

(a) Forward Cover

Buy £ 3,00,000 at 180 day FR

$$£ 3,00,000 \times 1.96 = \$ 5,88,000$$

(b) Money Market Cover

- Calculation of Amount to be invested in UK money market @ 4.5% for 180 days

$$= \frac{£ 3,00,000}{1.045} = £ 2,87,081.34$$

- \$ required to buy £ 2,87,081.34 at SR

$$£ 2,87,081.34 \times 2.00 = \$ 5,74,162.68$$

- Borrow \$ 5,74,162.68 @ 5.5% for 180 days from US Money market

Cash outflow

$$= \$ 5,74,162.68 (1.055)$$

$$= \$ 6,05,741.63$$

(c) Option Contract

Price	Exercised or not	Cost of \$	Premium	Effective Cost per \$	Cash outflows £ 3,00,000 × EC	Probability	Expected Cash outflows
1.91	No	\$ 1.91	\$ 0.04	\$ 1.95	\$ 5,85,000	25%	1,46,250
1.95	No	\$ 1.95	\$ 0.04	\$ 1.99	\$ 5,97,000	60%	3,58,200
2.01	Yes	\$ 1.97	\$ 0.04	\$ 2.01	\$ 6,03,000	15%	90,450
							\$ 5,94,900

(+) Opportunity Cost on premium

$$(£ 3,00,000 \times 0.04) \times 5.5\% = \$ 660$$

$$\text{Cash Outflow } (5,94,900 + 660) = \$ 5,95,560$$

(d) No Hedging

$$\text{Expected SR} = (1.91 \times 0.25) + (1.95 \times 0.60) + (2.05 \times 0.15)$$

$$= 1.955$$

$$\begin{aligned}\text{Cash outflows} &= \text{£ } 3,00,000 \times 1.955 \\ &= \$ 5,86,500\end{aligned}$$

No hedging is the best due to lower cash outflows.

Question – 45

A Ltd. of U.K. has imported some chemical worth of USD 3,64,897 from one of the U.S. suppliers. The amount is payable in six months time. The relevant spot and forward rates are:

Spot rate	USD 1.5617–1.5673
6 months' forward rate	USD 1.5455 –1.5609

The borrowing rates in U.K. and U.S. are 7% and 6% respectively and the deposit rates are 5.5% and 4.5% respectively.

Currency options are available under which one option contract is for GBP 12,500. The option premium for GBP at a strike price of USD 1.70/GBP is USD 0.037 (call option) and USD 0.096 (put option) for 6 months period.

The company has 3 choices:

- (i) Forward cover
- (ii) Money market cover, and
- (iii) Currency option

Which of the alternatives is preferable by the company?

(SM TYK – 40)

Solution:

Option 1: Forward Cover

Buy \$ 3,64,897 at 6 months FR

$$\text{Cash outflows} = \frac{\$ 3,64,897}{1.5455} = 2,36,103$$

Option 2: Money Market Cover

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

- Amount to be invested in US money market @ 4.5% p.a. for 6 month
$$\frac{\$ 3,64,897}{1 + (0.045 \times 6/12)} = \$ 3,56,867$$
$$= \text{£ } 2,28,512$$
- Borrow £ 2,28,512 from UK money market @ 7% p.a. for 6 months
Cash outflows = £ 2,28,512 × [1 + (0.07 × 6/12)]
= £ 2,36,510

Option 3: Currency Option

Step 1: Since \$ payables & we afraid from \$ rising but rate is given of £. It means £ falling hence we should we should buy put option £ at EP \$/£ 1.70.

Step 2: No. of Contract

$$\begin{aligned} \text{Contract size in \$} &= \text{£ } 12,500 \times 1.70 \\ &= \$ 21,250 \\ \text{No. of contracts} &= \frac{\$ 3,64,897}{\$ 21,250} \\ &= 17.17 \text{ "Means 17 Contracts"} \end{aligned}$$

Step 3: Cash Outflows

Covered through option hedging

$$\begin{aligned} \text{Put option EP} &= \$/\text{£} = \$ 1.70 \\ \text{Contract size} &= \$ 21,250 \quad \text{No.} = 17 \text{ contracts} \\ \text{Covered through option hedging } (\$ 21,250 \times 17) &= \$ 3,61,250 \\ \text{It means total £ required to buy} &= \frac{\$ 3,61,250}{\$ 1.70} = \text{£ } 2,12,500. \end{aligned}$$

Covered through forward contract

$$\begin{aligned} \text{Uncovered portion} &= \$ 3,64,897 - \$ 3,61,250 \\ &= \$ 3,647 \end{aligned}$$

$$\text{Buy } \$ 3,647 \text{ at 6 months FR} = \frac{\$ 3,647}{1.5455} = \text{£ } 2,360.$$

Premium Amount

$$\text{Premium of put option} = \$ 0.0096 \text{ per } \text{£}$$

$$\text{Contract size} = \text{£ } 12,500,$$

$$\text{No. of contracts} = 17$$

$$\begin{aligned} \text{Total premium in } \$ &= \$ 0.096 \times 12,500 \times 17 \\ &= \$ 20,400 \end{aligned}$$

$$\begin{aligned} \text{Buy } \$ 20,400 \text{ at SR} &= \frac{\$ 20,400}{1.5617} \\ &= \text{£ } 13,063 \end{aligned}$$

$$\begin{aligned} \text{Total Cash Outflows} &= \text{£ } 2,12,500 + \text{£ } 2,360 + \text{£ } 13,063 \\ &= \text{£ } 2,27,923. \end{aligned}$$

Currency option is best due to lower cash outflows.

Question – 46

XYZ, an Indian firm, will need to pay JAPANESE YEN (JY) 5,00,000 on 30th June. In order to hedge the risk involved in foreign currency transaction, the firm is considering two alternative methods i.e. forward market cover and currency option contract.

On 1st April, following quotations (JY/INR) are made available:

Spot	3 months forward
1.9516/1.9711.	1.9726./1.9923

The prices for forex currency option on purchase are as follows:

Strike Price	JY 2.125
Call option (June)	JY 0.047
Put option (June)	JY 0.098

For excess or balance of JY covered, the firm would use forward rate as future spot rate. You are required to recommend cheaper hedging alternative for XYZ.

(SM TYK – 33 & Exam November – 2015)

Solution:

Option 1: Forward Cover

Buy ¥ 5,00,000 at 3 Month FR

$$\text{Cash Outflow} = \frac{\text{¥ } 5,00,000}{1.9726} = \text{₹ } 2,53,472$$

Option 2: Currency Option

Step 1: Since ¥ Payable & We afraid from ¥ rising but rate is given of ₹ means ₹ falling hence we buy put option at

$$\text{EP } \text{¥/ ₹} = \text{¥ } 2.125$$

Step 2: Cash Outflow

Option Hedging

$$\text{Exposure} = \text{¥ } 5,00,000$$

$$\text{EP } \text{¥/ ₹} = \text{¥ } 2.125$$

$$\frac{\text{¥ } 5,00,000}{2.125} = 2,35,294$$

Premium

Premium of put option = JY 0.098 per ₹

Total premium (¥) = 0.098 × 2,35,294

$$= \text{¥ } 23,059$$

Buy ¥ 23,059 at SR = $\frac{\text{¥ } 23,059}{1.9516}$

$$= \text{₹ } 11,815$$

Cash Outflows (2,35,294 + 11,815) = ₹ 2,47,109

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

Currency option is better due to lower cash outflow.

Question – 47

An American firm is under obligation to pay interests of Can\$ 1010000 and Can\$ 705000 on 31st July and 30th September respectively. The Firm is risk averse and its policy is to hedge the risks involved in all foreign currency transactions. The Finance Manager of the firm is thinking of hedging the risk considering two methods i.e. fixed forward or option contracts.

It is now June 30. Following quotations regarding rates of exchange, US\$ per Can\$, from the firm's bank were obtained:

Spot	1 Month Forward	3 Months Forward
0.9284-0.9288	0.9301	0.9356

Price for a Can\$ /US\$ option on a U.S. stock exchange (cents per Can\$, payable on purchase of the option, contract size Can\$ 50000) are as follows:

Strike Price (USD/Can\$)	Calls		Puts	
	July	Sept.	July	Sept.
0.93	1.56	2.56	0.88	1.75
0.94	1.02	NA	NA	NA
0.95	0.65	1.64	1.92	2.34

According to the suggestion of finance manager if options are to be used, one month option should be bought at a strike price of 94 cents and three month option at a strike price of 95 cents and for the remainder uncovered by the options the firm would bear the risk itself. For this, it would use forward rate as the best estimate of spot. Transaction costs are ignored.

Recommend, which of the above two methods would be appropriate for the American firm to hedge its foreign exchange risk on the two interest payments.

(SM TYK – 36, MTP March – 2022 & Exam Nov – 2013)

Solution:

Option 1: Forward Cover

1 Month Exposure

Cash Outflow = Can \$ 10,10,000 × 0.9301 = \$ 9,39,401

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

3 Month Exposure

Cash Outflow = Can \$ 7,05,000 × 0.9356 = \$ 6,59,598

Option 2: Currency Option

Step 1: Since Can \$ Payable & we Afraid from Can \$ rising Hence we should buy call option

For 1 Month EP \$ 0.94 & Premium = \$ 0.0102

For 3 Month EP \$ 0.95 & Premium = \$ 0.0164

Step 2: No. of Contracts

$$1 \text{ Month} = \frac{\text{Can } \$ 10,10,000}{\text{Can } \$ 50,000} = 20 \text{ Contracts}$$

$$3 \text{ Month} = \frac{\text{Can } \$ 7,05,000}{\text{Can } \$ 50,000} = 14 \text{ Contracts}$$

	1 Month	3 Month
Option Hedging	(20 Contract × Can \$ 50,000) Can \$ 10,00,000 × 0.94 US \$ 9,40,000	(14 Contract × Can \$ 50,000) Can \$ 7,00,000 × 0.95 US \$ 6,65,000
Uncovered position using forward cover	(Can \$ 10,10,000 – Can \$ 10,00,000) Can \$ 10,000 × 0.9301 US \$ 9,301	(Can \$ 7,05,000 – 7,00,000) Can \$ 5,000 × 0.9356 US \$ 4,678
Premium	\$ 0.0102 per Can \$ (Can \$ 10,00,000 × 0.0102) = US \$ 10,200	\$ 0.0164 per Can \$ (Can \$ 7,00,000 × 0.0164) = US \$ 11,480
USD	9,59,501	6,81,158

Forward Contract is better due to lower cash outflows.

Question – 48

A Japanese company imports hi-tech printer cartridges from US worth \$1 million. The chief financial officer of the company wishes to know the best strategy for protection against uncertainty, for the payment that has to be

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

made at the end of 3 months. Financial team of the company has collected the following options for evaluation:

Table-1: Exchange rates quoted in FOREX Market:

¥/\$ Quotations	Bid Price	Offer/Ask Price
Spot Rates	146.03	146.63
3M – Forward Rates	144.03	145.00
6M – Forward Rates	146.35	146.70

Table-2 : Options Market rates for European options with 3 months expiry :

Type of Option	Strike Price (X) (¥/\$)	Premium (%) for Call & Put Options
Call & Put	145.20	1.6766% (Call) & 1.7414% (Put)
Call & Put	146.00	1.3505% (Call) & 2.1006% (Put)

The expected spot price at expiry is ¥/\$: 144.90/145.05

Suggest the best strategy for CFO of the Japanese Company to protect against uncertainty, with respect to the following alternatives :

- (i) Forward Hedge
- (ii) Buy 3 months call, X = 145.20
- (iii) Sell 3 months put, X = 145.20
- (iv) Buy call & sell put both having X = 146.00

(Exam November – 2023)

Solution:

Option 1: Forward Hedge

Buy \$ 10,00,000 at 3 months FR

$$\text{\$ } 10,00,000 \times 145 = \text{\text{¥}} 14,50,00,000$$

Option 2: Buy 3 months call, X = 145.20

Call = Right to buy

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

If expected spot price on maturity is ¥ 145.05, then company would not exercise its option

Buy \$ 10,00,000 at ¥ 145.05

$$(\$ 10,00,000 \times 145.05) = \text{¥ } 14,50,50,000$$

$$(+)\text{ Premium } (\text{¥ } 145.20 \times 1.6766\%) \times \$ 10,00,000 = \text{¥ } 24,34,423$$

$$= \text{¥ } 14,74,84,423$$

Option 3: Sell 3 months put, X = 145.20

Put = Right to sell

If expected price after 3 months is ¥ 144.90, then put option will be exercised

Buy \$ 10,00,000 at strike price

$$(\$ 10,00,000 \times 145.20) = \text{¥ } 14,52,00,000$$

(-) Received premium

$$(\text{¥ } 145.20 \times 1.7414\%) \times \$ 10,00,000 = \text{¥ } 25,28,513$$

$$= \text{¥ } 14,26,71,487$$

Option 4: Buy call & sell put at, X = 146

Premium on call

$$(\text{¥ } 146 \times 1.3505\%) \times \$ 10,00,000 = \text{¥ } 19,71,730$$

Premium received on put

$$(\text{¥ } 146 \times 2.1006\%) \times \$ 10,00,000 = \text{¥ } 30,66,876$$

$$\text{Net premium received} = \text{¥ } 10,95,146$$

If expected price to be ¥ 144.90/145.05, then call option will lapsed & put will exercise

$$\text{Buy \$ at EP } (\$ 10,00,000 \times 146) = \text{¥ } 14,60,00,000$$

$$(-)\text{ Premium} = \text{¥ } 10,95,146$$

$$= \text{₹ } 14,49,04,854$$

Decision: Option 3 is the best due to lowest cash outflows.

(7) CANCELLATION OF FORWARD CONTRACT

(I) CANCELLATION & EXTENSION OF FORWARD CONTRACT

Question – 49

An importer requests his bank to extend the forward contract for US\$ 20,000 which is due for maturity on 30th October, 2010, for a further period of 3 months. He agrees to pay the required margin money for such extension of the contract.

Contracted Rate – US\$ 1 = ₹ 42.32

The US Dollar quoted on 30-10-2010:- Spot – 41.5000/41.5200

3 months' Premium -0.87% /0.93%

Margin money for buying and selling rate is 0.075% and 0.20% respectively.

Compute:

- (i) The cost to the importer in respect of the extension of the forward contract, and
- (ii) The rate of new forward contract.

(SM TYK – 32 & Exam May – 2017)

Solution:

(i) Extension Cost

Selling Rate of Bank	= ₹ 42.32
(–) Buying Rate of Bank (41.5000 – 0.075%)	= ₹ 41.47
Gain to Bank	= ₹ 0.85
(×) Contract Size	= \$ 20,000
Extension Cost	= ₹ 17,000

(ii) Rate of New Forward Contract