Chapter 09 – ForEx & Risk Management

Every firm and individual operating in international environment faces problems with foreign exchange i.e., the exchange of foreign currency into domestic currency and vice-a-versa. Because the value of one currency relative to another is constantly changing, the conversion become risky. It has resulted in the foreign exchange risk management becoming one of the basic issues in international financial management.

The foreign exchange transactions (i.e., for the sale and purchase of foreign currencies) take place in foreign exchange market which provides a mechanism for transfer of purchasing power from one currency to another. This market is not a physical entity like the Mumbai stock exchange or a trading center, rather it is a network of telephones among banks, foreign exchange dealers and brokers etc.

The foreign exchange market operates at **four levels**.

1) At the **first level**, there are tourists, importers, exporters, investors, etc. These are the immediate users and suppliers of foreign currencies.

2) At the **second level**, there are commercial banks who act as clearing houses between users and earners of foreign exchange.

3) At the **third level**, there are foreign exchange brokers through whom the nation's commercial banks even out their foreign exchange inflows and outflows among themselves.

4) Finally, at the **fourth and highest level** is the nation's central bank which acts as the lender or buyer of last resort when the nation's total foreign exchange earnings and expenditures are unequal. The central bank then either draws down its foreign exchange reserves or adds to them.

In short, A Foreign Exchange Market is a market in which individuals, firms and banks, buy and sell foreign exchange. It is an "Over the Counter" (OTC) Market, where foreign currencies are bought and sold against one another. The demand and supply functions play a big role in the determination of the exchange rate of the currency.

It is regulated by RBI, who appoints Authorised Dealers to give foreign exchange quotations

State the "Participants" in a Foreign Exchange Market.

The participants in the foreign exchange market can be categorized as follows:

1) **Non-bank Entities:**

Many multinational companies exchange currencies to meet their import or export commitments or hedge their transactions against fluctuations in exchange rate. Even at the individual level, there is an exchange of currency as per the needs of the individual.

2) **Banks:**

Banks also exchange currencies as per the requirements of their clients.

3) **Speculators:**

This category includes commercial and investment banks, multinational companies and hedge funds that buy and sell currencies with a view to earn profit due to fluctuations in the exchange rates.

4) **Arbitrageurs:**

This category includes those investors who make profit from price differential existing in two markets by simultaneously operating in two different markets.

5) **Governments:**

The governments participate in the foreign exchange market through the central banks. They constantly monitor the market and help in stabilizing the exchange rates.

Explain an Exchange Rate

A foreign exchange rate, which is also called a forex rate or currency rate, represents the value of a specific currency compared to that of another country.

₹ / $

The given rate is a "$" rate. In the above notation;

In the above notation, for an Indian Person:

- ₹ is the Home Currency / Domestic Currency
- $ is the Foreign Currency

In the above notation, for a US Person:

- $ is the Home Currency / Domestic Currency
- ₹ is the Foreign Currency

In a Foreign Exchange transaction, only one party remains at risk; The Party whose payable/receivable currency is different from his domestic currency remains at risk.

Explain the ways in which an Exchange Rate can be quoted.

Exchange Rates can be quoted in 2 ways – **Direct Quote and Indirect Quote**

Direct Quote	Indirect Quote
It means, how many units of Home Currency, will be needed to buy one unit of Foreign Currency.	It means, how many units of Foreign Currency, will be needed to buy one unit of Home Currency.
Eg.: ₹ / $ 60.45 – This is a dollar rate; this is a Direct Quote for *India*	Eg.: ₹ / $ 60.45 – This is a dollar rate; this is an Indirect Quote for *US*

Mathematically, it is expressed as follows: **Direct Quote** $= \frac{1}{\text{Indirect Quote}}$

Question 1:

Convert the following direct quotes into indirect quotes for India: ₹ / $ 55.75, ₹ / £ 81.63

Solution:

i. ₹ / $ 55.75 – This is a $ Rate – This is a direct quote for ₹.

This means, that this is an Indirect quote for $. Thus, Indirect Quote for ₹ = ^{1} / Indirect Quote of $ (i.e. Direct Quote for ₹)

= ^{1} / $_{55.75}$ = **$ / ₹ 0.017937**

ii. ₹ / £ 81.63 – This is a £ Rate – This is a direct quote for ₹.

This means, that this is an indirect quote for £. Thus, Indirect Quote for ₹ = ^{1} / Indirect Quote of £ (i.e. Direct Quote for ₹)

= ^{1} / $_{81.63}$ = **$ / ₹ 0.012250**

Explain the concept of Bid Rate, Ask Rate and Spread.

₹ / $ 61.00 / 63.00

Dealers Point of View — Bid Rate Ask Rate

Customer's Point of View — Sell Rate Buy Rate

In this case, the Bid Rate is ₹ / $ 61.00. It means that the dealer is ready to **buy** $ (also equivalent to the customer willing to sell $) at ₹ / $ 61.00. Similarly, the Ask Rate is ₹ / $ 63.00. It means that the dealer is ready to sell $ (also equivalent to the customer willing to buy $) at ₹ / $ 63.00.

Spread = Dealer's Profit (therefore it is always positive)

= Difference between the Ask Rate & Bid Rate

= i.e. Difference between the Customer Buy & Customer Sell rate

= ₹ / $ 63.00 (–) ₹ / $ 61.00 **= ₹ / $ 2.00**

While Solving sums, always think from the customer's point of view and choose the rate

Question 2:

Given that ₹ / $ is 64.35 / 65.65. what rate is it? What is the Bid rate, Ask rate and spread from bank point of view? Also calculate the Buy and Sell rate from customer's point of view?

Solution:

- The given quote is ₹ / $ is 64.35 / 65.65 → It is a $ rate

- Bid Rate : ₹ / $ 64.35, Ask Rate : ₹ / $ 65.65,
- Spread = ₹ / $ 65.65 (–) ₹ / $ 64.35 = ₹ / $ 1.30

- Customer Buy Rate = Ask Rate = ₹ / $ 65.65
- Customer Sell Rate = Bid Rate = ₹ / $ 64.35

Explain "Currency Conversions"

Throughout the chapter, we have to convert 30,000 ₹ into $, or 40,000 $ into ₹

₹ / $ 61.00 / 63.00 – This is a $ Rate

Step 1: Choice of Rate

- If the customer wants to buy $ – then 63.00
- If the customer wants to sell $ – then 61.00

Step 2: Divide or Multiply

- If the amount is given is $ – then multiply
- If the amount is given in ₹ – then divide

Question 3:

Consider the following rates:

₹ / £ 82.10 / 82.50

₹ / $ 59.75 / 60.15

€ / ¥ 0.0093 / 0.0097

i. European firm having surplus funds of Euro 80,000 wants to invest in Japan. What amount of Yen it will be able to Invest?

ii. An Indian student decides to do CFA course. The price of the course is $ 1,500. How much ₹ is required?

iii. A US firm exports to India and receives ₹ 42,80,000 and wants to convert ₹ into $. How much dollar is received?

Solution:

i. **European firm wants to invest € 80,000 in Japan.**

- It is a European firm : Home Currency is € – Foreign Currency is ¥
- Relevant Rate is : € / ¥ 0.0093 / 0.0097 → Yen Rate
  Sell Buy
- Since the European firm wants to invest in Japan, it means that it will either have to:
  a. Sell €, or
  b. Buy ¥
- Since the given rate is a ¥ rate, the European firm will have to buy ¥ at € / ¥ 0.0097

Amount of ¥ required = € 80,000 (x) ¥ / € rate
= € 80,000 (x) ¥ / € ($^{1}/_{0.0097}$)
= ¥ 82,47,422.68

ii. **Indian Student pays $ 1,500 for CFA Course**

- It is an Indian Student : Home Currency is ₹ – Foreign Currency is $
- Relevant Rate is : ₹ / $ 59.75 / 60.15. → Dollar Rate
  Sell Buy
- Since the Indian Students wants to pay for the CFA Course, he will have to either:
  a. Buy $, or
  b. Sell ₹
- Since the given rate is a $ rate, the Indian Student will have to buy $ at ₹ / $ 60.15

Amount of ₹ required = $ 1,500 (x) ₹ / $ rate
= $ 1,500 (x) ₹ / $ 60.15
= ₹ 90,255

iii. **US firm receives ₹ 42,80,000 from its exports**

- It is an US firm : Home Currency is $ – Foreign Currency is ₹
- Relevant Rate is : ₹ / $ 59.75 / 60.15. → Dollar Rate
  Sell Buy
- Since the US firm receives ₹, it will have to either:

a. Sell ₹, or

b. Buy $

- Since the rate given to us is a $ rate, the US firm will have to buy $ @ ₹ / $ 60.15

Amount of $ received = ₹ 42,80,000 (x) $ / ₹ rate

= ₹ 42,80,000 (x) $ / ₹ (^{1} / $_{60.15}$)

= $ 71,155.44

Explain the concept of "Inverse Rates"

Given ₹ / $ = X / Y implied $ / ₹ = (^{1} / $_Y$) / (^{1} / $_X$)

Question 4:

Given ₹ / $ 59.75 / 60.15, calculate the implied $ / ₹ rates

Solution:

₹ / $ 59.75 / 60.15 – This is a $ rate.

Therefore, the implied $ / ₹ rate = (^{1}/$_{60.15}$) / (^{1}/$_{59.75}$)

= $ / ₹ 0.016625 / 0.016736

Question 5:

Calculate the Inverse Rates for the following quotes:

₹ / $ 68.50 / 69.25

₹ / £ 90.5423 / 91.1531

₹ / CAD 50.5325 / 50.7826

₹ / SF 68.1675 / 69.1690

₹ / ¥ 0.615 / 0.620

₹ / AUD 48.672 / 48.974

Solution:

The Inverse Rates for the above quotes are as follows:

a) ₹ / $ 68.50 / 69.25

This is a $ Rate. Thus the ₹ rate shall be: $ / ₹ $\frac{1}{69.25}$ / $\frac{1}{68.50}$

= $ / ₹ 0.014440 / 0.014598

b) ₹ / £ 90.5423 / 91.1531

This is a £ Rate. Thus the ₹ rate shall be: £ / ₹ $\frac{1}{91.1531}$ / $\frac{1}{90.5423}$

= £ / ₹ 0.010971 / 0.011045

c) ₹ / CAD 50.5325 / 50.7826

This is a CAD Rate. Thus the ₹ rate shall be: CAD / ₹ $\frac{1}{50.7826}$ / $\frac{1}{50.5325}$

= CAD / ₹ 0.019692 / 0.019789

d) ₹ / SF 68.1675 / 69.1690

This is a SF Rate. Thus the ₹ rate shall be: SF / ₹ $\frac{1}{69.1690}$ / $\frac{1}{68.1675}$

= SF / ₹ 0.014452 / 0.014670

e) ₹ / ¥ 0.615 / 0.620

This is a ¥ Rate. Thus the ₹ rate shall be: ¥ / ₹ $\frac{1}{0.620}$ / $\frac{1}{0.615}$

= ¥ / ₹ 1.612903 / 1.626016

f) ₹ / AUD 48.672 / 48.974

This is an AUD Rate. Thus the ₹ rate shall be: AUD / ₹ $\frac{1}{48.974}$ / $\frac{1}{48.672}$

= AUD / ₹ 0.020419 / 0.020546

Explain the concept of "Arbitrage"

The simple notion in Arbitrage is to purchase and sell a currency simultaneously in more than one foreign exchange market.

Arbitrage is the buying and selling of the same commodity in different markets or with different dealers. Business operation involving the purchase of foreign exchange, gold, financial securities, or commodities in one market and their almost simultaneous sale in another market, in order to profit from price differentials existing between the markets.

These transactions refer to advantage derived in the transactions of foreign currencies by taking the benefits of difference in rates between two currencies at two different centers at the same time or of difference between cross rates and actual rates.

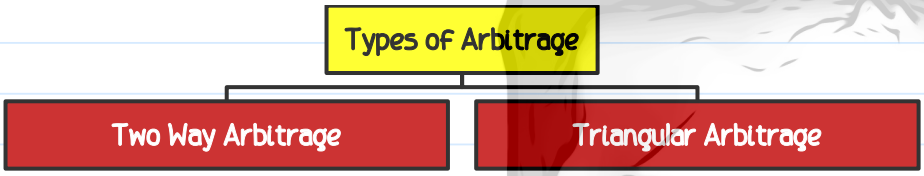
Arbitrage is not a method of hedging foreign exchange risk. in a real sense.
It is however a method of making profits from foreign exchange transactions.

In simple terms, Arbitrage is the process by which the investor makes RISKLESS Profits

What are the Rules of an Arbitrage

1. There are only 2 possible paths to an Arbitrage.
2. Both paths can never show profits.
3. Both paths CAN show losses.
4. One path can show profit and the other path can show loss.

Types of Arbitrage:



Two Way Arbitrage

Two-way arbitrage is possible if 2 banks provide different quotes, whereby the investor is in a position to buy foreign exchange from one Bank and sell the same to another bank, and make a riskless profit.

How to identify the path of Profit in Two Way Arbitrage?

Step 1: Draw a Number Line

Step 2: Plot the given quotes of both banks on the number line.

Step 3: Step 2 shall result in 2 possible outcomes:

a. The quotes of the two banks **DO NOT** overlap each other

b. The quotes of the two banks **DO** overlap each other

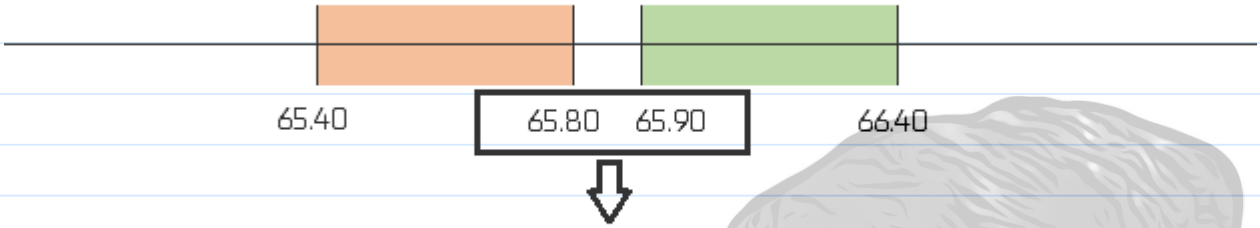
Step 4: If the situation is – 3(a) – Then Arbitrage gains can be made.

Step 5: If the situation is – 3(b) – Then Arbitrage gains cannot be made.

Example 1:

Consider the following quotes from 2 banks

		Sell	Buy
-	Bank A	₹ / $ 65.40	/ 65.80
-	Bank B	₹ / $ 65.90	/ 66.40



Path of Profit - Sell at 65.90 and buy at 65.80

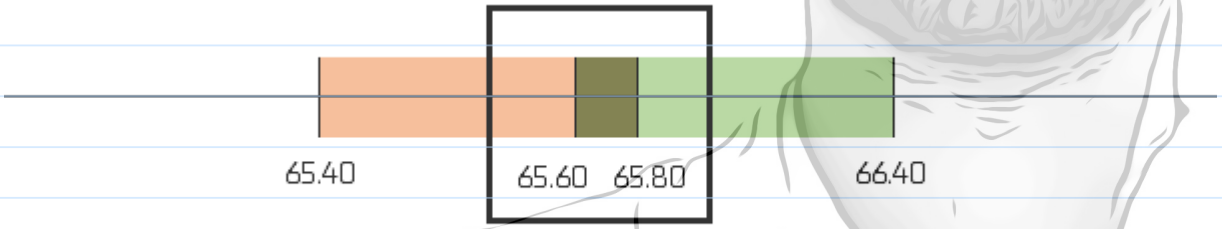
Looking at the above number line, we can see that the rates **do not** overlap each other and the investor is accordingly in a position to arbitrage, by buying $ from Bank A @ ₹ / $ 65.80 and selling the $ to Bank B at ₹ / $ 65.90, thereby making a riskless profit of ₹ 0.10 / $.

Example 2:

Consider the following quotes from 2 banks

- Bank A ₹ / $ 65.40 / 65.80
- Bank B ₹ / $ 65.60 / 66.40

Sell Buy



Overlap Each other. Thus, No Profit

Looking at the above number line, we can see that the rates **overlap** each other and the investor is accordingly **not** in a position to arbitrage.

Question 6:

Spot Rates in

- Switzerland 1 $ = 1.3689 / 1.3695 CHF (i.e. CHF / $ rate)
- USA 1 CHF = 0.7090 / 0.7236 $ (i.e. $ / CHF rate)

You have 1,000,000 CHF. What amount of profit you can make from arbitrage?

Solution:

Spot Rates in:

- Switzerland CHF / $ 1.3689 / 1.3695 → $ Rate
- USA $ / CHF 0.7090 / 0.7236 → CHF Rate
  Sell Buy

The two possible paths to an arbitrage in this case are:

I. Sell CHF in US (to receive $) at US Spot rate and sell $ (to receive CHF) in Switzerland at Switzerland Spot Rate

II. Sell CHF in Switzerland (to receive $) at Switzerland Spot rate and sell $ (to receive CHF) in US at US Spot Rate

Arbitrage Opportunity Analysis

Path 1: I. Sell CHF in US (to receive $) at US Spot and sell $ (to receive CHF) in Switzerland at Switzerland Spot.

CHF receivable after arbitrage = CHF 1,000,000 (x) $ / CHF 0.7090 (x) CHF / $ 1.3689
= **CHF 970,550.10**

Arbitrage Loss = CHF 1,000,000 (–) CHF 970,550.10 = **CHF 29,449.90**

Path 2: Sell CHF in Switzerland (to receive $) at Switzerland Spot and sell $ (to receive CHF) in US at US Spot

CHF receivable after arbitrage = CHF 1,000,000 (x) $ / CHF $^{1}/_{1.3695}$ (x) CHF / $ $^{1}/_{0.7236}$
= **CHF 1,009,112.08**

Arbitrage Profit = CHF 1,009,112.08 (–) CHF 1,000,000 = **CHF 9,112.08**

Explain the concept of "Cross Rates"

A Cross Rate is the exchange rate between two currencies implied by their exchange rates with a common third currency. Cross rates are necessary when there is no active foreign exchange market in the currency pair. The rate must be computed from the exchange rates between each of these two currencies, and a third currency.

Sr.	Available Quotes	Required Quotes	Calculation
1	₹ / $ a / b $ / £ c / d	₹ / £	a (x) c / b (x) d *[i.e. ₹ / $ (x) $ / £]*
2	₹ / $ a / b £ / $ c / d	₹ / £	a (x) (1/d) / b (x) (1/c) *[i.e. ₹ / $ (x) $ / £]*
3	$ / ₹ a / b $ / £ c / d	₹ / £	(1/b) (x) c / (1/a) (x) d *[i.e. ₹ / $ (x) $ / £]*

Question 7:

Calculate implied $ / £ rate from the given information. Bank A in US and Bank B in UK provide the following quotes

- Bank A $ / € 0.9250 / 0.9280
- Bank B £ / € 0.6150 / 0.6230

Solution:

The rates given to us are as follows:

- Bank A $ / € 0.9250 / 0.9280 – This is a € rate
- Bank B £ / € 0.6150 / 0.6230 – This is a € rate

Thus, Implied $ / £ rate = [$ / € 0.9250 (x) € / £ $^{1}/_{0.6230}$] / [$ / € 0.9280 (x) € / £ $^{1}/_{0.6150}$]

= $ / € 1.4848 / 1.5089

Question 8:

On January 28, 2015 an importer customer requested a bank to remit Singapore Dollar (SGD) 25,00,000 under an irrevocable LC. However due to bank strikes, the bank could effect the remittance only on February 4, 2015. The interbank market rates were as follows:

		January 28, 2015	February 04, 2015
Bombay	$ 1	₹ 45.85 / 45.90	₹ 45.92 / 45.97
London	£ 1	$ 1.7840 / 1.7850	$ 1.7765 / 1.7775
	£ 1	SGD 3.1575 / 3.1590	SGD 3.1380 / 3.1390

The bank wishes to retain an exchange margin of 0.125%. How much does the customer stand to gain or lose due to the delay? (Calculate the rate in multiples of 0.0001)

Solution:

An importer has SGD 25,00,000 payable. (i.e. FC Payable)

- $ and £ are the common currencies given to us to calculate the cross rates.
- Thus, it implies that the importer is an **Indian Importer**.

Home Currency = ₹, Foreign Currency = £, $, SGD

So, the Indian importer has 2 available Alternatives:

a. Buy SGD, or

b. Sell ₹

Calculation of the ₹ / SGD Implied Rate:

$$\frac{₹}{SGD} = \frac{₹}{\$} \times \frac{\$}{£} \times \frac{£}{SGD}$$

The question has given us the following quotes:

- ₹ / $ (in Bombay)
- $ / £ (in London)
- SGD / £ (in London)

Thus, the implied ₹ / SGD rate is:

January 28, 2015	February 04, 2015
$\frac{₹}{SGD_{bid}} = \frac{₹}{\$}\ 45.85 \times \frac{\$}{£} 1.7840 \times \frac{£}{SGD}\ \frac{1}{3.1590}$	$\frac{₹}{SGD_{bid}} = \frac{₹}{\$}\ 45.92 \times \frac{\$}{£} 1.7765 \times \frac{£}{SGD}\ \frac{1}{3.1390}$
= ₹ / SGD 25.8931 (Customer Sell Rate)	**= ₹ / SGD 25.9882 (Customer Sell Rate)**
$\frac{₹}{SGD_{ask}} = \frac{₹}{\$}\ 45.90 \times \frac{\$}{£} 1.7850 \times \frac{£}{SGD}\ \frac{1}{3.1575}$	$\frac{₹}{SGD_{ask}} = \frac{₹}{\$}\ 45.97 \times \frac{\$}{£} 1.7775 \times \frac{£}{SGD}\ \frac{1}{3.1380}$
= ₹ / SGD 25.9482 (Customer Buy Rate)	**= ₹ / SGD 26.0394 (Customer Buy Rate)**

Since the calculated implied rate is a SGD Rate, and the Indian Importer has to buy SGD, the applicable rate on:

- January 28, 2015 = ₹ / SGD 25.9482
- February 04, 2015 = ₹ / SGD 26.0394

Thus, the effective purchase price per $ for the Indian Importer = Rate **(+)** Exchange Margin

- January 28, 2015 = ₹ / SGD 25.9482 **(+) 0.125%** **= ₹ / SGD 25.9807**
- February 04, 2015 = ₹ / SGD 26.0394 **(+) 0.125%** **= ₹ / SGD 26.0720**

Thus, the loss due to delay = SGD 25,00,000 (x) $\frac{₹}{SGD}$ [26.0720 (−) 25.9807]

= ₹ 2,28,269

Question 9:

On September 27, 2018 an importer customer requested a bank to remit Singapore Dollar (SGD) 3,50,000 under an irrevocable LC. However due to bank strikes, the bank could effect the remittance only on September 30, 2018. The interbank market rates were as follows:

		September 27, 2018	September 30, 2018
Bombay	$ 1	₹ 65.75 / 66.15	₹ 66.05 / 66.75
London	£ 1	$ 1.6850 / 1.6900	$ 1.6765 / 1.6775
	£ 1	SGD 3.2000 / 3.2150	SGD 3.2075 / 3.2175

The bank wishes to retain an exchange margin of 0.150%. How much does the customer stand to gain or lose due to the delay? (Calculate the rate in multiples of 0.0001)

Solution:

An importer has SGD 3,50,000 payable. (i.e. FC Payable)

- $ and £ are the common currencies given to us to calculate the cross rates.
- Thus, it implies that the importer is an **Indian Importer**.

Home Currency = ₹, Foreign Currency = £, $, SGD

So, the Indian importer has 2 available Alternatives:

c. Buy SGD, or

d. Sell ₹

Calculation of the ₹ / SGD Implied Rate:

$$\frac{₹}{SGD} = \frac{₹}{\$} \times \frac{\$}{£} \times \frac{£}{SGD}$$

The question has given us the following quotes:

- ₹ / $ (in Bombay)
- $ / £ (in London)
- SGD / £ (in London)

Thus, the implied ₹ / SGD rate is:

September 27, 2018	September 30, 2018
$\frac{₹}{SGD_{bid}} = \frac{₹}{\$}\ 65.75 \times \frac{\$}{£} 1.6850 \times \frac{£}{SGD}\ \frac{1}{3.2150}$	$\frac{₹}{SGD_{bid}} = \frac{₹}{\$}\ 66.05 \times \frac{\$}{£} 1.6765 \times \frac{£}{SGD}\ \frac{1}{3.2175}$
= ₹ / SGD 34.4600 (Customer Sell Rate)	**= ₹ / SGD 34.4158 (Customer Sell Rate)**
$\frac{₹}{SGD_{ask}} = \frac{₹}{\$}\ 66.15 \times \frac{\$}{£} 1.6900 \times \frac{£}{SGD}\ \frac{1}{3.2000}$	$\frac{₹}{SGD_{ask}} = \frac{₹}{\$}\ 66.75 \times \frac{\$}{£} 1.6775 \times \frac{£}{SGD}\ \frac{1}{3.2075}$
= ₹ / SGD 34.9355 (Customer Buy Rate)	**= ₹ / SGD 34.9098 (Customer Buy Rate)**

Since the calculated implied rate is a SGD Rate, and the Indian Importer has to buy SGD, the applicable rate on:

- September 27, 2018 = ₹ / SGD 34.9355
- September 30, 2018 = ₹ / SGD 34.9098

Thus, the effective purchase price per $ for the Indian Importer = Rate **(+)** Exchange Margin

- September 27, 2018 = ₹ / SGD 34.9355 **(+) 0.150%** **= ₹ / SGD 34.9879**
- September 30, 2018 = ₹ / SGD 34.9098 **(+) 0.150%** **= ₹ / SGD 34.7537**

Thus, the profit due to delay = SGD 3,50,000 (x) $\frac{₹}{SGD}$ [34.9879 (−) 34.7537]

= ₹ 81,950

Triangular Arbitrage (a.k.a. Three Way Arbitrage)

As the name suggests, triangular arbitrage involves 3 currencies and 3 banks. Start by selling one currency and pass through the other 2 currencies and get back to the currency we started with.

If we end up with more money than we started with, there is an arbitrage profit. The rules of arbitrage as discussed in 2-way arbitrage will still hold true.

For instance, if the question provides us with 3 currencies, say $, ₹ and £, then we can start with £ and end with £. The 2 paths in such case would be:

- £ – $ – ₹ – £, or
- £ – ₹ – $ – £

Question 10:

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

- ₹ / $ 48.30 in Mumbai
- ₹ / GBP 77.52 in London
- $ / GBP 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.

Solution:

Since the arbitrageur has **$** 1,00,00,000 we shall start with $. The two possible paths are:

i. Path (i): $ – ₹ – GBP – $

ii. Path (ii): $ – GBP – ₹ – $

Arbitrage Opportunity Analysis

a) **Path 1: $ → ₹ → GBP → $**

$ receivable after arbitrage = $ 1,00,00,000 (x) ₹/$ 48.30 (x) £/₹ $^{1}/_{77.52}$ (x) $/£ 1.6231

= $ 1,01,12,968.26

Arbitrage Profit = $ 1,01,12,968.26 (–) $ 1,00,00,000

= $ 1,12,968.26

b) **Path 2: $ → GBP → ₹ → $**

Since path (i) has already shown us a profit, we need not check path (ii)

Explain the concept of Telegraphic Transfer (TT) Buy and Sell Commission

Bank charges commission on its buying and selling rates. One has to remember that these rates are given by bank. So, the buy commission should be applied on the Bank BUY (i.e. BID) Rate and the Selling commission should be applied to Bank SELL (i.e. ASK) Rate.

However, while adding and subtracting the commission, one has to *think from customer's point of view.*

Question 11:

The given interbank quote is ₹ / $ 52.10 / 52.70. TT Buying commission is 0.20%. TT Selling commission is 0.25%. Calculate the TT buying rate and the TT selling rate.

Solution:

Interbank quote		₹ / $	52.10 / 52.70
(–) Buying Commission			(0.20%)
(+) Selling Commission			0.25%
TT Rate		*₹ / $*	*51.9958 / 52.8318*
	Customer		*Sell / Buy*
	Bank		*Bid / Ask*

Explain the concept of Spot Rates and Forward Rates

- **Spot Rate:**

  It is the rate at which one can buy and sell the foreign currency **immediately** (Immediately means *2 working days*)

- **Forward Rate:**

  It is the rate that is determined / fixed **today** for buying and selling foreign currency at a later date in the future. *The forward exchange rate is set and agreed by the parties and remains fixed for the contract period regardless of the fluctuations in the spot exchange rates in future.*

Both, Spot Exchange Rate and Forward Exchange Rate are known TODAY

- **Forward Premium / Forward Discount:**

  a. **If the forward rate of a currency > Spot rate of that currency, then that currency is said to be at a premium**

  For eg. ₹ / $ Spot Rate is 60.20 and ₹ / $ 2 month Forward Rate is 62.15 – The rate is a $ rate, and $ is at a premium

  b. **If the forward rate of a currency ≤ Spot rate of that currency, then that currency is said to be at a discount**

  For eg. ₹ / $ Spot Rate is 60.20 and ₹ / $ 2 month Forward Rate is 58.64 – The rate is a $ rate, and $ is at a discount

When a $ rate is provided to us, then the formula to calculate (assume a ₹ / $ quote) Forward Premium / Discount on:

- $ $= \frac{F-S}{S} \times 100 \times \frac{12/52/365}{n}$
- ₹ $= \frac{S-F}{F} \times 100 \times \frac{12/52/365}{n}$

Remember, if $ is at a premium, then ₹ is at a discount, but NOT by the same %

Question 12:

From the following data, calculate the annualized forward premium / discount on each currency

- Spot Rate : € / £ 1.3450
- 2 month forward rate : € / £ 1.3410

Solution:

- Spot Rate : € / £ 1.3450 – This is a £ Rate
- 2 month forward rate : € / £ 1.3410 – This is a £ Rate

Since the Forward rate < Spot Rate, £ is at a discount (i.e. € is at a premium, but not by the same %)

a) **Annualised Forward Discount on £**

$$= \frac{F - S}{S} \times 100 \times \frac{12/52/365}{n}$$

$$= \frac{1.3410 - 1.3450}{1.3450} \times 100 \times \frac{12}{2} \qquad = 1.7844\ \%\ p.a.$$

b) **Annualised Forward Premium on €**

$$= \frac{S - F}{F} \times 100 \times \frac{12/52/365}{n}$$

$$= \frac{1.3450 - 1.3410}{1.3410} \times 100 \times \frac{12}{2} \qquad = 1.7897\ \%\ p.a.$$

Question 13:

From the following data, calculate the annualized forward premium / discount on each currency

- Spot Rate : ₹ / $ 66.80
- 3 month forward rate : ₹ / $ 67.35

Solution:

- Spot Rate : ₹ / $ 66.80 – This is a $ Rate
- 3 month forward rate : ₹ / $ 67.35 – This is a $ Rate

Since the Forward rate > Spot Rate, $ is at a premium (i.e. ₹ is at a discount, but not by the same %)

a) **Annualised Forward Premium on $**

$$= \frac{F - S}{S} \times 100 \times \frac{12/52/365}{n}$$

$$= \frac{67.35 - 66.80}{166.80} \times 100 \times \frac{12}{3} \qquad = 3.2934\ \%\ p.a.$$

b) **Annualised Forward Premium on ₹**

$$= \frac{S - F}{F} \times 100 \times \frac{12/52/365}{n}$$

$$= \frac{66.80 - 67.35}{67.35} \times 100 \times \frac{12}{3} \qquad = 3.2665\ \%\ p.a.$$

Question 14:

The 3 month forward rate is $ / £ 1.5865. Annualised Forward Premium on $ against £:

- Based on 3 month forward rate – 7%
- Based on 6 month forward rate – 9%

Calculate the 6 month forward rate.

Solution:

a) **Determination of Spot Rate**

3 month forward rate – $ / £ 1.5865 → £ Rate

$ is at a Premium against £.

Thus, $ Premium $= \frac{S - f}{f} \times 100 \times \frac{12/52/365}{n}$

i.e. 7.00 $= \frac{S - 1.5865}{1.5865} \times 100 \times \frac{12}{3}$

Thus, Spot Rate = **$ / £ 1.6143**

b) **Determination of 6 month Forward Rate**

Spot Rate = $ / £ 1.6143 → £ Rate

$ is at a Premium against £.

Thus, $ Premium $= \frac{S - f}{f} \times 100 \times \frac{12/52/365}{n}$

i.e. 9.00 $= \frac{1.6143 - 6 \text{ month } f}{6 \text{ month } f} \times 100 \times \frac{12}{6}$

Thus, 6 month Forward Rate = **$ / £ 1.5448**

Explain the concept of "Swap Points"

Swap rate is the difference between the spot rates and the forward rates.

Swap Points are movement in Exchange Rate expressed in absolute terms, i.e. in value Terms. Given the swap rates and swap points, we have to find the forward rates.

- If the **swap points** are 45 / 58 **(i.e. Low / High)**, it represents **premium** and thus, we should **add** them to the spot rate
- If the **swap points** are 55 / 47 **(i.e. High / Low)**, it represents **discount** and thus, we should **subtract** them from the spot rate

Explain the concept of "Price Interest Points (PIPs)"

Price Interest Point (PIPs) is the smallest unit by which a currency quotation can change. PIP in foreign currency quotation is similar to the tick size in share quotations. However, in Indian interbank market, ₹/$ rate is quoted up to 4 decimal points. **Hence minimum value change will be to the tune of 0.0001.**

For example:

1) ₹ / $ quoted to a customer is 61.75. The minimum value this rate can change is either ₹ / $ 61.74 or ₹ / $ 61.76.

   In other words, for ₹ / $ quote, the pip value is 0.01.

2) Another case is – Spot €/$ is quoted at a bid price of 1.0213 and an ask price of 1.0219.

   The difference is $ 0.0006 equal to 6 "pips"

Question 15:

Calculate the 1 month and 2 month forward rates from the following data:

- Spot Rate : 1 $ = ₹ 60.00 / 60.10
- 1 month forward swap points : 0.10 / 0.11
- 2 month forward swap points : 0.12 / 0.10

Solution:

a) **Calculation of 1 month Forward Rate**

Particulars	Rate	Remarks
Spot Rate	₹ / $ 60.00 / 60.10	
(+) Swap Points	0.10 / 0.11	Ascending Order → i.e. Premium Thus, ADD to Spot Rate
1 month Forward Rate	₹ / $ 60.10 / 60.21	

b) **Calculation of 2 month Forward Rate**

Particulars	Rate	Remarks
Spot Rate	₹ / $ 60.00 / 60.10	
(–) Swap Points	(0.12) / (0.10)	Descending Order → i.e. Discount Thus, LESS from Spot Rate
2 month Forward Rate	₹ / $ 59.88 / 60.00	

Question 16:

Calculate the 2 month and 3 month forward rates from the following data:

- Spot Rate : 1 $ = ₹ 65.00 / 67.10
- 2 month forward swap points : 0.15 / 0.19
- 3 month forward swap points : 0.26 / 0.18

Solution:

a) Calculation of 2 month Forward Rate

Particulars	Rate	Remarks
Spot Rate	₹ / $ 65.00 / 67.10	
(+) Swap Points	0.15 / 0.19	Ascending Order → i.e. Premium Thus, ADD to Spot Rate
2 month Forward Rate	₹ / $ 65.15 / 67.29	

b) Calculation of 3 month Forward Rate

Particulars	Rate	Remarks
Spot Rate	₹ / $ 65.00 / 67.10	
(–) Swap Points	(0.26) / (0.18)	Descending Order → i.e. Discount Thus, LESS from Spot Rate
3 month Forward Rate	₹ / $ 64.74 / 66.92	

Question 17:

Calculate the 2 month 15 days forward rates from the following data:

- Spot Rate : 1 $ = ₹ 63.73 / 64.89
- 2 month forward swap points : 0.15 / 0.20
- 3 month forward swap points : 0.18 / 0.14

Solution:

a) Calculation of 2 month Forward Rate

Particulars	Rate	Remarks
Spot Rate	₹ / $ 63.73 / 64.89	
(+) Swap Points	0.15 / 0.20	Ascending Order → i.e. Premium Thus, ADD to Spot Rate
2 month Forward Rate	₹ / $ 63.88 / 65.09	

b) Calculation of 3 month Forward Rate

Particulars	Rate	Remarks
Spot Rate	₹ / $ 63.73 / 64.89	
(–) Swap Points	(0.18) / (0.14)	Descending Order → i.e. Discount Thus, LESS from Spot Rate

3 month Forward Rate	₹ / $ 63.55 / 64.75	

c. Calculation of 1 month swap points between 2 months and 3 months

Particulars	Rate
2 month Forward Rate	₹ / $ 63.88 / 65.09
3 month Forward Rate	₹ / $ 63.55 / 64.75
1 month Swap Points	0.33 / 0.34

d. Calculation of 2 month 15 days forward rate

Particulars	Rate
1 month swap point (computed above)	0.33 / 0.34
Thus, swap points for 15 days	0.165 / 0.170
(+) 2 month swap Points (ascending order)	0.15 / 0.20
Thus, Swap Points for 2 months 15 days	0.315 / 0.370
Spot Rate	₹ / $ 63.73 / 64.89
Forward Rate for 2 months 15 days	₹ / $ 64.045 / 65.260

Explain "Covered Hedge and Uncovered Hedge"

If funds to fulfill the contract are **available on hand or are due to be received** by the business, the hedge is considered to be **'covered'**.

In situations where funds to fulfill the contract are **not available but have to be purchased in the spot market at some future date**, then such a hedge is known as **'uncovered'**.

Explain "Forward Cover"

Foreign Trade is subject to risk of foreign exchange rate differences. We can hedge the exposure by various methods. Forward exchange contracts are used to hedge against the adverse movement in exchange rates.

Entering into the forward market with a view to safeguard one's existing exposure (i.e. exposure of FC Receivable or FC Payable), is known as ***Hedging***

For example:

An exporter in India exports shirts to USA. He manufactures one shirt for ₹ 190 and quotes it for $ 4 per shirt, when the exchange rate is ₹ / $ 60.00. He expects to make a profit of ₹ 50 per shirt. However, the client has asked for a credit period of 4 months.

Now what can happen after 4 months is that the rates can fall and his expected profit may be reduced or even worse, be nullified. So what he can do is, he can fix the exchange rate TODAY by entering into the forward market and make an agreement with the bank to sell $'s 4 months from now at the rate decided today.

The Bank may quote a forward rate – that is **HIGHER / LOWER to the spot rate**, depending upon the forward premium / discount.

Let us say that the bank quotes ₹ / $ at 59. This will reduce the exporter's profit from ₹ 50 per shirt to ₹ 46 per shirt. ***However, this will be the final profit.*** Any further reduction will not be applicable to him. He is now protected from any further fluctuations.

Explain the possible exposure Scenario's and Strategies to adopt thereunder.

Scenario	Fear	Strategy to adopt
FC Receivable	Rates will **FALL**	**SELL** FC Forward
FC Payable	Rates will **RISE**	**BUY** FC Forward

Write a note on Non-deliverable Forward Contract (NDFs)

A Non-Deliverable Forward Contract is a cash-settled, short-term forward contract on a thinly traded or non-convertible foreign currency. The profit or loss at the time at the settlement date is calculated by taking the difference between the agreed upon exchange rate and the sport rate at the time of settlement, for an agreed upon notional amount of funds.

All NDFs have a fixing date and a settlement date. The fixing date is the date at which the difference between the prevailing market exchange rate and the agreed upon exchange rate is calculated. The settlement date is the date by which the payment of the difference is due to the party receiving payment.

NDFs are commonly quoted for time periods of one month up to one year, and are **normally quoted and settled in U.S. dollars**. They have become a popular instrument for corporations seeking to hedge exposure to foreign currencies that are not internationally traded.

Question 18:

A US firm has € 140,000 receivable after 6 months. The spot rate is $/€ 1.0427. The six months' forward rate quoted by the bank is $/€ 1.0527. How can the US firm hedge its exposure?

Solution:

The firm is a US firm. Thus, Home Currency = $ and Foreign Currency = €.

The US Firm has **€ 1,40,000 Receivable** after 6 months. Thus, the fear in the minds of the US Firm is that the rates in the future will **fall**.

Accordingly, the US Firm shall **SELL FC (i.e. €) Forward** at the 6 month $ / € Forward Rate
Thus, the applicable rate is $ / € 1.0527

Thus, accordingly, the **Amount Receivable (in $)** by the US Firm under Forward Cover after 6 months shall be = € 1,40,000 (x) $ / € 1.0527 **= $ 1,47,378**

Question 19:

An Indian Firm has $ 5,00,000 payable after 4 months. The spot rate is ₹/$ 67.75 / 68.35. The four months' forward rate quoted by the bank is ₹/$ 67.50 / 67.80. How can the Indian firm hedge its exposure? Is the decision to take forward cover justified if the spot rate at the end of 4 months is ₹/$ 67.83

Solution:

The firm is an Indian firm. Thus, Home Currency = ₹ and Foreign Currency = $.

The Indian Firm has **$ 5,00,000 Payable** after 4 months. Thus, the fear in the minds of the Indian firm is that the rates in the future will **rise**.

Accordingly, the Indian Firm shall **BUY FC (i.e. $) Forward** at the 4 month ₹ / $ Forward Rate
Thus, the applicable rate is ₹ / $ 67.80

Thus, accordingly, the **Amount Payable (in ₹)** by the Indian Firm under Forward Cover after 4 months shall be
= $ 5,00,000 (x) ₹ / $ 67.80
= ₹ 3,39,00,000

Determination of Justification of Forward Cover:

- ₹ Payable if Forward Cover is undertaken = ₹ 3,39,00,000 (computed above)
- ₹ Payable if Forward Cover is not undertaken = $ 5,00,000 (x) ₹/$ 67.83 = 3,39,15,000

Thus, Loss = ₹ 3,39,15,000 (–) ₹ 3,39,00,000 **= ₹ 15,000**

Conclusion:

The decision to take forward cover by the Indian Firm is justified.

Question 20:

In September, 1998, Multinational Industries Inc. assessed March, 1999 spot rate for pound sterling at the following rates:

→ $ 1.30/£ with probability 0.15

→ $ 1.35/£ with probability 0.20

→ $ 1.40/£ with probability 0.25

→ $ 1.45/£ with probability 0.20

→ $ 1.50/£ with probability 0.20

You are required to:

1. Calculate the expected spot rate for March, 1999?
2. If the six-month forward rate is $ 1.40, should the firm sell forward its £ 1,000 receivables due in March, 1999?

Solution:

a. **Calculation of Expected Spot Rate in March 1999**

$ / £ Rate	Probability	Probable Rate
1.30	0.15	0.1950
1.35	0.20	0.2700
1.40	0.25	0.3500
1.45	0.20	0.2900
1.50	0.20	0.3000
Expected Spot		1.4050

b. **Advise**

As the Expected Spot Rate (i.e. $ / £ 1.4050) > 6 month forward Rate ($ / £ 1.4000), it is **financially** advised to not undertake forward cover. However from a risk free perspective, it is advisable to go ahead with Forward Cover.

Question 21:

At the end of August 2018, an Indian Export company has an export exposure of HK$ 500,000 due at the end of September 2018. The HK$ is not directly quoted against the ₹. The current spot rates are:

- ₹ / $ 46.00
- HK$ / $ 2.30

It is estimated that the HK$ will depreciate to HK$ 2.50 level and the ₹ will appreciate against the $ to ₹ 47.00. One month forward rates at the end of August 2018 are:

- ₹ / $ 47.04
- HK$ / $ 2.45

Calculate the expected loss, if hedging is not done. How will the position change if the company takes a forward cover? If the spot rates in September 2018 are eventually

- ₹ / $ 47.88
- HK$ / $ 2.52

Is the decision to take forward cover justified?

Solution:

Indian Export Co. → ∴ HC = ₹ ; FC = HK$.

↓

It has HK$ 5,00,000 receivable.

∴ Fear → Rates will fall.

∴ Forward Cover strategy → Sell FC (i.e. HK$) forward.

i) Amount receivable on spot sale. [No Hedge]

∴ Equivalent ₹ = HK$ 5,00,000 (x) ₹/$ 46.00 (x) $/HK$ 1/2.30

= ₹1,00,00,000

ii) Amount receivable → Sept end → Based on Expected Spot

∴ Equivalent ₹ = HK$ 5,00,000 (x) ₹/$ 47.00 (x) $/HK$ 1/2.50

= ₹94,00,000

∴ Expected loss if hedging is not done

= ₹1,00,00,000 (-) ₹94,00,000 = ₹6,00,000

iii) Forward Cover is undertaken

∴ Equivalent ₹ = HK$ 5,00,000 (x) ₹/$ 47.04 (x) $/HK$ 1/2.45

= ₹96,00,000 (Receivable)

∴ Loss = ₹1,00,00,000 (-) ₹96,00,000

= ₹4,00,000

∴ Savings in loss = ₹6,00,000 (-) ₹4,00,000 = -₹2,00,000

iv) Amount receivable → Sept end → Based on ACTUAL SPOT

∴ Equivalent ₹ = HK$ 5,00,000 (x) ₹/$ 47.88 (x) $/HK$ 1/2.52

= ₹95,00,000.

Conclusion: The decision to go for forward cover is justified.

Explain "Cancellation of Forward Contracts"

Traditionally forward contracts are allowed in India for hedging purpose. However, the import or export order due to which the forward contracts are initially entered may be cancelled. Hence the forward contract shall also be required to be cancelled.

Cancellation involves a reverse contract. One should remember that the contract for reversal should fall on the same day when it is supposed to be executed

For Example:

On **01/01/2018** Mr. AS entered into a 3 month forward contract for the **purchase** of $ 100,000. It means that the transaction was due on 01/04/2018. Now, if he wants to cancel the contract on

- **01/02/2018:**
  Then he must enter into a ***2 month forward* sell** contract so that the sell coincides on 01/04/2018

- **01/03/2018:**
  Then he must enter into a ***1 month forward* sell** contract so that the sell coincides on 01/04/2018

- **01/04/2018:**
  Then he must enter into a ***spot* sell** contract so that the sell coincides on 01/04/2018

Profit / (Loss) on cancellation shall be credited / debited to the Customer's Account. ***As per the FEDAI (i.e. Foreign Exchange Dealer's Association of India), a flat cancellation fee of ₹ 100 is charged***

Think and write the answer from the customer's point of view, NOT Bank's point of view

If Forward Contract is cancelled

- **On / Before** the Maturity Date
  - The bank recovers / pays, as the case may be, the difference between the contracted rate and the rate at which the cancellation is effected.
- **After** the Maturity Date
  - **Gain** to Customer is **not paid to him**, but loss to customer is recovered from him
- In absence of any information from the customer
  - Contracts which have matured are **automatically cancelled on the fifteenth day from the date of maturity.** In case the fifteenth day falls on a Saturday or holiday, the contract is cancelled on the next working day.

    Exchange difference, if any, is recovered from the customer, but customer is not paid any gain accruing to him from such cancellations.

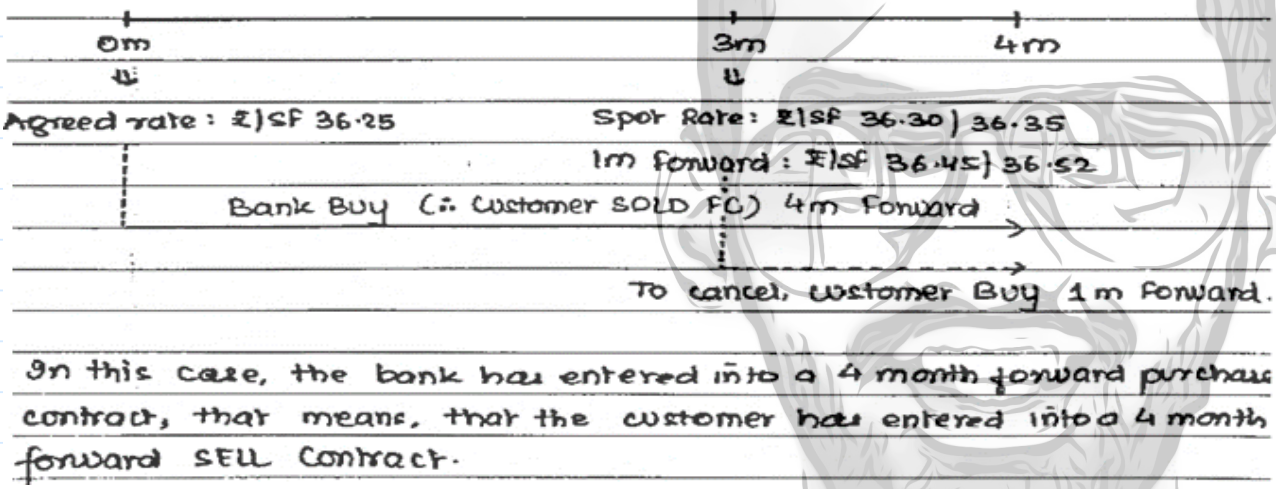
Question 22:

A customer with whom, Bank had entered into 4 months forward purchase contract for Swiss Francs (SF) 1,00,000 at the rate of ₹ 36.25 comes to the bank after 3 months, and requests cancellation of the contract. On this date, the rates are:

- Spot Rate ₹ / SF 36.30 / 36.35
- 1 month forward rate ₹ / SF 36.45 / 36.52

Determine the amount of Profit or Loss to the customer due to cancellation of the contract.

Solution:



4 month sell SF 1,00,000 @ ₹ / SF 36.25. Customer goes to the bank after 3 months for cancellation, so he will have to enter into a 1 month forward BUY contract @ ₹ / SF 36.52

1 month forward rate is ₹ / SF 36.45 / 36.52
Sell Buy

Calculation of Total Loss on Cancellation of the Forward Contract

Loss on Cancellation of the contract = SF 1,00,000 (x) ₹ / SF (36.52 (–) 36.25)	= ₹ 27,000
(+) FEDAI Charges	= ₹ 100
Total Loss	**= ₹ 27,100**

Explain "Extension / Rollover of Forward Contracts"

A Contract wherein as an Exporter, you have no Foreign Currency to Deliver at maturity and as an Importer you have no Local Currency to deliver at maturity will result in the Extension or Rollover of a Deliverable Forward Contract.

Extension involves cancellation of the OLD forward contract and entering into a new forward contract for the revised maturity.

The rationale behind the rollover is:

1) Non-receipt of Foreign Currency from client (export perspective),
2) Shortage of local currencies (Import perspective),
3) Non-agreement of payment with clients,
4) Non availability of longer period forward contracts as normally forward contracts are available maximum for one year and to hedge the exposure for the period more than one roll over contract shall be used.

A flat extension fee of ₹ 100 is charged pursuant to FEDAI guidelines on extension of a Forward Contract.

Question 23:

On 30th June 2009 when a forward contract matured for execution you are asked by an importer customer to extend the validity of the forward sale contract for $ 10,000 for a further period of three months.

Contracted Rate $ = ₹ 41.87

The US Dollar quoted on 30.6.2009.

- Spot ₹ 40.4800 / 40.4900
- Premium July 0.1100 / 0.1300
- Premium August 0.2300 / 0.2500
- Premium September 0.3500 / 0.3750

Calculate the cost for your customer in respect of the extension of the forward contract. Rupee values to be rounded off to the nearest Rupee. Margin: 0.080% for Buying Rate. Margin: 0.25% for Selling Rate.

Solution:

You have entered into a forward **sell** contract with the importer (i.e. Customer). This implies, that the importer has entered into a forward **buy** contract.

The importer has approached you for the extension of forward Contract, which involves the following two steps involves following steps

Step 1: Cancel the contract at **Customer Sell Rate**.

Step 2: Rebook the contract for three months at the current rate of exchange.

Accordingly:

Step 1: Cancel the contract at Customer Sell on 30.6.2009

Particulars	Amount
Spot Rate	₹ / $ 40.4800

(–) Bank Buy Commission @ 0.080%	₹ / $ (0.0324)
Effective Selling Rate for the Importer	**₹ / $ 40.4476**
Thus, (Profit) / Loss on Cancellation to the Importer shall be:	
- Amount payable on Purchase of Contract [₹ / $ 41.87]	₹ 4,18,700
- Amount receivable on Sale of Contract [₹ / $ 40.4476]	₹ (4,04,476)
Thus, Loss on Cancellation	**₹ 14,224**

Thus, The total loss (net of FEDAI Charges) = ₹ 14,224 (+) ₹ 100 (FEDAI Charges)

= ₹ 14,324

Step 2: New contract to be booked at the appropriate forward rate.

Particulars	Amount
Spot Rate [Customer Buy Rate]	₹ / $ 40.4900
(+) September Premium	₹ / $ 0.3750
Effective 3 month forward Buy Rate for the Importer	**₹ / $ 40.8650**
(+) Bank Selling Commission @ 0.25%	₹ / $ 0.1022
Thus, the effective 3 month forward Customer Buy Rate	**₹ / $ 40.9672**

Question 24:

An exporter requests his bank to extend the forward contract for $ 20,000 which is due for maturity on 31st October, 2014, for a further period of 3 months. He agrees to pay the required margin money for such extension of the contract.

Contracted Rate: 1 $ = ₹ 62.32

The US Dollar quoted on 31–10–2014 as:

Spot	1$ = ₹ 61.5000 / 61.5200
3 months' Discount	0.93% / 0.87%

Margin money from bank's point of view for buying and selling rate is 0.45% and 0.20% respectively.

You are required to compute:

1] The cost to the importer in respect of the extension of the forward contract, and

2] The rate of new forward contract.

Solution:

You have entered into a forward **buy** contract with the exporter (i.e. Customer).

This implies, that the exporter has entered into a forward **sell** contract.

The exporter has approached you for the extension of forward Contract, which involves the following two steps involves following steps:

Step 1: Cancel the contract at **Customer Buy Rate**.

Step 2: Rebook the contract for three months at the current rate of exchange.

Step 1: Cancel the contract at Customer Buy on 31.10.2014

Particulars	Amount
Spot Rate	₹ / $ 61.5200
(+) Margin Money @ 0.20%	₹ / $ 0.1230
Effective Buying Rate for the Exporter	**₹ / $ 61.6430**
Thus, (Profit) / Loss on Cancellation to the Exporter shall be:	
- Amount payable on Purchase of Contract [₹ / $ 61.6430]	₹ 12,32,861
- Amount receivable on Sale of Contract [₹ / $ 62.3200]	₹ (12,46,400)
Thus, Profit on Cancellation	**₹ 13,539**

Thus, The total profit (net of FEDAI Charges) = ₹ 13,539 (–) ₹ 100 (FEDAI Charges)

= ₹ 13,439

Step 2: New contract to be booked at the appropriate forward rate.

Particulars	Amount
Spot Rate [Customer Sell Rate]	₹ / $ 61.5000
(–) Discount @ 0.93%	₹ / $ (0.5720)
Effective 3 month forward Sell Rate for the Exporter	**₹ / $ 60.9280**
(–) Margin Money @ 0.45%	₹ / $ (0.2742)
Thus, the effective 3 month forward Customer Sell Rate	**₹ / $ 60.6538**

Question 25:

BC Export Co are holding an Export bill in United States Dollar (USD) 1,00,000 due 60 days hence. Rate at which deal was finalized was ₹ 47.50 per USD. The Company is worried about the fluctuating exchange rate. The firm's

Bankers have agreed to make advance against the bill after deduction of interest 9% per annum and also quoted a 60–day forward rate of ₹ 48.10. The cost of capital for the exporter is 15% p.a. Advise whether the exporter will agree to the banker's offer.

Solution:

Particulars	₹
Value of the export bill in ₹ [$ 1,00,000 (x) ₹/$ 47.50]	47,50,000
Interest @ 9% p.a. for 60 days [₹ 47,50,000 (x) 9% (x) $^{60}/_{360}$]	71,250
Net Amount to be received	46,78,750
Cost of funds @ 15% p.a. for 60 days [₹ 46,78,750 (x) 15% (x) $^{60}/_{360}$]	1,16,969
Net Savings (Cost of funds (–) Interest)	**45,719**
Difference to be paid after 60 days at forward rate [₹/$ (48.10 – 47.50) (x) $ 1,00,000]	**60,000**

Conclusion:

Since the amount of difference to be paid after 60 days exceeds the net savings to the exporter, it should not agree to the offer of his banker

Question 26:

Consider the following table:

Particulars	July 01	August 01	September 01
Spot Rate – ₹	45.30 / 45.50	45.40 / 45.60	45.75 / 45.95
1 month swap points	40 / 50	60 / 50	90 / 110
2 month swap points	70 / 80	80 / 70	130 / 150
3 month swap points	100 / 110	100 / 90	–

Evaluate the following cases:

1. Customer on July 01 sold $ 20,000 2 month forward contract and cancelled the contract on September 01 *[Hint – Profit on cancellation (net of FEDAI Charges) = ₹ 900)*
2. On August 01, the bank entered into a forward sale contract of 2 months involving $ 5,00,000. On September 01, the customer requests extension by 1 month.
3. On July 01, a customer sold $ 3,00,000 3 month forward. However on August 01, he wanted to extend the contract by 1 month

Solution:

The rates of exchange are as follows:

Particulars	July 01	August 01	September 01
Spot Rate – ₹	45.30 / 45.50	45.40 / 45.60	45.75 / 45.95
1 month forward rate	45.70 / 46.00	44.80 / 45.10	46.65 / 47.05
2 month forward rate	46.00 / 46.30	44.60 / 44.90	47.05 / 47.45
3 month forward rate	46.30 / 46.60	44.40 / 44.70	–

Case 1:

Case 2:

Case 3:

Question 27:

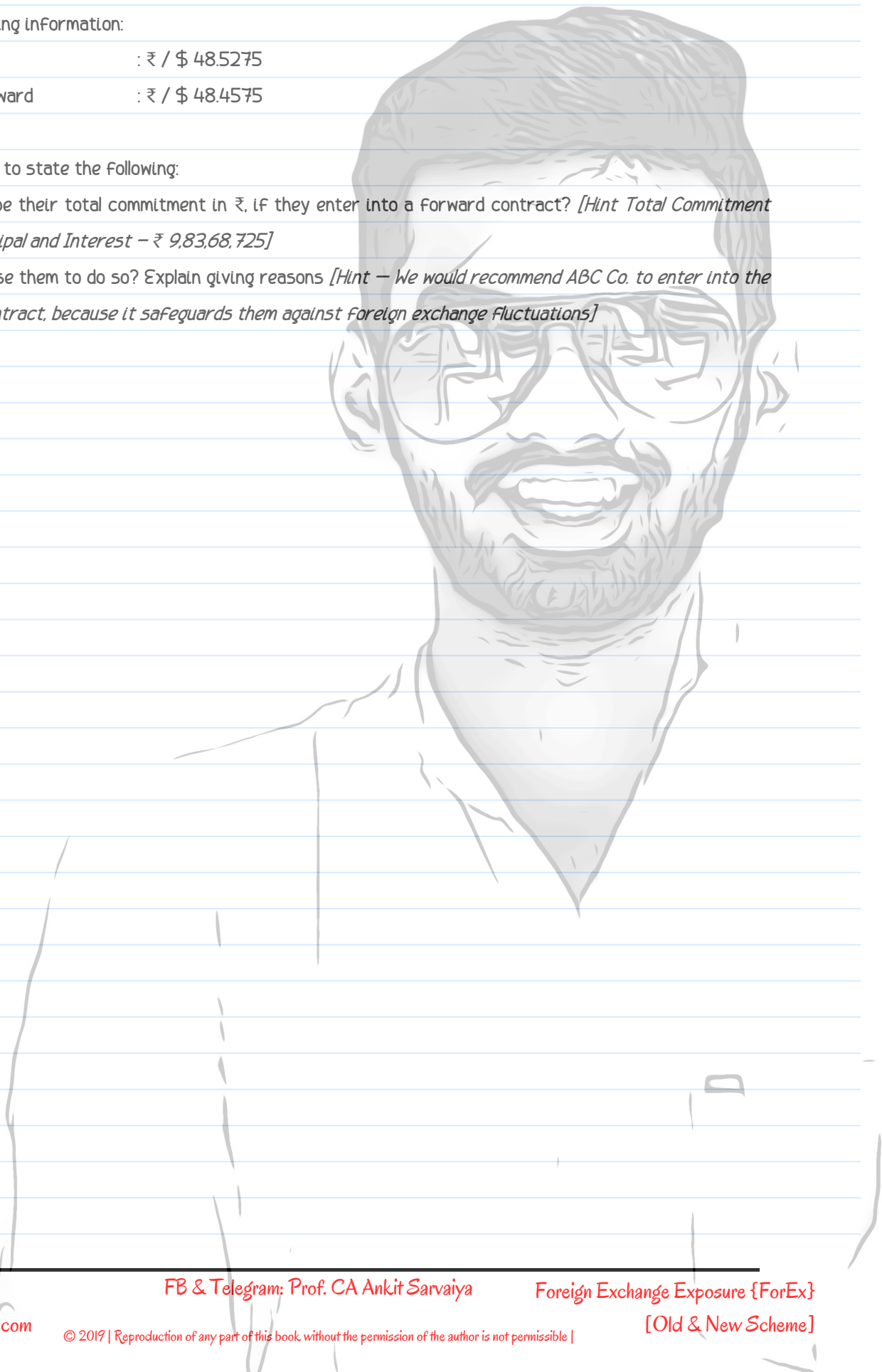
ABC Co. have taken a 6 month loan from their foreign collaborators for $ 2 millions. Interest payable on maturity is fixed at LIBOR plus 1.00%. Current 6 month LIBOR is 2%. Enquiries regarding exchange rates with their bank elicits the following information:

- Spot Rate : ₹ / $ 48.5275
- 6 month forward : ₹ / $ 48.4575

You are required to state the following:

1. What would be their total commitment in ₹, if they enter into a forward contract? *[Hint Total Commitment means Principal and Interest – ₹ 9,83,68,725]*
2. Will you advise them to do so? Explain giving reasons *[Hint – We would recommend ABC Co. to enter into the Forward Contract, because it safeguards them against foreign exchange fluctuations]*

Solution:



Explain the "Strategies for Exposure Management" of Forward Contracts

		REWARD	
		LOW	HIGH
RISK	LOW	This option involves automatic hedging of exposures in the forward market as soon as they arise, irrespective of the attractiveness or otherwise of the forward rate.	This strategy requires selective hedging of exposures whenever forward rates are attractive but keeping exposures open whenever they are not. This option is similar to an investment strategy of a combination of bonds and equities with the proportion of the two components depending on the attractiveness of prices.
	HIGH	Perhaps the worst strategy is to leave all exposures unhedged. The risk of destabilization of cash flows is very high. The merit is zero investment of managerial time or effort.	This strategy involves active trading in the currency market through continuous cancellations and rebooking's of forward contracts.

Question 28:

Place the following strategies by different persons in the Exposure Management Strategies Matrix.

Strategy 1:

Kuljeet a wholesaler of imported items imports toys from China to sell them in the domestic market to retailers. Being a sole trader, he is always so much involved in the promotion of his trade in domestic market and negotiation with foreign supplier that he never pays attention to hedge his payable in foreign currency and leaves his position unhedged.

Strategy 2:

Moni, is in the business of exporting and importing brasswares to USA and European countries. In order to capture the market he invoices the customers in their home currency. Lavi enters into forward contracts to sell the foreign exchange only if he expects some profit out of it other-wise he leaves his position open.

Strategy 3:

TSC Ltd. is in the business of software development. The company has both receivables and payables in foreign currency. The Treasury Manager of TSC Ltd. not only enters into forward contracts to hedge the exposure but carries out cancellation and extension of forward contracts on regular basis to earn profit out of the same. As a result management has started looking Treasury Department as Profit Centre.

Strategy 4:

DNB Publishers Ltd. in addition to publishing books are also in the business of importing and exporting of books. As a matter of policy the movement company invoices the customer or receives invoice from the supplier immediately covers its position in the Forward or Future markets and hence never leave the exposure open even for a single day.

Solution:

Classification of Strategies:

Strategy 1:

This strategy is covered by **High Risk : Low Reward** category and worst as it leaves all exposures unhedged. Although this strategy does not involve any time and effort, it carries high risk.

Strategy 2:

This strategy covers **Low Risk : Reasonable reward** category as the exposure is covered wherever there is anticipated profit otherwise it is left.

Strategy 3:

This strategy is covered by **High Risk : High Reward** category as to earn profit, cancellations and extensions are carried out.

Although this strategy leads to high gains but it is also accompanied by high risk.

Strategy 4:

This strategy is covered by **Low Risk : Low Reward** category as company plays a very safe game.

Diagrammatically all these strategies can be depicted as follows:

		REWARD	
		LOW	HIGH
RISK	LOW	Strategy 1	Strategy 3
	HIGH	Strategy 4	Strategy 2

Explain the Interest Rate Parity (IRP) Theory

As per this theory, the exchange rate between currencies is directly affected by their interest rate differentials.

As per this theory, in a free and efficient market, covered interest arbitrage is not possible. That means no one can gain from the difference in interest rates in different countries. No one can borrow from one country and

invest the same in other country and earn profit. It will be negated by difference between the exchange rate in the spot market and forward market.

For example:

Consider a situation where interest rate in India happens to 10% and interest rate in US is 4% respectively. Spot rate is ₹ / $ 60.

Suppose we borrow $ 1,000 for 1 year from US, then the amount payable shall be 1,000 (x) 1.04 = $ 1040. $ 1,000 which is borrowed, is brought to India at a spot rate of ₹ / $ 60. That gets him, ₹ 60,000 and he invests the same in India for a year @10%. The amount receivable would be ₹ 60,000 (x) 1.10 = ₹ 66,000. So, after the year when the person goes back to repay the loan in US the forward rate will be such that he shall not be in the position to earn Profit.

1 year forward rate under covered IRP would be ₹ / $ $^{66,000}/_{1040}$ = **₹ / $ 63.4615**, which cuts any possibility of profit.

Remember that, the country who's interest rate is lower, has its currency at a premium

The IRP Equation is: $\frac{F}{S} = \frac{1+i_A}{1+i_B}$

Remember, in case of a ₹ / $ rate, i_A means the ₹ Interest Rate, and i_B means the $ interest rate

(Denominator is the interest rate of the currency whose rate is given)

Question 29:

The United States Dollar is selling in India at ₹ 45.50. If the interest rate for a 6 month borrowing in India is 8% per annum and the corresponding rate in USA is 2% per annum;

1. Do you expect United States Dollar to be at a premium or at discount in the Indian forward market?
2. What is the expected 6 month forward rate for United States Dollar in India?

Solution:

1. Since the interest rate in US is lower as compared to India, $ is at a premium to the Rupee

2. As per the IRP Theory, the 6 month forward rate for $ in India shall be:

$$\frac{F}{S} = \frac{1+i_A}{1+i_B}$$

Thus,

$$\frac{\text{6 month F}}{₹ / \$\ 45.50} = \frac{1 + 0.04\ [\text{i.e. } 0.08\ (x)\ {}^{6\,m}/_{12\,m}]}{1 + 0.01\ [\text{i.e. } 0.02\ (x)\ {}^{6\,m}/_{12\,m}]}$$

Thus, 6 month forward rate **= ₹ / $ 46.8515**

Question 30:

1] On 1st July 2008, 3 months interest rate in the US and Germany are 6.5 per cent and 4.5 per cent per annum respectively. The $/DM spot rate is 0.6560. What would be the forward rate for DM for delivery on 30th September 2008?

2] In International Monetary Market an international forward bid on December, 15 for one Euro (€) is $ 1.2816 at the same time the price of IMM € future for delivery on December, 15 is $ 1.2806. The contract size of Euro is € 62,500. How could the dealer use arbitrage in profit from this situation and how much profit is earned?

Solution:

1) **Calculation of Forward Rate on 30th September 2008**

$ / DM Spot Rate	0.6560
$ Interest Rate (i_A)	6.50% p.a.
DM Interest Rate (i_B)	4.50% p.a.

3 month Forward Rate, based on IRP shall be:

$$\frac{F}{S} = \frac{1 + i_A}{1 + i_B}$$

Thus,

$$\frac{\text{3 month F}}{\$ / DM\ 0.6560} = \frac{1 + 0.01625\ [\text{i.e. } 0.0650\ (x)\ {}^{3\,m}/_{12\,m}]}{1 + 0.01125\ [\text{i.e. } 0.0450\ (x)\ {}^{3\,m}/_{12\,m}]}$$

Thus, 3 month forward rate **= $ / DM 0.6592**

2) **Calculation of Arbitrage Profit**

Particulars	Amount
Sell € 62,500 @ $ / € 1.2816	$ 80,100.00
Buy € 62,500 @ $ / € 1.2806	$ 80,037.50
Thus, Arbitrage Profit	**$ 62.50**

Alternatively, if the market comes back together before December 15, the dealer could unwind his position (by simultaneously buying € 62,500 forward and selling a futures contract. Both for delivery on December 15, and earn the same profit of $ 62.50.

Question 31:

On April 1, 3 months interest rate in the UK £ and US $ are 7.5% and 3.5% per annum respectively. The UK £/US $ spot rate is 0.7570. What would be the forward rate for US $ for delivery on 30th June ?

Solution:

£ / $ Spot Rate	0.7570
£ Interest Rate (i_A)	7.50% p.a.
$ Interest Rate (i_B)	3.50% p.a.

3 month Forward Rate, based on IRP shall be:

$$\frac{F}{S} = \frac{1 + i_A}{1 + i_B}$$

Thus,

$$\frac{\text{3 month } F}{£ / \$\ 0.7570} = \frac{1 + 0.01875\ [\text{i.e. } 0.0750\ (x)\ {}^{3\,m}/_{12\,m}]}{1 + 0.00875\ [\text{i.e. } 0.0350\ (x)\ {}^{3\,m}/_{12\,m}]}$$

Thus, 3 month forward rate **= £ / $ 0.7645**

Question 32:

If the interest rate for the next 6 months for the US$ is 1.5% (annual compounding). The interest rate for the € is 2% (annual compounding). The spot price of the € is US $ 1.665. The forward price is expected to be US$ 1.664. You are required to determine the correct forward price and recommend an arbitrage strategy.

Solution:

$ / € Spot Rate	1.6650
$ / € 6 months' Forward Rate	1.6650
$ Interest Rate (i_A)	1.50% for 6 months
€ Interest Rate (i_B)	2.00% for 6 months

6 month Forward Rate, based on IRP shall be:

$$\frac{F}{S} = \frac{1 + i_A}{1 + i_B}$$

Thus,

$$\frac{6 \text{ month } F}{\$ / € \ 1.6650} = \frac{1 + 0.0150}{1 + 0.0200}$$

Thus, 6 month forward rate **= $ / € 1.6568**

Strategy for Arbitrage:

Because the **Actual Forward Price is higher than the Theoretical Forward Price**, we will **sell** the forward contract.

If transaction costs could be covered, we would buy the € in the spot market at $1.665 and sell it in the forward market at $1.664. We would earn interest at the foreign interest rate of 2 percent. By selling it forward, we could then convert back to dollars at the rate of $1.664. In other words, $1.665 would be used to buy 1 unit of the €, which would grow to 1.02 units (the 2 percent € rate). Then 1.02 € would be converted back to 1.02($1.664) = $1.69728. This would be a return of $(^{\$ 1.69728}/_{\$ 1.6650}) - 1 = 0.019387$ or 1.94 percent, which is better than the US rate.

Question 33:

Spot Rate = ₹ / $ 46.50. The 9 month forward rate annualized forward premium on ₹ against $ is 6%. If the $ interest rate is 8% p.a., find out the ₹ Interest rate.

Solution:

The rate given to us in the question is a $ Rate. We are given that the ₹ is at a premium to the $. Thus

$$\text{₹ Premium} = \frac{S - F}{F} \times 100 \times \frac{12/52/365}{n}$$

$$6.00 = \frac{46.50 - F}{F} \times 100 \times \frac{12}{9}$$

9 month Forward Rate **= ₹/$ 44.4976**

₹ Interest rate based on IRP shall be:

$$\frac{F}{S} = \frac{1 + i_A}{1 + i_B}$$

Thus,

$$\frac{₹ / \$ \ 44.4976}{₹ / \$ \ 46.50} = \frac{1 + i_A}{1 + (0.08 \times {}^{9}/_{12})}$$

Thus, ₹ Interest Rate = 1.4354 % (9 months)

= 1.9139% p.a.

Explain the Process of "Arbitrage" under IRP Theory

IRP Arbitrage involves 4 steps:

Step	What to do?
1	Borrow and Calculate the amount payable on maturity
2	Convert to another currency at SPOT rate
3	Invest and calculate the amount receivable
4	Convert the amount receivable back into home currency & calculate the profit (loss)

Question 34:

Consider the following information:

Exchange rate

- Canadian Dollar 0.665 per DM (Spot)
- Canadian Dollar 0.670 per DM (3 months forward)

Interest rates

- DM – 7% p.a.
- Canadian Dollar – 9% p.a.

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

Solution:

The rates given to us are as follows:

- Spot Rate CD / DM 0.665 – It is a DM rate
- 3 months forward CD / DM 0.670 – It is a DM rate

Accordingly, i_A – CD Interest Rate – 9% p.a. – 2.25% for 3 months

i_B – DM Interest Rate – 7% p.a. – 1.75% for 3 months

The two possible paths to arbitrage are:

i. Borrow Canadian Dollar (It is assumed that CD 10,000 are borrowed)

ii. Borrow Deutsche Mark (It is assumed that DM 10,000 are borrowed)

Arbitrage opportunity Analysis

Path 1: Borrow Canadian Dollar (It is assumed that CD 10,000 are borrowed)

Step	Description	Calculation
1	Borrow and Calculate the amount payable on maturity	Amount payable = CD 10,000 (x) 1.0225 = CD 10,225
2	Convert to another currency at SPOT rate	Amount received = CD 10,000 (x) DM / CD $^{1}/_{0.665}$ = DM 15,037.59
3	Invest and calculate the amount receivable	Amount receivable = DM 15,037.59 (x) 1.0175 = DM 15,300.75
4	Convert the amount receivable back into home currency and calculate the profit / (loss)	Sell 15,300.75 DM @ 3 m CD / DM Forward Rate. Amount Receivable = DM 15,300.75 (x) CD / DM 0.670 = CD 10,251.50

Arbitrage Profit = CD 10,251.50 (–) CD 10,225.00 = CD 26.50

Path 2: Borrow Deutsche Mark (It is assumed that DM 10,000 are borrowed)

Since we have reached profit in path (1) itself, we need perform calculations on path (2)

Explain the Process of "Hedging" under IRP Theory (a.k.a. Money Market Cover – MMC)

Hedging is undertaken with a view to safeguard its exposure. We have earlier discussed Forward cover as a tool to safeguard oneself against foreign currency exposure. Now the knowledge of IRP has helped us to establish the relationship between F, S, iA and iB.

Now, instead of using F we can hedge ourselves by using S, iA, and iB. This is known as money market cover.

Money Market Cover uses Spot and interest rates of two countries.

For MMC, remember – step 1 is always to CUT the exposure

Explain the various Scenario's, and Strategies to adopt in MMC

Sr.	Scenario	Strategy	Logic
1	FC Receivable	Borrow → Sell → Invest	We have FC receivable – we have to cut the exposure – for which – we need to take a payable position – thus, borrow. Once we borrow, we shall have FC, which we shall sell and buy HC, which will be invested to get HC at its due date

2	FC Payable	**Invest → Buy → Borrow**	We have FC payable – we have to cut the exposure – for which – we need to take a receivable position – **thus, invest.** To invest, we will have to buy FC through HC, which we have to borrow.

Question 35:

A US firm has £ 50,000 payable after 3 months.

- Spot Rate $ / £ 1.6210 / 1.6250
- 3 month forward $ / £ 1.6280 / 1.6350
- 3 month interest rate $ – 6% / 7%
  £ – 4% / 5%

Advice the US firm regarding forward cover or money market cover.

Solution:

It is a US firm, which has £ 50,000 payable after 3 months. For US firm – HC = $, FC = £

1) **If Forward Cover is Taken**

Relevant Rate = 3 month forward Rate = $/£ 1.6280 / 1.6350 (This is a £ Rate)
Sell Buy

The US firm had £ payable after 3 months. Thus, it has to **BUY** £ at $/£ 1.6350.

Amount payable shall be = £ 50,000 (x) $/£ 1.6350 **= $ 81,750**

2) **If Money Market Cover is taken**

The exposure is **FC Payable**. Thus, the Strategy will be: **Invest → Buy → Borrow**

Sr	Description	Calculation
1	Invest £ to receive £ 50,000 after 3 months Relevant Interest Rate – £ Rate. **Invest £ = Sell £.** Thus, the relevant interest rate = 4% p.a. = 1% for 3 months	= £ 50,000 / 1.01 = £ 49,504.95
2	Buy £ 49,504.95 at Spot Rate Relevant rate – $ / £ Spot 1.6210 / 1.6250 ∴ Buy £ at $ / £ 1.6250	= £ 49,504.95 (x) $ / £ 1.6250 = $ 80,445.54

3	Borrow $ 80,445.54 for 3 months	= $ 80445.54 (x) 1.0175
	Relevant Interest Rate – $ Rate. **Borrow $ = Buy $.**	***= $ 81,853.34***
	Thus, the relevant interest rate = 7% p.a. = 1.75 % for 3 months	

Conclusion: Go for Forward Cover (as it results in lower outflow of $)

Question 36:

A US firm has £ 50,000 receivable after 3 months.

- Spot Rate $ / £ 1.6210 / 1.6250
- 3 month forward $ / £ 1.6280 / 1.6350
- 3 month interest rate $ – 6% / 7%
  £ – 4% / 5%

Advice the US firm regarding forward cover or money market cover.

Solution:

It is a US firm, which has £ 50,000 receivable after 3 months. For US firm – HC = $, FC = £

1) **If Forward Cover is Taken**

Relevant Rate = 3 month Forward Rate = $/£ 1.6280 / 1.6350 (This is a £ Rate)

Sell Buy

The US firm had £ receivable after 3 months. Thus, it has to **SELL** £ at $/£ 1.6280.

Amount payable shall be = £ 50,000 (x) $/£ 1.6280 **= $ 81,400**

2) **If Money Market Cover is taken**

The exposure is **FC Receivable**. Thus, the Strategy will be: **Borrow → Sell → Invest**

Sr	Description	Calculation
1	Borrow £ to receive £ 50,000 after 3 months	= £ 50,000 / 1.0125
	Relevant Interest Rate – £ Rate. **Invest £ = Sell £.**	= £ 49,382.72
	Thus, the relevant interest rate = 5% p.a. = 1.25 % for 3 months	
2	Sell £ 49,382.72 at Spot Rate	= £ 49,382.72 (x) $ / £ 1.6210
	Relevant rate – $ / £ Spot 1.6210 / 1.6250	= $ 80,049.38
	∴ Buy £ at $ / £ 1.6210	

3	Invest $ 80,049.38 for 3 months	= $ 80,049.38 (x) 1.0150
	Relevant Interest Rate – $ Rate. **Invest $ = Sell $.**	***= $ 81,250.12***
	Thus, the relevant interest rate = 6% p.a. = 1.50 % for 3 months	

Conclusion: Go for Forward Cover (as it results in higher inflow of $)

Question 37:

A UK firm has € 90,000 receivable 6 months from now.

- Spot Rate € / £ 1.5320 / 1.5350
- 6 month swap points £ 80 / 60
- 6 month interest rate £ – 7% / 8%;
  € – 3% / 4%

Advice the US firm regarding forward cover or money market cover.

Solution:

The exchange rate quotes available with us are as follows:

- Spot Rate € / £ 1.5320 / 1.5350 – It is a £ rate
  £ / € (1/1.5350) / (1/1.5320) – It is a € rate
  £ / € 0.6515 / 0.6527 – It is a € rate
- 6 month swap points £ 80 / 60
- *Thus, 6 month forward rate is* *€ / £ 1.5240 / 1.5290*
  Sell Buy

i. **If Forward Cover is Taken**

US firm has FC Receivable. Fear is – Price will **Fall**. Thus, Strategy is to **Sell** FC Forward

Thus, Amount receivable = € 90,000 (x) £ / € 6 month Forward Customer Sell Rate
= € 90,000 (x) £ / € $^{1}/_{1.5290}$
= £ 58,862

ii. **If MMC is taken**

The exposure is **FC Receivable**. Thus, the Strategy will be: **Borrow → Sell → Invest.**

Sr	Description	Calculation
1	Borrow € to pay € 90,000 after 6 months	= $^{€\ 90,000}/_{1.02}$
	Relevant Interest Rate – € Rate	= € 88,235.29

	Borrow € = Buy € £. Thus, the relevant interest rate = 4% p.a. = 2 % for 6 months	
2	Sell € 88,235.29 at Spot Rate Relevant rate – £ / € Spot 0.6515 / 0.6527. ∴ Sell € at £ / € 0.6515	= € 88,235.29 (x) £ / € 0.6515 = £ 57,485.29
3	Invest £ 57,485.29 for 6 months Relevant Interest Rate – £ Rate **Invest £ = Sell £.** Thus, the relevant interest rate = 7% p.a. = 3.50 % for 6 months	= £ 57,485.29 (x) 1.0150 ***= £ 59,497.28***

Conclusion: Go for Money Market Cover (as it results in higher inflow of £)

Question 38:

Columbus Surgicals Inc. is based in US, has recently imported surgical raw materials from the UK and has been invoiced for £ 480,000, payable in 3 months. It has also exported surgical goods to India and France. The Indian customer has been invoiced for £ 138,000, payable in 3 months, and the French customer has been invoiced for € 590,000, payable in 4 months. Current spot and forward rates are as follows:

	£ / US $
Spot	0.9830 – 0.9850
Three months forward	0.9520 – 0.9545

	US $ / €
Spot	1.8890 – 1.8920
Four months forward	1.9510 – 1.9540

Current money market rates are as follows:

UK	10.00% – 12.00% p.a.
France	14.00% – 16.00% p.a.
USA	11.50% – 13.00% p.a.

You as the Treasury Manager are required to show how the company can hedge its foreign exchange exposure using Forward markets and Money markets and suggest the best hedge option.

Solution:

Dealing with the £ Exposure of the company

Since Columbus has a £ receipt (£ 138,000) and £ payment of (£ 480,000) maturing at the same time i.e. 3 months, it can match them against each other leaving a net liability of £ 342,000 to be hedged.

1) **Forward market hedge**

The company has a net FC Payable exposure. Accordingly, the strategy would be to Buy £ Forward Contract and accordingly, the amount payable after 3 months will be £ 342,000 (x) $/£ $^{1}/_{0.9520}$ **= $ 359,244**

2) **Money market hedge**

To pay £ after 3 months' Columbus shall requires to borrow in $ and translate to £ and then deposit in £. (Invest – Buy – Borrow)

Step 1. Invest

For payment of £ 342,000 in 3 months (@ 2.5% interest) amount required to be deposited now shall be:

= (£ 342,000 / 1.025)

= £ 333,658

Step 2. Buy

At spot rate of £/$ 0.9830, a $ loan needed will be equal to:

= £ 333,658 (x) $/£ $^{1}/_{0.9830}$

= $ 339,429

Step 3. Borrow

Loan repayable after 3 months (@ 3.25% interest) will be equal to:

= $ 339,429 (x) 1.0325

= $ 350,460

Conclusion:

In this case the money market hedge is a cheaper option.

Dealing with the € Exposure of the company

€ Receipt Amount to be hedged = € 590,000

Now we Convert exchange rates to home currency

	€ / US$
Spot	0.5285 – 0.5294
4 months forward	0.5118 – 0.5126

1) **Forward market hedge**

The company has a net FC Receivable exposure. Accordingly, the strategy would be to Sell € Forward Contract and accordingly, the amount receivable after 4 months will be € 590,000 (x) $/€ $^{1}/_{0.5126}$ **= $ 1,150,995**

2) **Money market hedge**

To receive $ after 4 months' Columbus shall requires to borrow in € and translate to $ and then deposit in $. (Borrow – Sell – Invest)

Step 1. Borrow

For receipt of € 590,000 in 4 months (@ 5.33% interest) amount required to be borrowed now shall be:

= (€ 590,000 / 1.0533)

= € 560,144

Step 2. Sell

At spot rate of €/$ 0.5294, a $ deposit needed will be equal to:

= € 560,144 (x) $/€ $^{1}/_{0.5294}$

= $ 1,058,074

Step 3. Invest

Amount receivable after 4 months (@ 3.83% interest) shall equal to:

= $ 1,058,074 (x) 1.0383

= $ 1,098,598

Conclusion:

In this case the forward cover hedge is a better option.

Question 39:

Wenden Co is a Dutch-based company which has the following expected transactions.

One month: Expected receipt of	£ 2,40,000
One month: Expected payment of	£ 1,40,000
Three months: Expected receipts of	£ 3,00,000

The finance manager has collected the following information:

Spot rate (£ per €):	1.7820 ± 0.0002
One month forward rate (£ per €):	1.7829 ± 0.0003
Three months forward rate (£ per €):	1.7846 ± 0.0004

Money market rates for Wenden Co.

	Borrowing	Deposit
One year Euro Interest Rate	4.90%	4.60%
One year Sterling Interest Rate	5.40%	5.10%

You are required to:

1. Calculate the expected Euro receipts in one month and in three months using the forward market.
2. Calculate the expected Euro receipts in three months using a money-market hedge and recommend whether a forward market hedge or a money market hedge should be used.

Solution:

1) **Evaluation of Forward Cover Hedge**

- **One month Receipt's**

Net receipt in 1 month = £ 2,40,000 (–) £1,40,000 = £ 1,00,000

Wenden Co needs to sell Sterling at an exchange rate of £/€ (1.7829 + 0.0003) = £/€ 1.7832

Euro value of net receipt = £ 1,00,000 (x) €/£ $^{1}/_{1.7832}$ = € 56,079

- **Three Month Receipt's**

Receipt in 3 months = £ 3,00,000

Wenden Co needs to sell Sterling at an exchange rate of £/€ (1.7846 + 0.0004) = £/€ 1.7850

Euro value of receipt in 3 months = £ 3,00,000 (x) €/£ $^{1}/_{1.7850}$ = € 1,68,067

2) **Evaluation of Money Market Hedge (Borrow – Sell – Invest)**

Expected Receipts after 3 months = £ 300,000

Step 1. Borrow

For receipt of £ 300,000 in 3 months (@ 5.40% interest p.a.) amount required to be borrowed now shall be:

= (£ 300,000 / 1.0135)

= £ 296,004

Step 2. Sell

At spot rate of £/€ [1.7820 + 0.0002], a € deposit needed will be equal to:

= £ 296,004 (x) €/£ $^{1}/_{1.7822}$

= € 166,089

Step 3. Invest

Amount receivable after 3 months (@ 4.60% interest p.a.) shall equal to:

= € 166,089 (x) 1.0115

= € 167,999

Conclusion:

The forward market is marginally preferable to the money market hedge for the Sterling receipt expected after 3 months.

Explain the Purchasing Power Parity (PPP) Theory

The Purchasing Power Theory refers to the amount of goods and services that money can buy. Inflation erodes the purchasing power of money.

Exchange rates are affected by inflation. Higher rate of inflation in one country (as compared to the other country, results in discount of currency of that country and vice versa)

The ***ABSOLUTE FORM of PPP***, also called the 'Law of One Price' suggests that prices of similar products of two different countries should be equal, when measured in a common currency

For Example:

Suppose of 1 Kg of Rice is available in India for ₹ 50 and the same is available in the US for $ 1. The exchange rate established is 1$ = ₹ 50.

Now let us assume that the inflation rates in India is 10% and 5% in US. So, after a year, 1 Kg of rice will be available in US for $ 1.05, and the same will be available in India for ₹ 55. So, now the exchange rate will be $ 1.05 = ₹ 55 – i.e. $ 1 = 52.38095. This shows that the $ has become expensive in India, i.e. $ is at a Premium and ₹ is at a discount (as the rate given is a $ rate)

In short, the exchange rates are affected by the inflation rates in various countries.

We must co-relate PPP with IRP as the math's Involved is same. The country whose inflation rate is lower, has its currency at a Premium

The PPP Equation is: $\frac{E(S)}{S} = \frac{1+r_A}{1+r_B}$

Here, 'r' refers to the Inflation rate. Remember, in case of a ₹ / $ rate, r_A means the ₹ Inflation Rate, and r_B means the $ inflation rate (Denominator is the inflation rate of the currency whose rate is given)

Question 40:

- Spot Rate ₹ / $ 50.00
- Expected Inflation in India 8% p.a.
- Expected Inflation in US 3% p.a.

Find E(S) [i.e. Expected Spot Rate] after 1 year and 3 years.

Solution:

Spot Rate is ₹ / $ 50.00. As per the PPP Theory,

$$\frac{E(S)}{S} = \frac{1+r_A}{1+r_B}$$

Thus, Expected Spot Rate at the end of Year 1: $\frac{E(S)}{50} = \frac{1.08}{1.03}$ = ₹/$ 52.43

Thus, Expected Spot Rate at the end of Year 3: $E(S) = 50 \text{ (x) } \frac{1.08}{1.03} \text{ (x) } \frac{1.08}{1.03} \text{ (x) } \frac{1.08}{1.03}$ = ₹/$ 57.64

Explain the process of "Arbitrage" under the PPP Theory

Purchasing Power Parity Theory states that higher inflation in one country will be offset by depreciation in the currency of that country. PPP theory should hold good, to prevent commodity arbitrage.

There are **two forms of PPP Theory**, viz:

a) **Absolute Form of PPP**

Consider a common basket of commodities which is priced at $ 1,000 in US and ₹ 60,000 in India. So we have $ 1,000 = ₹ 60,000 or ₹ / $ 60.00.

Assuming that there are no transportation costs and trade barriers, law of one 1 price must hold good to prevent commodity arbitrage. Suppose the actual exchange rate is ₹ / $ 61.50, this means that the commodity is relatively overpriced in the US, i.e. relatively underpriced in India.

Arbitrage in this case would involve the following steps:

1. Buy the commodity in India : Outflow ₹ 60,000
2. Sell the commodity in US : Inflow $ 1,000
3. Convert $ 1,000 into ₹ through the forex market, getting $ 1,000 (x) ₹ / $ 61.50 = ₹ 61,500

If everybody joins this party

- On Account of step 1, commodity price in India will rise. (as demand increases)

- On Account of step 2, commodity price in US will fall. (as supply increases)
- On Account of Step 3, exchange rate (₹ / $ rate) will fall.

The party will come to an end (i.e. arbitrage will stop), when the exchange rate shall be:

$$₹ / \$ = \frac{\text{Price Basket in India}}{\text{Price Basket in US}}$$

b) **Relative Form of PPP**

It means that if the inflation rate in one country is higher than that in another country then the effect of this high inflation is offset by the depreciation in the currency of that country.

Question 41:

The price of a commodity in UK is £ 150, while in the US it is $ 225. Exchange rate is presently fixed at $ / £ 1.65. Explain the process of Commodity Arbitrage.

Solution:

i. **Path 1 – Buy in UK and Sell in US**

→ Buy the commodity in UK : Outflow £ 150

→ Sell the commodity in US : Inflow $ 225

→ Convert $ 225 into £ through the forex market, getting $ 225 (x) £ / $ (1/1.65) = £ 136.36

Arbitrage Loss = £ 150 (–) £ 136.36 = £ 13.64

ii. **Path 2 – Buy in US and Sell in UK**

→ Buy the commodity in US : Outflow $ 225

→ Sell the commodity in UK : Inflow £ 150

→ Convert £ 150 into $ through the forex market, getting £ 150 (x) $ / £ 1.65 = $ 247.50

Arbitrage Profit = $ 247.50 (–) $ 225 = $ 22.50

Write a note on The International Fischer Effect (IFE) Theory

International Fisher Effect is the relationship between interest rate differentials and inflation differentials (i.e. Interest Rate and Inflation Rates). According to the IFE, 'nominal risk–free interest rates contain a real rate of return and anticipated inflation'. This means if investors of all countries require the same real return, interest rate differentials between countries may be the result of differential in expected inflation.

The Fisher Effect states that:

(1 + Nominal Interest) = (1 + Real Interest rate) x (1 + Inflation Rate)

As per the Uncovered IRP Theory: $\frac{E(S)}{S} = \frac{1+i_A}{1+i_B}$ (i.e. Interest Rate Differentials)

As per the Uncovered PPP Theory: $\frac{E(S)}{S} = \frac{1+r_A}{1+r_B}$ (i.e. Inflation Rate Differentials)

i.e. Ratio of Interest Rate Factors = Ratio of Inflation Rate Factors

Thus, based on the International Fischer Effect: $\frac{1+i_A}{1+i_B} = \frac{1+r_A}{1+r_B}$

Question 42:

From the following data, calculate the Interest Rate in US.

- Interest rate in India (i_A) : 10%
- Inflation rate in India (r_A) : 6%
- Inflation rate in US (r_B) : 4%

Solution:

Let the Interest Rate in US = i_B

Based on the International Fischer Effect,

$$\frac{1+i_A}{1+i_B} = \frac{1+r_A}{1+r_B}$$

Thus, $\frac{1+0.10}{1+i_B} = \frac{1+0.06}{1+0.04}$

Thus, Interest Rate in US (i_B) = **7.92% p.a.**

Question 43:

XYZ Ltd. is considering a project in Luxemburg, which will involve an initial investment of € 1,30,00,000. The project will have 5 years of life. Current spot exchange rate is Rs.58 per €. The risk free rate in Germany is 8% and the same in India is 12%.

Cash inflow from the project are as follows:

Year	Cash Inflow (€)
1	3,00,00,000
2	2,50,00,000
3	3,50,00,000
4	4,00,00,000
5	6,00,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

Solution:

As per the International Fischer Effect:

(1 + Nominal Interest) = (1 + Real Interest rate) x (1 + Risk Premium)

(1 + 0.14) = (1 + 0.12) x (1 + Risk Premium)

Thus, **Risk Premium = 1.7857%**

Therefore, Risk adjusted dollar rate is = 1.017857 (x) 1.08

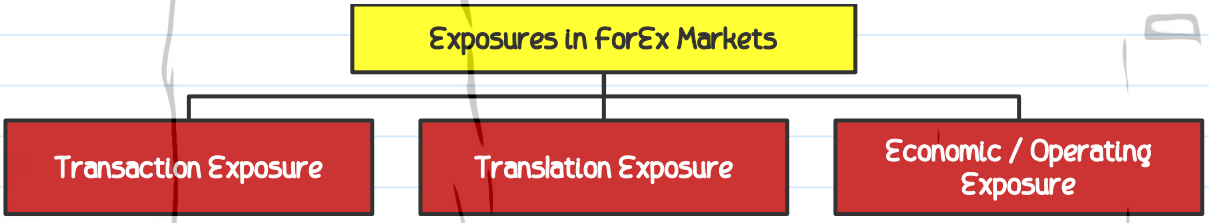
= 1.0992857 – 1 = 0.0992859

Calculation of NPV

Year	Cash Inflow(€)	PVF @ 9.92857%	PV of CF(€)
1	30,00,000	0.9097	27,29,045
2	25,00,000	0.8275	20,68,802
3	35,00,000	0.7528	26,34,731
4	40,00,000	0.6848	27,39,162
5	60,00,000	0.6229	37,37,647
PV of Inflows			1,39,09,386
(–) PV of Outflows			–1,30,00,000
NPV			9,09,386

Explain the various types of Currency Exposure in ForEX Markets

Foreign Exchange Exposure is defined as sensitivity of changes in the value of the firm on account of changes in foreign exchange rates. Foreign exchange exposure is divided into three parts:



1. **Transaction Exposure:**

It is concerned with gain / loss arising out of foreign exchange rate fluctuations on account of outstanding payables and receivables in foreign currency. It measures the effect of an exchange rate change on outstanding obligations that existed before exchange rates changed but were settled after the exchange rate changes.

For Example:

Suppose an Indian firm has $ 60,000 receivable after 6 months. If the $ falls, then the firm shall make loss. On the other hand, Suppose an Indian firm has $ 70,000 payable after 6 months. If the $ rises, then the firm shall make loss.

2. **Translation Exposure:**

Also known as accounting exposure or balance sheet exposure, it refers to gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for consolidation purposes.

This relates to the translation of financial statements of foreign subsidiaries & branches into the Parent company's home currency. It refers to the probability of loss that the firm may have to face because of decrease in value of assets due to devaluation of a foreign currency despite the fact that there was no foreign exchange transaction during the year. For this purpose, firms follow "Revised AS 11" – The Net result of this process results in gain / loss, and there by affects the value of firm.

3. **Economic or Operating Exposure:**

It refers to the extent to which the economic value of a company can decline due to changes in exchange rate. It is the overall impact of exchange rate changes on the value of the firm. The essence of economic exposure is that exchange rate changes significantly alter the cost of a firm's inputs and the prices of its outputs and thereby influence its competitive position substantially. It is an Indirect exposure faced by all firms and arises out of the competitive nature of business.

For example:

Suppose a firm is establishing a subsidiary in a foreign country which is selling the goods produced by the firm in that country. It estimates that a large quantity will be sold at attractive prices. Suppose the currency of that country falls and the market is not in a position to absorb the increase in price, future income of the firm and future cash flows of the firm will also fall.

Question 44:

An automobile company in Gujarat exports its goods to Singapore, at the price of SG$ 500 per unit. The company also imports components from Italy and the cost of components for each unit is € 200. The company's CEO executed an agreement for the supply of 20,000 units on January 01 2018, and on the same date paid for the imported components. The company's variable cost of producing one unit is ₹ 1,250 and the allocable fixed costs of the company are ₹ 1,00,00,000. The exchange rates as on January 01, 2018 are as follows:

- Spot Rate ₹ / SG $ 33.00 / 33.04
- Spot Rate ₹ / € 56.49 / 56.56

Mr. A, the treasury manager of company is observing the movements of exchange rates on a day to day basis and has expected that the ₹ would appreciate against SG $ and would depreciate against €. As per his estimate, the following are the expected rates for 30th June 2018

- Spot Rate ₹ / SG $ 32.15 / 32.21
- Spot Rate ₹ / € 57.27 / 57.32

You are required to find out:

i. The change in profitability due to transaction exposure for the contract entered into.

ii. How many units should the company increase in its sales in order to maintain the current profit level for the proposed contract at the end of June 2018.

Solution:

i) Change in Profitability, due to transaction Exposure

- Current Position

Sales (20000 units (x) SG $ 500/unit (x) ₹/SG $ 33)		33,00,00,000
(-) Related costs		
• Variable cost (20000 units (x) ₹1,250/unit)	2,50,00,000	
• Purchase cost (20,000 units (x) € 200/unit (x) ₹/€56.56)	22,62,40,000	
	25,12,40,000	
• Allocable Fixed cost	1,00,00,000	(26,12,40,000)
∴ Profit (estimated)		₹ 6,87,60,000

The above profit of ₹ 6,87,60,000 is subject to transaction exposure on ₹/SG $. ₹/€ exposure is cut off, as the payment for the same is made today.

- After 1 month

Amount received = 20000 units (x) 500 SG $ (x) ₹/SG $ 32.15 = ₹ 32,15,00,000

∴ Loss due to transaction exposure is = ₹ 33,00,00,000 (-) ₹ 32,15,00,000 = ₹ 85,00,000

2) Increase in units to maintain same profit:

Let the total no. of units sold = x.

Sales (x (x) S$ 500 (x) ₹/S$ 32.15)		16,075 x
(-) Related costs		
• Variable cost (x (x) ₹1250)	1,250 x	
• Purchase cost (x (x) € 200 (x) ₹/€ 56.56)	11,312 x	
• Fixed cost	1,00,00,000	(1 (x (+) 12562x)
∴ Profit		₹6,87,60,000

∴ 16075x (-) [1,00,00,000 (+) 12,562x] = 6,87,60,000

∴ 3513x = 7,87,60,000

∴ Units to be sold (x) = 22,419.58

= 22,420 (approx)

∴ Increase in units = 22,420 units (-) 20,000 units

= 2,420 units

Question 45:

M/s Omega Electronics Ltd. Exports air conditioners to Germany by importing all the components from Singapore. The company is exporting 2,400 units at a price of € 500 per unit. The cost of imported components is S$ 800 per unit. The fixed cost and other variables cost per unit are ₹ 1,000 and ₹ 1,500 respectively. The cash flow in foreign currencies are due in six months. The current exchange rates are as follows:

₹/€ 51.50/55

₹/$ 27.20/25

After 6 months the exchange rates turn out as follows:

₹/€ 52.00/05

₹/$ 27.70/75

You are required

1) To calculate loss/gain due to transaction exposure.
2) Based on the following additional information calculate the loss/gain due to transaction and operating exposure if the contracted price of air conditioners is ₹ 25,000
   a) The current exchange rate changes to
      ₹/€ 51.75/80
      ₹/$ 27.10/15
   b) Price elasticity of demand is estimated to be 1.5
   c) Payments and Receipts are to be settled at the end of six months.

Solution:

1. Profit at current exchange rates

= 2,400 [(€ 500 x ₹/€ 51.50) – {(S$ 800 x ₹/S$ 27.25) + ₹ 1,000 + ₹ 1,500}]

= 2,400 [₹ 25,750 – ₹ 24,300]

= ₹ 34,80,000

2. Profit after change in exchange rates

= 2,400 [(€ 500 x ₹/€ 52) – {(S$ 800 x ₹/S$ 27.75) + ₹ 1,000 + ₹ 1,500}]

= 2,400 [₹ 26,000 – ₹ 24,700]

= ₹ 31,20,000

3. Loss due to Transaction Exposure

= ₹ 34,80,000 – ₹ 31,20,000

= ₹ 3,60,000

4. Profit based on new exchange rates

= 2,400 [₹ 25,000 – {(S$ 800 x ₹/S$ 27.15) + ₹ 1,000 + ₹ 1,500}]

= 2,400 [₹ 25,000 – ₹ 24,220]

= ₹ 18,72,000

5. Profit after change in exchange rates at the end of six months

= 2,400 [₹ 25,000 (–) {(S$ 800 x ₹ 27.75) + ₹ 1,000 + ₹ 1,500}]

= 2,400 [₹ 25,000 – ₹ 24,700]

= ₹ 7,20,000

6. Decline in profit due to transaction exposure

= ₹ 18,72,000 – ₹ 7,20,000

= ₹ 11,52,000

Current Price of Each unit in S$ = ₹ 25,000 (x) S$/₹ ($^{1}/_{51.50}$) = S$ 485.44

Price after change in exchange Rate = ₹ 25,000 (x) S$/₹ ($^{1}/_{51.75}$) = S$ 483.09

Change in Price due to change in Exch. Rate = S$ 485.44 – S$ 483.09

= S$ 2.35 or (–) 0.48%

Price elasticity of demand = 1.5

Increase in demand due to fall in price = 0.48% x 1.5 **= 0.72%**

Size of increased order = 2,400 x 1.0072 **= 2,417 units**

Profit = 2,417 [₹ 25,000 – {(S$ 800 x ₹/S$ 27.75) + ₹ 1,000 + ₹ 1,500)]

= 2,417 [₹ 25,000 – ₹ 24,700]

= ₹ 7,25,100

Therefore, decrease in profit due to operating exposure

= ₹ 18,72,000 – ₹ 7,25,100 **= ₹ 11,46,900**

Question 46:

OJ Ltd. is a supplier of leather goods to retailers in the UK and other Western European countries. The company is considering entering into a joint venture with a manufacturer in South America. The two companies will each own 50 per cent of the limited liability company JV(SA) and will share profits equally. £ 450,000 of the initial capital is being provided by OJ Ltd. and the equivalent in South American dollars (SA$) is being provided by the foreign partner. The managers of the joint venture expect the following net operating cash flows, which are in nominal terms:

SA $ ('000s)	Forward	Rates of Exchange to the £ Sterling
Year 1	4.2500	10
Year 2	6.5000	15
Year 3	8.3500	21

For tax reasons, JV(SV) the company to be formed specifically for the joint venture, will be registered in South America. Ignore taxation in your calculations.

Assuming you are financial adviser retained by OJ Limited to advise on the proposed joint venture,

1. Calculate the NPV of the project under the two assumptions explained below. Use a discount rate of 18 per cent for both assumptions.

Assumption 1:

The South American country has exchange controls which prohibit the payment of dividends above 50 per cent of the annual cash flows for the first three years of the project. The accumulated balance can be repatriated at the end of the third year.

Assumption 2:

The government of the South American country is considering removing exchange controls and restriction on repatriation of profits. If this happens all cash flows will be distributed as dividends to the partner companies at the end of each year

2. Comment briefly on whether or not the joint venture should proceed based solely on these calculations.

Solution:

Since only one discounting rate in given and interest rates are absent, we have to follow Home currency approach.

Assumption 1: Exchange Control Exists

Yr	CF (SA$)	OJ's Share	Withdraw	Ex. Rate (SA$/£)	CF (£)	PVF @ 18%	PV of £ CF
1	42,50,000	21,25,000	10,62,500	10	1,06,250.00	0.8475	90,042.37
2	65,00,000	32,50,000	16,25,000	15	1,08,333.33	0.7182	77,803.31
3	83,50,000	41,75,000	68,62,500	21	3,26,785.71	0.6086	1,98,891.87
PV (Inflows)							**3,66,737.56**
(–) PV (Outflows)							–4,50,000.00
NPV							**–83,262.44**

Assumption 2: Exchange Control Does Not Exist

Yr	CF (SA$)	OJ's Share	Ex. Rate (SA$/£)	CF (£)	PVF @ 18%	PV of £ CF
1	42,50,000	21,25,000	10	2,12,500.00	0.8475	1,80,084.75
2	65,00,000	32,50,000	15	2,16,666.67	0.7182	1,55,606.63
3	83,50,000	41,75,000	21	1,98,809.52	0.6086	1,21,001.61
PV (Inflows)						**4,56,692.99**
(–) PV (Outflows)						–4,50,000.00
NPV						**6,692.99**

Decision: The project can be picked up is the exchange controls are removed.

Question 47:

Somu Electronics imported goods from Japan on July 1st 2009, of JP ¥ 1 million, to be paid on 31st December 2009. The treasury manager collected the following exchange rates on July 01, 2009 from the bank.

Delhi	₹/US $ Spot 45.86 /88
6 months forward	46.00/03
Tokyo	JP ¥/ US $ Spot 108/108.50
6 months forward	110/110.60

In spite of fact that the forward quotation for JP ¥ was available through cross currency rates, Mr. X, the treasury manager purchased spot US $ and converted US $ into JP ¥ in Tokyo using 6 months forward rate. However, on 31st December, 2009 ₹/US $ spot rate turned out to be 46.24/26. You are required to calculate the loss or gain in the strategy adopted by Mr. X by comparing the notional cash flow involved in the forward cover for Yen with the actual cash flow of the transaction.

Solution:

Here we have to compare the notional cash outflow for the forward rate of JP ¥ and the actual cash outflow involved in rupees against forward purchase of JP ¥ for dollars in Tokyo and spot purchase of $ in Delhi for ₹.

1. **Cash flow of forward purchasing the JP ¥**

   ₹/JP ¥ 6 month forward rate

   $= {}^{₹}/_{\$}\ (x)\ {}^{\$}/_{JP\ ¥}$

   $= [{}^{₹}/_{\$}\ 46.00\ (x)\ {}^{\$}/_{JP\ ¥}\ {}^{1}/_{110.60}] / [{}^{₹}/_{\$}\ 46.03\ (x)\ {}^{\$}/_{JP\ ¥}\ {}^{1}/_{110.00}]$

   Hence, ₹/JP ¥ 6 month forward rate = ₹/JP ¥ 0.415913/0.418455

   Accordingly, if the company had purchased JP ¥ forward against ₹ it would have paid

   = JP ¥ 1,000,000 (x) ₹/JP ¥ 0.418455

   = ₹ 418,454.50

2. **Cash flow of forward purchasing US$ in spot market and converting into JP ¥**

   Amount of US dollars to be paid on due date by purchase of JP ¥ 1 million in forward market

   = JP ¥ 1,000,000 (x) $/JP¥ 110 **= US $ 9,090.91**

   Cash outflows in rupees against purchase of dollars on Dec. 31, 2009

   = US $ 9,090.91 (x) ₹/$ 46.26 **= ₹ 420,545.45**

   Thus, Loss or gain due to strategy adopted by Mr. X

   = ₹ 4,18,454.50 (–) ₹ 4,20,545.45

   = ₹ 2090.95

   Thus, the company paid an excess amount of ₹ 2,090.95 under the strategy adopted by Mr. X.

Explain the Concept of "Leading" in ForEX Markets

Leading means Advancing a Payment (i.e. Making a payment before it is due). If the importer gets certain advantage in terms of early payment by borrowing funds from a local bank at a local rate, then the importer should lead the payment.

Question 48:

An Indian firm has imported a machine from USA. The Invoice value is $ 1,00,000. The payment is to be made in 2 months' time. The USD rates are quoted in the market as follows:

- Spot Rate ₹ / $ 45.00 / 45.05
- 2 month forward rate ₹ / $ 45.30 / 45.36

The Importer firm is considering leading. It can borrow rupees in India at the rate of 9% p.a. You are required to:

i. Opine whether leading should be undertaken or not.

ii. Will your opinion change if the exporter allows a discount of 1% on immediate payment?

Solution:

It is an Indian firm, which has $ 1,00,000 Payable. The given rate is a $ rate – The importer will have to BUY $.

i. **Payment Without Discount**

- Without Leading $ 1,00,000 (x) ₹ / $ 45.36 — ₹ 45,36,000
- Leading $ 1,00,000 (x) ₹ / $ 45.05 (x) 1.015 — ₹ 45,72,575

(i.e. Int – 9% p.a. = 1.5% for 2 m)

Decision: Not to lead

ii. **Payment with Discount**

- Without Leading $ 1,00,000 (x) ₹ / $ 45.36 — ₹ 45,36,000
- Leading ($ 1,00,000 – 1%) (x) ₹ / $ 45.05 (x) 1.015 — ₹ 45,26,849

(Int – 9% p.a. = 1.5% for 2 m)

Decision: Go ahead with leading.

Explain the Concept of "Lagging" in ForEX Markets

Lagging means Delaying the Payment. The importer may decide to delay the payment if the exchange rates are in his favor and also if he is in a position to invest funds at a better rate

Question 49:

An Indian firm has imported a machine from USA. The invoice value is $1,00,000. The payment is to be made in 2 months' time. The USD rates are quoted in the market as follows:

- 2 months forward rate ₹ / $ 45.30 / 45.36

- 3 months forward rate ₹ / $ 44.80 I 44.85

The importer firm is considering lagging. The exporter firm will charge interest at the rate of 9% p.a. if the payment is delayed after it becomes due. Your cost of capital is 12%. Opine.

Solution:

It is an Indian firm, which has $ 1,00,000 Payable. The given rate is a $ rate – The importer will have to BUY $.

- Without Lagging $ 1,00,000 (x) ₹ / $ 45.36 (x) ($^1/_{1.02}$) **₹ 44,47,058**

  (i.e. 12% p.a. = 2% for 2 m)

- Lagging $ 1,00,000 (x) ₹ / $ 44.85 (x) 1.0075✯ (x) ($^1/_{1.03}$)✯✯✯ **₹ 43,87,027**

✯ (i.e. 9% p.a. = 0.75% for 2 m)

✯✯✯ (i.e. 12% p.a. = 3% for 3 m)

Decision: Go for Lagging

Explain Nostro, Vostro, Loro Accounts in ForEX Markets

1) **Nostro Account:**

Nostro in latin means OURS. In this sense, Nostro account means OUR Account with YOUR BANK. Nostro is a current account that a bank holds with a bank in a foreign country. Such accounts are operated in the currency of that foreign country. For eg: The account held by State Bank of India with Bank of America in New York is a Nostro Account of the State bank of India.

We will be provided with the opening a/c balance and the opening position, certain transactions for a period, and we have to compute the closing balance and the closing position.

Points to Remember:

1. We should think from the Indian Bank's point of view
2. Think of FC, not HC
3. Inflow of FC – Credit
4. Outflow of FC – Debit
5. Purchase of FC – Long Position
6. Sale of FC – Short Position
7. Spot Transaction will affect both – a/c balance and a/c position. However, forward transaction will affect only position.
8. Any purchase / sale through bills of exchange, is a forward transaction
9. When a FC Demand Draft is made – it is a SHORT position. If the draft later on gets cancelled, it is a long position – a/c balance is not affected.

10. To achieve target closing BALANCE, we advise SPOT Transactions. This will change the position. Now to achieve the target position, we advise FORWARD Transactions.

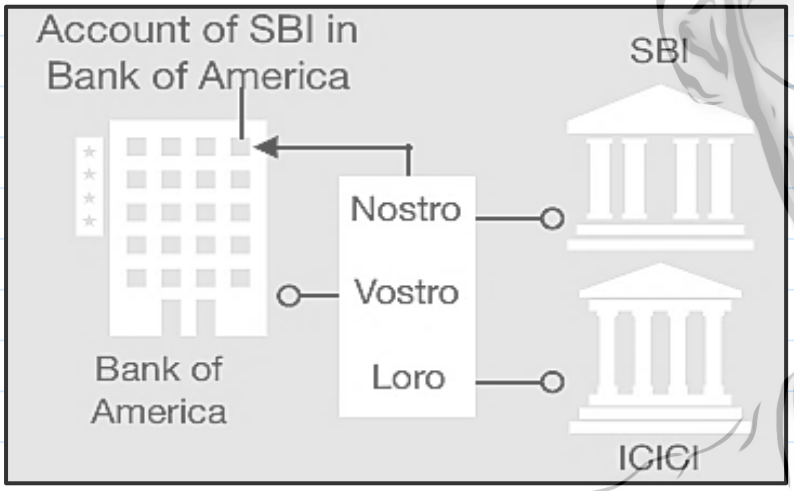
2) **Vostro Account:**

It means YOUR ACCOUNT with OUR BANK. It is the account which is held by a foreign bank with a Local bank. For example, If Bank of America maintains an account with State Bank of India it will be a Vostro Account for State bank of India.

3) **Loro Account:**

It means YOUR ACCOUNT with THEIR BANK. It is used when referring to third party accounts. For example, State bank of India account in Bank of America is Loro Account for ICICI Bank

Summary of Nostro, Vostro and Loro Accounts



Question 50:

You as a dealer in foreign exchange have the following position in Swiss Francs on 31st October 2017.

Particulars	Swiss Francs
Balance in the Nostro a/c Credit	1,00,000
Opening position overbought	50,000
Purchased a bill on zurich	80,000
Sold forward TT	60,000
Forward purchase contract cancelled	30,000
Remitted by TT	75,000
Draft on Zurich cancelled	30,000

What steps would you take, if you are required to maintain a credit balance of Swiss Francs 30,000 in the Nostro Account, and keep an overbought position of Swiss Francs 10,000.

Solution:

Nostro Account

Dr Cr

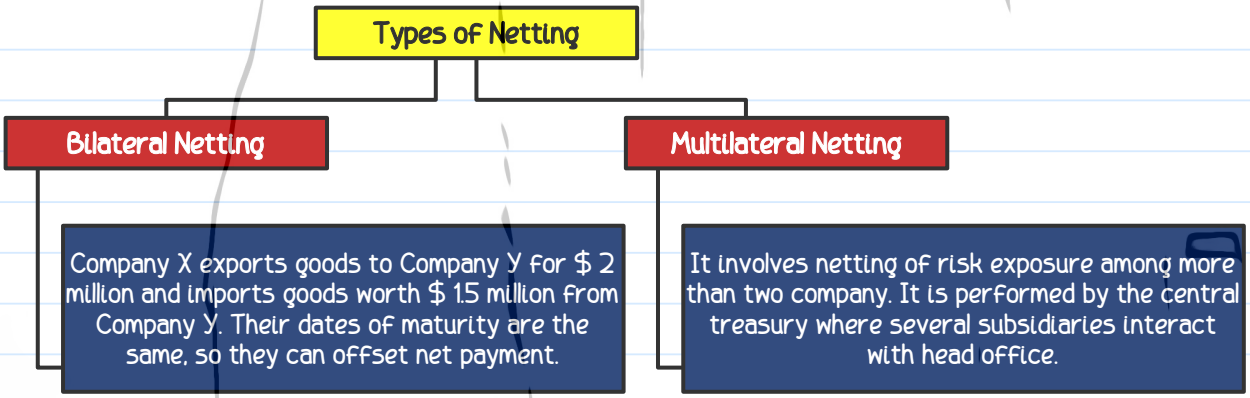
Particulars	Swiss Francs	Particulars	Swiss Francs
To Payment	75,000	By Balance b/d	100,000
To balance c/d	30,000	By Receipts	5,000
	105,000		105,000

Account Position

Particulars	Bought	Sold
Opening Balance	50,000	–
Bills payable	80,000	–
Sold forward TT	–	60,000
Forward Purchase Contract Cancelled	–	30,000
Remitted by TT	–	75,000
Draft on Zurich cancelled	30,000	–
Receipts	5,000	–
	165,000	165,000
(+) Bills payable	10,000	–
	175,000	165,000

Explain the concept of "Netting"

The simplest scheme is known as bilateral netting and involves pairs of companies. Each pair of associates nets out their own individual positions with each other & cash flows are reduced by the lower of each company's purchases from or sales to its netting partner. It reduces the number of intercompany payments and receipts. It reduces banking costs and increases central control of intercompany settlements.



Question 51:

Following are the details of cash inflows and outflows in foreign currency denominations of MNP Co. an Indian export firm, which has no foreign subsidiaries:

Currency	Inflow	Outflow	Spot Rate	Forward Rate
US $	4,00,00,000	2,00,00,000	48.01	48.82
French Francs (FFr)	2,00,00,000	80,00,000	7.45	8.12
UK £	3,00,00,000	2,00,00,000	75.57	75.98
Japanese Yen (¥)	1,50,00,000	2,50,00,000	3.20	2.40

You are required to:

(i) Determine the net exposure of each foreign currency in terms of Rupees.

(ii) State whether any of the exposure positions offsetting to some extent?

Solution:

(i) **Determination of the Net Exposure of each Foreign Currency in terms of Rupees**

Cur	Inflow	Outflow	Net	Spot Rate	Forward Rate	Difference	Net Exposure
US $	4,00,00,000	2,00,00,000	2,00,00,000	48.01	48.82	0.81	1,62,00,000
FFr	2,00,00,000	80,00,000	1,20,00,000	7.45	8.12	0.67	80,40,000
UK £	3,00,00,000	2,00,00,000	1,00,00,000	75.57	75.98	0.41	41,00,000
¥	1,50,00,000	2,50,00,000	(1,00,00,000)	3.20	2.40	−0.80	80,00,000

(ii) **Offsetting Positions**

a. Net Exposure in all the currencies are offset by better forward rates. In the case of US $, FFr and UK £, the net exposure is receivable, and the forward rates are quoted at a premium for these currencies.

b. In case of Japanese Yen (¥), the net exposure is payable, and the forward rate is quoted at a discount. Therefore, a better forward rate is also offsetting the net payable in Japanese Yen (¥).

Question 52:

Trueview plc, a group of companies controlled from the United Kingdom includes subsidiaries in India, Malaysia and the United States. As per the CFO's forecast that, at the end of the June 2018 the position of inter-company indebtedness will be as follows:

- The Indian subsidiary will be owed ₹ 1,44,38,100 by the Malaysian subsidiary and will owe the US subsidiary US $ 1,06,007.
- The Malaysian subsidiary will be owed MYR 14,43,800 by the US subsidiary and will owe it US$ 80,000.

Suppose you are head of central treasury department of the group and you are required to net off inter-company balances as far as possible and to issue instructions for settlement of the net balances. For this purpose, the relevant exchange rates may be assumed in terms of £ 1 are US$ 1.415; MYR 10.215; ₹ 68.10. What are the net payments to be made in respect of the above balances?

Solution:

Statement showing amount due and receivable by each subsidiary

Particulars	India	Malaysia	US
Inflow			
From India	–	–	$ 1,06,007
From Malaysia	₹ 1,44,38,100	–	$ 80,000
From US	–	MYR 14,43,800	–
Outflow			
To India	–	₹ 1,44,38,100	–
To Malaysia	–	–	MYR 14,43,800
To US	$ 1,06,007	$ 80,000	–

Given Exchange Rates are:

$/£ 1.415;

MYR/£ 10.215;

₹/£ 68.10.

Since the company belongs to United Kingdom, its Home currency = £. Accordingly, we convert the cash flows of all subsidiaries in £ based on the above exchange rates. Hence, the cash flows for each subsidiary in £ are:

Particulars	India	Malaysia	US
Inflow			
From India	–	–	74,916.61
From Malaysia	2,12,013.22	–	56,537.10
From US	–	1,41,341.16	–
Outflow			
To India	–	-2,12,013.22	–
To Malaysia	–	–	-1,41,341.16
To US	-74,916.61	-56,537.10	–
Net £ Exposure	**1,37,096.61**	**-1,27,209.14**	**-9,887.45**

Decision:

Central treasury department will instruct the Malaysia subsidiary to pay the Indian subsidiary £ 1,27,209.14 and the US subsidiary to pay the Indian subsidiary £9,887.45.

Explain the concept of "Matching"

Matching is a mechanism whereby a company matches its foreign currency inflows with its foreign currency outflows in respect of amount and approximate timing. The prerequisite for a matching operation is a two-way cash flow in the same foreign currency. Although netting and matching are terms, which are frequently used interchangeably, there are distinctions.

For example:

An Indian exporter exports finished goods to US firm and he will also import the raw material from the US firms. Then the receipts and payment transactions can be offset at the origin itself by operating a bank account in US for convenience.

Netting is a term applied to potential flows within a group of companies whereas Matching can be applied to both intra-group and to third-party balancing.

Write a note on "Asset and Liability Mismatch"

This technique can be used to manage balance sheet, income statement or cash flow exposures. It has aggressive or defensive postures.

In the aggressive attitude, the firm simply increases exposed cash inflows denominated in currencies expected to be strong or increases exposed cash outflows denominated in weak currencies.

By contrast, the defensive approach involves matching cash inflows and outflows according to their currency of denomination, irrespective of whether they are in strong or weak currencies.