAD 0.671 Resulting into receivable of CAD 1026.40

After 3 months:

Step 5. Realize Investments i.e. $DM\ 1501.50 + 1.875\% = DM\ 1529.65$

Step 6. Honour the Forward contract by selling DM 1529.65 and obtain CAD 1026.40

Step 7. Repay the Canadian Loan (with interest) i.e. $CAD\ 1000 + 2.375\% = CAD\ 1023.75$

Result:

$$\begin{aligned} \text{Arbitrage Gain} &= \text{Inflow (Step 6)} - \text{Outflow (Step 7)} \\ &= \text{CAD } 1026.40 - \text{CAD } 1023.75 \\ &= \text{CAD } 2.65 \end{aligned}$$

$$\therefore \text{Arbitrage Gain (after 3 months)} = \text{CAD } 2.65$$

Question 89

A dealer in foreign exchange has the following position in Swiss Francs on 31st January, 2018:

	(Swiss Francs)
Balance in the Nostro A/c Credit	1,00,000
Opening Position Overbought	50,000
Purchased a bill on Zurich	70,000
Sold forward TT	49,000
Forward purchase contract cancelled	41,000
Remitted by TT	75,000
Draft on Zurich cancelled	40,000

Examine what steps would the dealer take, if he is required to maintain a credit balance of Swiss Francs 30,000 in the Nostro A/c and keep as overbought position on Swiss Francs 10,000?

(Nov 2018, 8 Marks)

Solution

Exchange Position:

Particulars	Purchase Sw. Fcs.	Sale Sw. Fcs.
Opening Balance Overbought	50,000	
Bill on Zurich	70,000	
Forward Sales - TT		49,000

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Cancellation of Forward Contract		41,000
TT Sales		75,000
Draft on Zurich cancelled	40,000	-
	1,60,000	1,65,000
Closing Balance Oversold	5,000	-
	1,65,000	1,65,000

Cash Position (Nostro A/c)

	Credit	Debit
Opening balance credit	1,00,000	-
TT sales	-	75,000
	1,00,000	75,000
Closing balance (credit)	-	25,000
	1,00,000	1,00,000

The Bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro account to Sw. Fcs. 30,000.

This would bring down the oversold position on Sw. Fcs. as Nil.

Since the bank requires an overbought position of Sw. Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

Question 90

An Indian company obtains the following quotes (₹/\$)

Spot:	35.90/36.10
3 Months forward rate:	36.00/36.25
6 Months forward rate:	36.10/36.40

The company needs \$ funds for six months. Determine whether the company should borrow in \$ or ₹ Interest rates are:

3 Months interest rate:	₹: 12%, \$: 6%
6 Months interest rate:	₹: 11.50%, \$: 5.5%

Also determine what should be the rate of interest after 3-months to make the company indifferent between 3-months borrowing and 6-months borrowing in the case of:

- i. Rupee borrowing
- ii. Dollar borrowing

Note: For the purpose of calculation you can take the units of dollar and rupee as 100 each.

(Nov 18, 8 Marks)

Solution

- i. If company borrows in \$ then outflow would be as follows:

Let company borrows \$ 100	\$ 100.00
Add: Interest for 6 months @ 5.5%	\$ 2.75
Amount Repayable after 6 months	\$ 102.75
Applicable 6 months forward rate	36.40

Amount of Cash outflow in Indian Rupees	₹ 3,740.10
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If company borrows equivalent amount in Indian Rupee, then outflow would be as follows:

Equivalent ₹ amount ₹ 36.10 X 100	₹ 3,610.00
Add: Interest @11.50%	₹ 207.58
	₹ 3817.58

Since cash outflow is more in ₹ borrowing then borrowing should be made in \$.
ii.

a) Let 'i_r' be the interest rate of ₹ borrowing make indifferent between 3 months borrowings and 6 months borrowing then
 $(1 + 0.03) (1 + i_r) = (1 + 0.0575)$
 $i_r = 2.67\%$ or 10.68% (on annualized basis)

b) Let 'i_d' be the interest rate of \$ borrowing after 3 months to make indifference between 3 months borrowings and 6 months borrowings. Then,
 $(1 + 0.015) (1 + i_d) = (1 + 0.0275)$
 $i_d = 1.232\%$ or 4.93% (on annualized basis)

Question 91

On 19th January, Bank A entered into forward contract with a customer for a forward sale of US \$ 7,000, delivery 20th March at ₹ 46.67. On the same day, it covered its position by buying forward from the market due 19th March, at the rate of ₹ 46.655. On 19th February, the customer approaches the bank and requests for early delivery of US \$. Rates prevailing in the interbank markets on that date are as under:

Spot (₹/\$)	46.5725/5800
March	46.3550/3650

Interest on outflow of funds is 16% and on inflow of funds is 12%. Flat charges for early delivery are ₹ 100.

What is the amount that would be recovered from the customer on the transaction?

Note: Calculation should be made on months basis than on days basis.

(Nov 18, 8 Marks)

Solution

a. The bank would sell US \$ to its customer at the agreed rate under the contract. However, it would recover loss from the customer for early delivery. On 19th February bank would buy US\$ 7000 from market and shall sell to customer. Further, Bank would enter into one month forward contract to sell the US \$ acquired under the cover deal.

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i. Swap Difference

Bank sells at	₹ 46.3550
Bank buys at	₹ 46.5800
Swap loss per US \$	0.225
Swap loss for US \$ 7000	₹ 1,575

ii. Interest on Outlay of Funds

On 19th February, Bank sell to customer	₹ 46.67
It buys from spot Market	₹ 46.58
Inflow of funds per US \$	₹ 0.09

Inflow of funds for US \$ 7000 is ₹ 630

Interest on ₹ 630 at 12% for one month ₹ 6.30

b. Charges for early delivery

Swap loss	₹ 1,575.00
Flat charges	₹ 100.00
Less: Interest on outflow of funds	₹ 6.30
	₹ 1,668.70

Total amount to be recovered from the customer

Amount as per Forward Contract ₹ 46.67 X 7000	₹ 3,26,690.00
Add: Charges for early delivery	₹ 1,668.70
	₹ 3,28,358.70

Question 92

On 1st January 2019 Global Ltd., an exporter entered into a forward contract with BBC Bank to sell US\$ 2,00,000 on 31st March 2019 at ₹ 71.50/\$. However, due to the request of the importer, Global Ltd. received the amount on 28 February 2019. Global Ltd. requested the Bank to take delivery of the remittance on 2nd March 2019. The Inter-banking rates on 28th February were as follows:

Spot Rate	₹ 71.20/71.25
One month premium	5/10

If Bank agrees to take early delivery then what will be the net inflow to Global Ltd. assuming that the prevailing prime lending rate is 15%. Assume 365 days in a year.

(May 19, 8 Marks)

Solution

On 28th February 2019 bank would purchase from the exporter US\$ 2,00,000 at the agreed rate i.e. ₹ 71.50/\$. However, bank will charge for this early delivery consisting of Swap Difference and Interest on outlay of funds.

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i. Swap Difference

Bank sells at	₹ 71.20
It buys at	₹ 71.35
Swap loss per US\$	<u>₹ 0.15</u>
Swap loss for \$ 2,00,000 is	₹ 30,000

ii. Interest on Outlay of funds

On February Bank sell \$ in Market	₹ 71.20
Bank buys from customer	₹ 71.50
Outlay per US \$	<u>₹ 0.30</u>
Outlay of funds for US\$ 2,00,000	₹ 60,000
Interest of outlay of funds on ₹ 60,000 for 31 days (1st March 2019 to 31st March 2019) at 15% p.a. i.e.	₹ 764

iii. Charges for early delivery

Swap loss	₹ 30,000
Interest on Outlay of Funds	₹ 764
	<u>₹ 30,764</u>

iv. Net Inflow to Global Ltd.

Proceed of US \$ 2,00,000@₹ 71.50	₹ 1,43,00,000
Less: Charges for early delivery	₹ 30,764
Net Flow	<u>₹ 1,42,69,236</u>

Question 93

K Ltd. currently operates from 4 different buildings and wants to consolidate its operations into one building which is expected to cost ₹ 90 crores. The Board of K Ltd. had approved the above plan and to fund the above cost, agreed to avail an External Commercial Borrowing (ECB) of GBP 10 m from G Bank Ltd. on the following conditions:

- The Loan will be availed on 1st April, 2019 with Interest payable on half yearly rest.
- Average Loan Maturity life will be 3.4 years with an overall tenure of 5 years.
- Upfront Fee of 1.20%.
- Interest Cost is GBP 6 months LIBOR + Margin of 2.50%.
- The 6 months LIBOR is expected to be 1.05%.

K Ltd. also entered into a GBP-INR hedge at 1 GBP = INR 90 to cover the exposure on account of the above ECB Loan and the cost of the hedge is coming to 4.00% p.a.

As a Finance Manager, given the above information and taking the 1 GBP = INR 90:

- Calculate the overall cost both in percentage and rupee terms on an annual basis.
- What is the cost of hedging in rupee terms?
- If K Ltd. wants to pursue an aggressive approach, what would be the net gain/loss for K Ltd. if the INR depreciates/appreciates against GBP by 10% at the end of the 5 years assuming that the loan is repaid in GBP at the end of 5 years?

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Ignore time value and Taxes and calculate to two decimals.

(May 19, 8 Marks)

Solution

i. Calculation of Overall Cost

Upfront Fee (GBP 10 M @ 1.20%)	₹ 1,20,000
Interest Payment (GBP 10 M x 3.55% x 3.4)	₹ 12,07,000
Hedging Cost (GBP 10 M x 4% x 3.4)	₹ 13,60,000
Total	₹ 26,87,000

OR ₹ 2.687 million

Overall cost in % terms on Annual Basis

$$\frac{2.687 \text{ million}}{(1,00,00,000 - 1,20,000)} \times \frac{1}{3.4} = \frac{2.687}{9.88} \times \frac{1}{3.4} \times 100 = 8\%$$

Overall Cost in Rupee terms@ GBP 1

$$= ₹ 90 \times \frac{2.687}{3.4} \times 100 = ₹ 711.26 \text{ Lakhs}$$

OR

Overall cost in % terms on Annual Basis

$$\frac{2.687 \text{ million}}{(1,00,00,000)} \times \frac{1}{3.4} = \frac{2.687}{9.88} \times \frac{1}{3.4} \times 100 = 7\%$$

Overall Cost in Rupee terms@ GBP 1 =

$$1,00,00,000 \times 7.90\% \times 90 = ₹ 71,100,000$$

OR

Calculation of overall cost

Interest & Margin (A) = 3.55%

Hedging Cost (B) = 4%

7.55%

Onetime fee = 1.20%

Average loan maturity = 3.4 Years

Per annum cost 1.2/3.4 (C) = 0.35%

Annual overall cost in % terms (A+B+C) = 7.9%

Overall Cost in Rupee terms@ GBP 1 =

$$1,00,00,000 \times 7.90\% \times 90 = ₹ 71,100,000$$

ii. Cost of Hedging in terms of Rupees

$$₹ 13,60,000 \times 90 = ₹ 12,24,00,000 = ₹ 12.24 \text{ crores in Total}$$

OR

$$\text{GBP}10,000,000 \times 90 \times 4\% = ₹ 3,60,00,000 \text{ on Annual Basis}$$

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iii. If K Ltd. pursues an aggressive approach then Gain/Loss in INR Depreciation/ Appreciation shall be computed as follows:

i. If INR depreciates by 10%

Re. loss per GBP = 90 x 10%	=	₹ 9
Total Losses GBP10M	=	₹ 90 Million
Less: Cost of Hedging	=	₹ 36 Million
Net Loss	=	₹ 54 million

ii. If INR appreciates by 10%

₹ Gains per GBP = ₹ 90 x 10%	=	₹ 9
Total Gain on Repayment of loan	=	₹ 90 Million
Add: Saving in Cost of Hedging	=	₹ 36 Million
Net Gain	=	₹ 126 million

Question 94

Following information relates to AKC Ltd. which manufactures some parts of an electronics device which are exported to USA, Japan and Europe on 90 days credit terms.

Cost and sales information:

	Japan	USA	Europe
Variable cost per unit	₹ 225	₹ 395	₹ 510
Export sale price per unit	Yen 650	US\$ 10.23	Euro 11.99
Receipt from sale due in 90 days	Yen 78,00,000	US \$ 1,02,300	Euro 95,920

Foreign exchange rate information:

	Yen/₹	US \$/₹	Euro/₹
Spot market	2.417-2.437	0.0214-0.0217	0.0177-0.0180
3 months forward	2.397-2.427	0.0213-0.0216	0.0176-0.0178
3 months spot	2.423-2.459	0.02144-0.02156	0.0177-0.0179

Advice AKC Ltd. by calculating average contribution to sales ratio whether it should hedge its foreign currency risk or not.

(Nov. 2019, 8 Marks)

Solution

1. Calculation of P.V. Ratio if foreign currency risk is hedged.

Particulars	Japan	USA	Europe	Total
A. Variable cost p.u	₹ 225	₹ 395	₹ 510	
B. Receipt due	₹ 78,00,000	\$ 1,02,300	₹ 95,920	
C. Export price	₹ 650	\$ 10.23	₹ 11.99	
D. No of Units sold	12,000	10,000	8,000	
E. Forward Rate	₹ 2.427	\$ 0.0216	₹ 0.0178	
F. Sales proceeds in ₹ B ÷ E	32,13,844	47,36,111	53,88,764	1,33,38,719

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G. Total Variable cost in ₹ (A × D)	27,00,000	39,50,000	40,80,000	1,07,30,000
H. Contribution P.V. Ratio	5,13,845 15.99%	7,86,111 16.60%	13,08,764 24.29%	26,08,719

$$\therefore \text{Average P.V. Ratio} = \frac{26,08,719}{1,33,38,719} \times 100 = 19.56\%$$

2. Calculation of PV Ratio in foreign currency risk is not hedged

Particulars	Japan	USA	Europe	Total
I. Spot Rate	2.459	0.02156	0.0179	
J. Sale Proceed in ₹	31,72,021	47,44,898	53,58,659	1,32,75,578
K. Contribution	4,72,021	7,94,898	12,78,659	25,45,578

$$\therefore \text{P.V. Ratio} = \frac{25,45,578}{1,32,75,578} \times 100 = 19.17\%$$

Conclusion: AKC Ltd. is advised to Hedge its Foreign Currency Risk

