

$$\begin{aligned}\text{SGD}/\text{£} &= 3.1575 \\ \text{₹}/\text{SGD} &= \text{₹}/\$ \times \$/\text{£} \times \text{SGD}/\text{£} \\ &= 45.90 \times 1.7850 \times 1/3.1575 \\ &= 25.9482 + 0.125\% \\ &= \text{₹ } 25.9806.\end{aligned}$$

04/02/2013

$$\begin{aligned}\text{₹}/\$ &= 45.97 \\ \$/\text{£} &= 1.7775 \\ \text{SGD}/\text{£} &= 3.1380 \\ \text{₹}/\text{SGD} &= 45.97 \times 1.7775 \times \frac{1}{3.1380} \\ &= 26.0341 + 0.125\% \\ &= \text{₹ } 26.0719\end{aligned}$$

Loss due to delay

$$\begin{aligned}&= (25.9806 - 26.0719) \times \text{SGD } 25,00,000 \\ &= \text{₹ } 2,28,250.\end{aligned}$$

Question - 03

The price of a bond just before a year of maturity is \$ 5,000. Its redemption value is \$ 5,250 at the end of the said period. Interest is \$ 350 p.a. The Dollar appreciates by 2% during the said period. Calculate the rate of return.

(SM TYK - 01 & Exam May - 2012)

Solution:

Rate of return

US investor

$$\text{Return} = \frac{\$ 5,250 + \$ 350 - \$ 5,000}{\$ 5,000} \times 100 = 12\%$$

Other than US investor

$$\text{Return} = [(1.12 \times 1.02) - 1] \times 100 = 14.24\%$$

Question – 04

Mr. Mammen, an Indian investor invests in a listed bond in USA. If the price of the bond at the beginning of the year is USD 100 and it is USD 103 at the end of the year. The coupon rate is 3% payable annually.

Find the return on investment in terms of home country currency if:

- (i) USD is Flat.
- (ii) USD appreciates during the year by 3%.
- (iii) USD depreciates during the year by 3%.
- (iv) Indian Rupee appreciates during the year by 5%.

(RTP May – 2022 & Exam July – 2021)

Solution:

Calculation of the return on investment

(i) If USD is flat

$$\text{Return on Investment} = \frac{\$ 106 - \$ 100}{\$ 100} \times 100 = 6\% \text{ p.a.}$$

(ii) If & appreciator by 3%

$$\text{Return on Investment} = [(1.06 \times 1.03) - 1] \times 100 = 9.18\%$$

(iii) If & deprecator by 3%

$$\text{Return on Investment} [(1.06 \times 0.97) - 1] \times 100 = 2.82\%$$

(iv) If ₹ appreciator by 5% (If \$ depreciates by 5%)

$$\text{Return on Investment} = [(1.06 \times 0.95) - 1] \times 100 = 0.7\%$$

(2) SPOT MARKET

Question – 05

Followings are the spot exchange rates quoted at three different forex markets:

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

USD/INR	48.30 in Mumbai
GBP/INR	77.52 in London
GBP/USD	1.6231 in New York

The arbitrageur has USD 1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

(SM TYK – 13)

Solution:

Arbitrage process

Sell \$ in Mumbai

$$= \$1,00,00,000 \times 48.30 = ₹ 48,30,00,000$$

Buy £ in London

$$= \frac{₹ 48,30,00,000}{77.52} = £ 62,30,650.15$$

Sell £ in New York

$$= £ 62,30,650.15 \times 1.6231 = \$ 1,01,12,968.27$$

Arbitrage

$$= \$ 1,01,12,968.27 - \$1,00,00,000 = \$ 1,12,968.27$$

Question – 06

USD 10,000 is lying idle in your Bank Account. You are able to get the following quotes from the dealers:

Dealer	Quote
A	EUR/USD 1.1539
B	EUR/GBP 0.9094
C	GBP/USD 1.2752

Is there an opportunity of gain from these quotes?

(Exam November – 2020)

Solution:

The arbitrageur can proceed as started below to realize arbitrage gains.

- (i) Buy € from US\$ 10,000 from Dealer A
 $(10,000/1.1539) = € 8,666.26$
- (ii) Convert these € to £ by selling to Dealer B
 $(€ 8,666.26 \times 0.9094) = £ 7,881.09$
- (iii) Convert £ to US\$ by selling to Dealer C
 $(£ 7,881.09 \times 1.2752) = US\$ 10,049.97$

There is net gain of US\$ 10,049.97 less US\$ 10,000 i.e. US\$ 49.97 or US\$ 50.00.

Question – 07

Citi Bank quotes JPY/ USD 105.00 - 106.50 and Honk Kong Bank quotes USD/JPY 0.0090- 0.0093.

- (a) Are these quotes identical if not then how they are different?
- (b) Is there a possibility of arbitrage?
- (c) If there is an arbitrage opportunity, then show how would you make profit from the given quotation in both cases if you are having JPY 1,00,000 or US\$ 1,000.

(RTP November – 2020)

Solution:

City bank	Honk Kong Bank
¥/\$ 105.00/106.50	\$/¥ 0.0090/0.0093
\$/¥ 0.0094/0.0095	¥/\$107.53/111.11

- (i) No. these quote are not identical, City bank's quote direct quote for yen & Honk Kong bank's quote direct quote for \$.

- (ii) Since City bank rates of \$/¥ 0.0094/0.0095, both rate are higher than Honk Kong bank's rate, hence there is a possibility of arbitrage.

Arbitrage Gain

If we have ¥ 1,00,000

Buy \$ from City Bank

$$= \frac{¥ 1,00,000}{106.50} = \$ 938.967$$

Sell \$ in Honk Kong Bank

$$= \$ 938.967 \times 107.53 = ¥ 1,00,967$$

$$\text{Gain} = ¥ 1,00,967 - ¥ 1,00,000$$

$$= ¥ 967$$

It we have \$ 1,000

Buy \$ from Honk Kong Bank

$$= \$ 1,000 \times 107.53 = ¥ 1,07,530$$

Sell \$ in City bank

$$\frac{¥ 1,07,530}{106.50} = \$ 1,009.67$$

$$\text{Gain} = \$ 1,009.67 - \$ 1,000$$

$$= \$ 9.67$$

(3) FORWARD CONTRACT

Question – 08

The following 2-way quotes appear in the foreign exchange market:

	Spot	2-months forward
RS/US \$	₹ 46.00/₹ 46.25	₹ 47.00/₹ 47.50

Required:

- (i) How many US dollars should a firm sell to get ₹ 25 lakhs after 2 months?

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

- (ii) How many Rupees is the firm required to pay to obtain US \$ 2,00,000 in the spot market?
- (iii) Assume the firm has US \$ 69,000 in current account earning no interest. ROI on Rupee investment is 10% p.a. Should the firm encase the US \$ now or 2 months later?

(SM TYK – 11)

Solution:

- (i) \$ Sell by firm to get ₹ 25,00,000

$$\frac{\text{₹ } 25,00,000}{47} = \$ 53191.49$$

- (ii) Rupees required to buy \$ 2,00,000

$$\$ 2,00,000 \times \text{₹ } 46.25 = \text{₹ } 92,50,000$$

- (iii) Encase Now

$$\text{Sell } \$ 69,000 \times 46 = \text{₹ } 31,74,000$$

Invest ₹ 31,74,000 @ 10% p.a for 2 Months

$$\begin{aligned} \text{Cash Inflow} &= 31,74,000 + (31,74,000 \times 10\% \times \frac{2}{12}) \\ &= \text{₹ } 32,26,900 \end{aligned}$$

Encase after 2 months

Sell \$ 69,000 at 2 months FR

$$\$ 69,000 \times 47 = \text{₹ } 32,43,000$$

Encase after 2 months is better due to higher cash inflows.

Question – 09

In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 01/09/2009:

\$/Pound	Probability
1.60	0.15
1.70	0.20

1.80	0.25
1.90	0.20
2.00	0.20

- (i) What is the expected spot rate for 01/09/2009?
- (ii) If, as of March, 2009, the 6-month forward rate is \$ 1.80, should the firm sell forward its pound receivables due in September, 2009?

(SM TYK – 15)

Solution:

- (i) Expected Spot Rate
- $$= (\$ 1.60 \times 0.15) + (1.70 \times 0.20) + (1.80 \times 0.25) + (1.90 \times 0.20) + (2.00 \times 0.20)$$
- $$= \$ 1.81.$$
- (ii) Since Expected spot rate is more than forward rate, hence firm should not sell its pound receivable.

Question – 10

JKL Ltd., an Indian company has an export exposure of JPY 10,000,000 receivable August 31, 2014. Japanese Yen (JPY) is not directly quoted against Indian Rupee.

The current spot rates are:

INR/US \$ = ₹ 62.22

JPY/US\$ = JPY 102.34

It is estimated that Japanese Yen will depreciate to 124 level and Indian Rupee to depreciate against US \$ to ₹ 65.

Forward rates for August 2014 are

INR/US \$ = ₹ 66.50

JPY/US\$ = JPY 110.35

Required:

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

(i) Calculate the expected loss, if the hedging is not done. How the position will change, if the firm takes forward cover?

(ii) If the spot rates on August 31, 2014 are:

$$\text{INR/US \$} = ₹ 66.25$$

$$\text{JPY/US\$} = \text{JPY } 110.85$$

Is the decision to take forward cover justified?

(SM TYK – 06 & Exam May – 2014)

Solution:

(i) **Calculation of SR, Expected SR & FR of ₹/¥**

Spot Rate:

$$\text{₹/\$} \quad 62.22$$

$$\text{¥/\$} \quad 102.34$$

$$\text{₹/¥} \quad 62.22 \times \frac{1}{102.34} = 0.6080$$

Expected SR:

$$\text{₹/\$} \quad 65$$

$$\text{¥/\$} \quad 124$$

$$\text{₹/¥} \quad 65 \times \frac{1}{124} = 0.5242$$

Forward Rate:

$$\text{₹/\$} \quad 66.50$$

$$\text{¥/\$} \quad 110.35$$

$$\text{₹/¥} \quad 66.50 \times \frac{1}{110.35} = 0.6026$$

Calculation of Expected Loss if hedging is not done

$$\text{If sell ¥ at SR (¥ 1,00,00,000} \times 0.6080) \quad = ₹ 60,80,000$$

FOREIGN EXCHANGE EXPOSURE & RISK MANAGEMENT

If Sell ¥ at Expected SR (1,00,00,000 × 0.5242)	= ₹ 52,42,000
Expected Loss	<u>= ₹ 8,38,000</u>

Calculation of lose if forward cover is done

If Sell ¥ at SR	= ₹ 60,80,000
If Sell ¥ at FR (¥ 1,00,00,000 × 0.6026)	= ₹ 60,26,000
Loss	<u>= ₹ 54,000</u>

Due to the forward contract loss is reduced to ₹ 54,000.

(ii) **Spot Rate as on August 31st, 2014**

$$₹/\$ = 66.25$$

$$¥/\$ = 110.85$$

$$₹/¥ = 66.25 \times \frac{1}{110.85} = 0.5977$$

Calculation of loss on the basis actual SR

If Sell ¥ at SR	= ₹ 60,80,000
If Sell ¥ at SR on 31/08/2014 (¥ 1,00,00,000 × 0.5977)	= ₹ 59,77,000
Loss	<u>= ₹ 1,03,000</u>

Least loss in forward cover, hence forward cover is justified.

Question – 11

A company operating in Japan has today effected sales to an Indian company, the payment being due 3 months from the date of invoice. The invoice amount is 108 lakhs yen. At today's spot rate, it is equivalent to ₹ 30 lakhs. It is anticipated that the exchange rate will decline by 10% over the 3 months period and in order to protect the yen payments, the importer proposes to take appropriate action in the foreign exchange market. The 3 months forward rate is presently quoted as 3.3 yen per rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

(SM TYK – 17)

Solution:

Calculation of Spot Rate & Estimated SR

$$\begin{aligned} \text{Spot Rate:} \quad \text{¥ 108 Lakhs} &= \text{₹ 30 Lakhs} \\ & \\ & \text{¥/₹} = \frac{\text{¥ 108}}{\text{₹ 30}} = 3.60 \end{aligned}$$

$$\text{Expected SR:} \quad \text{¥/₹} = 3.60 \times 0.90 = 3.24$$

$$\text{Forward Rate} \quad \text{¥/₹} = 3.30$$

Calculation of Expected Loss, if hedging is not done

$$\text{If Buy ¥ at SR} = \frac{\text{¥ 108}}{3.60} = \text{₹ 30 Lakhs}$$

$$\text{If Buy ¥ at Estimated SR} = \frac{\text{¥ 108 Lakhs}}{3.24} = \text{₹ 33.33 Lakhs}$$

$$\text{Expected Lose} = \text{₹ 3.33 Lakhs}$$

Calculation of loss, if covered through forward contract

$$\text{If Buy ¥ at SR} = \text{₹ 30 Lakhs}$$

$$\text{If Buy ¥ at FR} = \frac{\text{¥ 108 Lakhs}}{3.30} = \text{₹ 32.73 Lakhs}$$

$$\text{Loss} = \text{₹ 2.73 Lakhs}$$

Loss can be reduced to ₹ 2.73 Lakhs due to the forward contract.

Question – 12

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st July, 2016 for which it has to make a payment of US\$ 60,000 on December 31, 2016. The present exchange rate is 1 US \$ = ₹ 65. It can purchase forward 1 \$ at ₹ 64. The company will have to make an upfront premium @ 2% of the forward amount purchased. The cost of funds to the company is 12% per annum.

In the following situations, compute the profit/loss the company will make if it hedges its foreign exchange risk with the exchange rate on 31st December, 2016 as: