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Foreign Exchange Exposure and Risk Management

Question 1

Outland Steel has a small but profitable export business. Contracts involve substantial delays in payment, but since the company has had a policy of always invoicing in dollars, it is fully protected against changes in exchange rates. More recently the sales force has become unhappy with this, since the company is losing valuable orders to Japanese and German firms that are quoting in customers' own currency. How will you, as Finance Manager, deal with the situation?

Answer

As a Finance Manager to deal with the situation two problems emerge – (i) the problem of negotiating individual contracts and (ii) managing the company's foreign exchange exposure.

The sales force can be allowed to quote in customer's own currency and hedge for currency risk by obtaining the forward contracts etc.

The finance manager can decide whether the company ought to insure. There are two ways of protecting against exchange loss. Firstly, by selling the foreign currency forward and secondly, to borrow foreign currency against its receivables, sell the foreign currency spot and invest the proceeds in the foreign currency say dollars. Interest rate parity theory tells us that in free market the difference between selling forward and selling spot should be exactly equal to difference between the interest on the money one has to pay overseas and the interest one earns from dollars.

Question 2

"Operations in foreign exchange market are exposed to a number of risks." Discuss.

Answer

A firm dealing with foreign exchange may be exposed to foreign currency exposures. The exposure is the result of possession of assets and liabilities and transactions denominated in foreign currency. When exchange rate fluctuates, assets, liabilities, revenues, expenses that have been expressed in foreign currency will result in either foreign exchange gain or loss. A firm dealing with foreign exchange may be exposed to the following types of risks:

(i) **Transaction Exposure:** A firm may have some contractually fixed payments and

receipts in foreign currency, such as, import payables, export receivables, interest payable on foreign currency loans etc. All such items are to be settled in a foreign currency. Unexpected fluctuation in exchange rate will have favourable or adverse impact on its cash flows. Such exposures are termed as transactions exposures.

(ii) **Translation Exposure:** The translation exposure is also called accounting exposure or balance sheet exposure. It is basically the exposure on the assets and liabilities shown in the balance sheet and which are not going to be liquidated in the near future. 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.

(iii) **Economic Exposure:** Economic exposure measures the probability that fluctuations in foreign exchange rate will affect the value of the firm. The intrinsic value of a firm is calculated by discounting the expected future cash flows with appropriate discounting rate. The risk involved in economic exposure requires measurement of the effect of fluctuations in exchange rate on different future cash flows.

Question 3

What is the meaning of:

(i) Interest Rate Parity and

(ii) Purchasing Power Parity?

Answer

(i) Interest Rate Parity (IRP): Interest rate parity is a theory which states that 'the size of the forward premium (or discount) should be equal to the interest rate differential between the two countries of concern". When interest rate parity exists, covered interest arbitrage (means foreign exchange risk is covered) is not feasible, because any interest rate advantage in the foreign country will be offset by the discount on the forward rate. Thus, the act of covered interest arbitrage would generate a return that is no higher than what would be generated by a domestic investment.

The Covered Interest Rate Parity equation is given by:

$$(1+r_D)=\frac{F}{S}(1+r_F)$$

Where $(1 + r_D)$ = Amount that an investor would get after a unit period by investing a rupee in the domestic market at r_D rate of interest and $(1+ r_F)$ F/S = is the amount that an investor by investing in the foreign market at r_F that the investment of one rupee yield same return in the domestic as well as in the foreign market.

Thus, IRP is a theory which states that the size of the forward premium or discount on a currency should be equal to the interest rate differential between the two countries of concern.

(ii) Purchasing Power Parity (PPP): Purchasing Power Parity theory focuses on the 'inflation – exchange rate' relationship. There are two forms of PPP theory:-

The ABSOLUTE FORM, 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". If a discrepancy in prices as measured by a common currency exists, the demand should shift so that these prices should converge.

The RELATIVE FORM is an alternative version that accounts for the possibility of market imperfections such as transportation costs, tariffs, and quotas. It suggests that 'because of these market imperfections, prices of similar products of different countries will not necessarily be the same when measured in a common currency.' However, it states that the rate of change in the prices of products should be somewhat similar when measured in a common currency, as long as the transportation costs and trade barriers are unchanged.

The formula for computing the forward rate using the inflation rates in domestic and foreign countries is as follows:

$$F = S \frac{(1+i_D)}{(1+i_F)}$$

Where F= Forward Rate of Foreign Currency and S= Spot Rate

i_D = Domestic Inflation Rate and i_F= Inflation Rate in foreign country

Thus PPP theory states that the exchange rate between two countries reflects the relative purchasing power of the two countries i.e. the price at which a basket of goods can be bought in the two countries.

Question 4

Write short notes on the following:

(a) Leading and lagging

(b) Meaning and Advantages of Netting

(c) Nostro, Vostro and Loro Accounts

Answer

(a) Leading means advancing a payment i.e. making a payment before it is due. Lagging involves postponing a payment i.e. delaying payment beyond its due date.

In forex market Leading and lagging are used for two purposes:-

(1) Hedging foreign exchange risk: A company can lead payments required to be made in a currency that is likely to appreciate. For example, a company has to pay $100000 after one month from today. The company apprehends the USD to appreciate. It can make the payment now. Leading involves a finance cost i.e. one month's interest cost of money used for purchasing $100000.

A company may lag the payment that it needs to make in a currency that it is likely to depreciate, provided the receiving party agrees for this proposition. The receiving party may demand interest for this delay and that would be the cost of lagging. Decision regarding leading and lagging should be made after considering (i) likely movement in exchange rate (ii) interest cost and (iii) discount (if any).

(2) Shifting the liquidity by modifying the credit terms between inter-group entities: For example, A Holding Company sells goods to its 100% Subsidiary. Normal credit term is 90 days. Suppose cost of funds is 12% for Holding and 15% for Subsidiary. In this case the Holding may grant credit for longer period to Subsidiary to get the best advantage for the group as a whole. If cost of funds is 15% for Holding and 12% for Subsidiary, the Subsidiary may lead the payment for the best advantage of the group as a whole. The decision regarding leading and lagging should be taken on the basis of cost of funds to both paying entity and receiving entity. If paying and receiving entities have different home currencies, likely movements in exchange rate should also be considered.

(b) It is a technique of optimising cash flow movements with the combined efforts of the subsidiaries thereby reducing administrative and transaction costs resulting from currency conversion. There is a co-ordinated international interchange of materials, finished products and parts among the different units of MNC with many subsidiaries buying /selling from/to each other. Netting helps in minimising the total volume of inter-company fund flow.

Advantages derived from netting system includes:

(1) Reduces the number of cross-border transactions between subsidiaries thereby decreasing the overall administrative costs of such cash transfers

(2) Reduces the need for foreign exchange conversion and hence decreases transaction costs associated with foreign exchange conversion.

(3) Improves cash flow forecasting since net cash transfers are made at the end of each period

(4) Gives an accurate report and settles accounts through co-ordinated efforts among all subsidiaries.

(c) In interbank transactions, foreign exchange is transferred from one account to another account and from one centre to another centre. Therefore, the banks maintain three types of current accounts in order to facilitate quick transfer of funds in different currencies. These accounts are Nostro, Vostro and Loro accounts meaning “our”, “your” and “their”. A bank’s foreign currency account maintained by the bank in a foreign country and in the home currency of that country is known as Nostro Account or “our account with you”. For example, An Indian bank’s Swiss franc account with a bank in Switzerland. Vostro account is the local currency account maintained by a foreign bank/branch. It is also called “your account with us”. For example, Indian rupee account maintained by a bank in Switzerland with a bank in India. The Loro account is an account

wherein a bank remits funds in foreign currency to another bank for credit to an account of a third bank.

Question 5

Briefly explain the main strategies for exposure management.

Answer

Four separate strategy options are feasible for exposure management. They are:

(a) Low Risk: Low Reward- 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.

(b) Low Risk: Reasonable Reward- This strategy requires selective hedging of exposures whenever forward rates are attractive but keeping exposures open whenever they are not.

(c) High Risk: Low Reward- Perhaps the worst strategy is to leave all exposures unhedged.

(d) High Risk: High Reward- This strategy involves active trading in the currency market through continuous cancellations and re-bookings of forward contracts. With exchange controls relaxed in India in recent times, a few of the larger companies are adopting this strategy.

Question 6

The price of a bond just before a year of maturity is $ 5,000. Its redemption value is $ 5,250 at the end of the said period. Interest is $ 350 p.a. The Dollar appreciates by 2% during the said period. Calculate the rate of return from US Investor's and Non-US Investor's view point.

Answer

Here we can assume two cases (i) If investor is US investor then there will be no impact of appreciation in $. (ii) If investor is from any other nation other than US say Indian then there will be impact of $ appreciation on his returns.

First we shall compute return on bond which will be common for both investors.

$$\text{Return} = \frac{(\text{Price at end - Price at begining}) + \text{Interest}}{\text{Price at begining}}$$

$$= \frac{(5250 - 5000) + 350}{5000}$$

$$= \frac{250 + 350}{5000} = 0.12 \text{ say } 12\%$$

(i) For US investor the return shall be 12% and there will be no impact of appreciation in $.

(ii) If $ appreciate by 2% then return for non-US investor shall be:

Return x 1.02 = 0.12 x 1.02=0.1224 i.e. 12.24%

Alternatively, it can also be considered that $ appreciation will be applicable to the amount of principal as well. The answer therefore could also be

(1+0.12)(1+0.02) -1 =1.12X1.02 - 1 = 0.1424 i.e. 14.24%

Question 7

ABN-Amro Bank, Amsterdam, wants to purchase ₹ 15 million against US$ for funding their Nostro account with Canara Bank, New Delhi. Assuming the inter-bank, rates of US$ is ₹ 51.3625/3700, what would be the rate Canara Bank would quote to ABN-Amro Bank? Further, if the deal is struck, what would be the equivalent US$ amount.

Answer

Here Canara Bank shall buy US$ and credit ₹ to Vostro account of ABN-Amro Bank. Canara Bank's buying rate will be based on the Inter-bank Buying Rate (as this is the rate at which Canara Bank can sell US$ in the Interbank market)

Accordingly, the Interbank Buying Rate of US$ will be ₹ 51.3625 (lower of two) i.e. (1/51.3625) = $ 0.01947/₹

Equivalent of US$ for ₹ 15 million at this rate will be

$$= \frac{15,000,000}{51.3625} \qquad = \text{US\$ } 2,92,041.86$$

or $\qquad$ = 15,000,000 x $ 0.01947 = US$ 2,92,050

Question 8

ABC Ltd. of UK has exported goods worth Can $ 5,00,000 receivable in 6 months. The exporter wants to hedge the receipt in the forward market. The following information is available:

Spot Exchange Rate	*Can $ 2.5/£*
Interest Rate in UK	*12%*
Interest Rate In Canada	*15%*

The forward rates truly reflect the interest rates differential. Find out the gain/loss to UK exporter if Can $ spot rates (i) declines 2%, (ii) gains 4% or (iii) remains unchanged over next 6 months.

Answer

$$\text{Forward Rate} = \frac{2.50\,(1+0.075)}{(1+0.060)} = \text{Can\$ } 2.535/£$$

(i) If spot rate decline by 2%

Spot Rate = Can$ 2.50 x 1.02 = Can$ 2.55/£

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.55)	1,96,078
Gain due to forward contract	1,161

(ii) If spot rate gains by 4%

Spot Rate = Can$ 2.50 x 0.96 = Can$ 2.40/£

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.40)	2,08,333
Loss due to forward contract	11,094

(iii) If spot rate remains unchanged

	£
£ receipt as per Forward Rate (Can $ 5,00,000/ Can$ 2.535)	1,97,239
£ receipt as per Spot Rate (Can $ 5,00,000/ Can$ 2.50)	2,00,000
Loss due to forward contract	2,761

Question 9

On April 3, 2016, a Bank quotes the following:

Spot exchange Rate (US $ 1)	*INR 66.2525*	*INR 67.5945*
2 months' swap points	*70*	*90*
3 months' swap points	*160*	*186*

In a spot transaction, delivery is made after two days.

Assume spot date as April 5, 2016.

Assume 1 swap point = 0.0001,

You are required to:

(i) ascertain swap points for 2 months and 15 days. (For June 20, 2016),

(ii) determine foreign exchange rate for June 20, 2016, and

(iii) compute the annual rate of premium/discount of US$ on INR, on an average rate.

Answer

(i) Swap Points for 2 months and 15 days

	Bid	Ask
Swap Points for 2 months (a)	70	90
Swap Points for 3 months (b)	160	186
Swap Points for 30 days (c) = (b) – (a)	90	96
Swap Points for 15 days (d) = (c)/2	45	48
Swap Points for 2 months & 15 days (e) = (a) + (d)	115	138

(ii) Foreign Exchange Rates for 20th June 2016

	Bid	Ask
Spot Rate (a)	66.2525	67.5945
Swap Points for 2 months & 15 days (b)	0.0115	0.0138
	66.2640	67.6083

(iii) Annual Rate of Premium

	Bid	Ask
Spot Rate (a)	66.2525	67.5945
Foreign Exchange Rates for 20th June 2016 (b)	66.2640	67.6083
Premium (c)	0.0115	0.0138
Total (d) = (a) + (b)	132.5165	135.2028
Average (d) / 2	66.2583	67.6014
Premium	$\frac{0.0115}{66.2583} \times \frac{12}{2.5} \times 100$ = 0.0833%	$\frac{0.0138}{67.6014} \times \frac{12}{2.5} \times 100$ = 0.0980%

Question 10

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

Then :

(i) Will US $ be at a premium or at a discount in the Indian forward market?

(ii) Find out the expected 6 month forward rate for US$ in India.

(iii) Find out the rate of forward premium/discount.

Answer

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

(ii) Calculation of the forward rate:

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

Where: R_h is home currency interest rate, R_f is foreign currency interest rate, F_1 is end of the period forward rate, and E_o is the spot rate.

Therefore $\frac{1+(0.09/2)}{1+(0.02/2)} = \frac{1+(0.09/2)}{1+(0.02/2)} = \frac{F_1}{64.50}$

$$\frac{1+0.045}{1+0.01} = \frac{F_1}{64.50}$$

or $\frac{1.045}{1.01} \times 64.50 = F_1$

or $\frac{67.4025}{1.01} = F_1$

or F_1 = ₹66.74

(iii) Rate of premium:

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

Question 11

XYZ Bank, Amsterdam, wants to purchase ₹ 25 million against £ for funding their Nostro account and they have credited LORO account with Bank of London, London.

Calculate the amount of £'s credited. Ongoing inter-bank rates are per $, ₹ 61.3625/3700 & per £, $ 1.5260/70.

Answer

To purchase Rupee, XYZ Bank shall first sell £ and purchase $ and then sell $ to purchase Rupee. Accordingly, following rate shall be used:

$(£/₹)_{ask}$

The available rates are as follows:

$(\$/£)_{bid}$ = $1.5260

$(\$/£)_{ask}$ = $1.5270

$(₹/\$)_{bid}$ = ₹ 61.3625

$(₹/\$)_{ask}$ = ₹ 61.3700

From above available rates we can compute required rate as follows:

$(£/₹)_{ask}$ = $(£/\$)_{ask}$ x $(\$/₹)_{ask}$

= (1/1.5260) x (1/61.3625)

= £ 0.01068 or £ 0.0107

Thus amount of £ to be credited

= ₹ 25,000,000 x £ 0.0107

= £ 267,500

Question 12

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

The current spot rates are:

INR/US $ = ₹ 62.22

JPY/US$ = JPY 102.34

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

Forward rates for August 2014 are

INR/US $ = ₹ 66.50

JPY/US$ = JPY 110.35

Required:

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

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

INR/US $= ₹ 66.25

JPY/US$ = JPY 110.85

Is the decision to take forward cover justified?

Answer

Since the direct quote for ¥ and ₹ is not available it will be calculated by cross exchange rate as follows:

₹/$ x $/¥ = ₹/¥

62.22/102.34 = 0.6080

Spot rate on date of export 1¥ = ₹ 0.6080

Expected Rate of ¥ for August 2014 = ₹ 0.5242 (₹ 65/¥124)

Forward Rate of ¥ for August 2014 = ₹ 0.6026 (₹ 66.50/¥110.35)

(i) Calculation of expected loss without hedging

Value of export at the time of export (₹ 0.6080 x ¥10,000,000)	₹ 60,80,000
Estimated payment to be received on Aug. 2014 (₹ 0.5242 x ¥10,000,000)	₹ 52,42,000
Loss	₹ 8,38,000

Hedging of loss under Forward Cover

₹ Value of export at the time of export (₹ 0.6080 x ¥10,000,000)	₹ 60,80,000
Payment to be received under Forward Cover (₹ 0.6026 x ¥10,000,000)	₹ 60,26,000
Loss	₹ 54,000

By taking forward cover loss is reduced to ₹ 54,000.

(ii) Actual Rate of ¥ on August 2014 = ₹ 0.5977 (₹ 66.25/¥110.85)

Value of export at the time of export (₹ 0.6080 x ¥10,000,000)	₹ 60,80,000
Estimated payment to be received on Aug. 2014 (₹ 0.5977 x ¥10,000,000)	₹ 59,77,000
Loss	₹ 1,03,000

The decision to take forward cover is still justified.

Question 13

You sold Hong Kong Dollar 1,00,00,000 value spot to your customer at ₹ 5.70 & covered yourself in London market on the same day, when the exchange rates were

US$ 1 = H.K.$ 7.5880 7.5920

Local inter bank market rates for US$ were

Spot US$ 1 = ₹ 42.70 42.85

Calculate cover rate and ascertain the profit or loss in the transaction. Ignore brokerage.

Answer

The bank (Dealer) covers itself by buying from the market at market selling rate.

Rupee – Dollar selling rate = ₹ 42.85

Dollar – Hong Kong Dollar = HK $ 7.5880

Rupee – Hong Kong cross rate = ₹ 42.85 / 7.5880

= ₹ 5.6471

Profit / Loss to the Bank

Amount received from customer (1 crore × 5.70)	₹ 5,70,00,000
Amount paid on cover deal (1 crore × 5.6471)	₹ 5,64,71,000
Profit to Bank	₹ 5,29,000

Question 14

You, a foreign exchange dealer of your bank, are informed that your bank has sold a T.T. on Copenhagen for Danish Kroner 10,00,000 at the rate of Danish Kroner 1 = ₹ 6.5150. You are required to cover the transaction either in London or New York market. The rates on that date are as under:

Mumbai-London	*₹ 74.3000*	*₹ 74.3200*
Mumbai-New York	*₹ 49.2500*	*₹ 49.2625*
London-Copenhagen	*DKK 11.4200*	*DKK 11.4350*
New York-Copenhagen	*DKK 07.5670*	*DKK 07.5840*

In which market will you cover the transaction, London or New York, and what will be the exchange profit or loss on the transaction? Ignore brokerages.

Answer

Amount realized on selling Danish Kroner 10,00,000 at ₹ 6.5150 per Kroner = ₹ 65,15,000.

Cover at London:

Bank buys Danish Kroner at London at the market selling rate.

Pound sterling required for the purchase (DKK 10,00,000 ÷ DKK 11.4200) = GBP 87,565.67

Bank buys locally GBP 87,565.67 for the above purchase at the market selling rate of ₹ 74.3200.

The rupee cost will be = ₹ 65,07,88

Profit (₹ 65,15,000 - ₹ 65,07,881) = ₹ 7,119

Cover at New York:

Bank buys Kroners at New York at the market selling rate.

Dollars required for the purchase of Danish Kroner (DKK10,00,000 ÷ 7.5670) = USD 1,32,152.77

Bank buys locally USD 1,32,152.77 for the above purchase at the market selling rate of ₹ 49.2625.

The rupee cost will be = ₹ 65,10,176.

Profit (₹ 65,15,000 - ₹ 65,10,176) = ₹ 4,824

The transaction would be covered through London which gets the maximum profit of ₹ 7,119 or lower cover cost at London Market by (₹ 65,10,176 - ₹ 65,07,881) = ₹ 2,295

Question 15

On January 28, 2013 an importer customer requested a Bank to remit Singapore Dollar (SGD) 2,500,000 under an irrevocable Letter of Credit (LC). However, due to unavoidable factors, the Bank could effect the remittances only on February 4, 2013. The inter-bank market rates were as follows:

	January 28, 2013	*February 4, 2013*
US$ 1=	*₹ 45.85/45.90*	*₹ 45.91/45.97*
GBP £ 1	*US$ 1.7840/1.7850*	*US$ 1.7765/1.7775*
GBP £ 1	*SGD 3.1575/3.1590*	*SGD 3. 1380/3.1390*

The Bank wishes to retain an exchange margin of 0.125%

Required:

How much does the customer stand to gain or lose due to the delay?

(Note: Calculate the rate in multiples of 0.0001)

Answer

On January 28, 2013 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US $	=	₹ 45.90
Pound 1	=	US$ 1.7850
Pound 1	=	SGD 3.1575
Therefore, SGD 1	=	$\frac{₹\ 45.90 * 1.7850}{SGD\ 3.1575}$
SGD 1	=	₹ 25.9482
Add: Exchange margin (0.125%)		₹ 0.0324
		₹ 25.9806

On February 4, 2013 the rates are

US $	=	₹ 45.97
Pound 1	=	US$ 1.7775
Pound 1	=	SGD 3.1380

Therefore, SGD 1 = $\frac{₹\ 45.97 * 1.7775}{SGD\ 3.1380}$

SGD 1 = ₹ 26.0394

Add: Exchange margin (0.125%) ₹ 0.0325

₹ 26.0719

Hence, loss to the importer

= SGD 25,00,000 (₹ 26.0719 – ₹ 25.9806)= ₹ 2,28,250

Question 16

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

Currency	*Inflow*	*Outflow*	*Spot rate*	*Forward rate*
US $	*4,00,00,000*	*2,00,00,000*	*48.01*	*48.82*
French Franc (FFr)	*2,00,00,000*	*80,00,000*	*7.45*	*8.12*
U.K. £	*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*

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

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

Answer

(i) Net exposure of each foreign currency in Rupees

	Inflow	Outflow	Net Inflow	Spread	Net Exposure
	(Millions)	(Millions)	(Millions)		(Millions)
US$	40	20	20	0.81	16.20
FFr	20	8	12	0.67	8.04
UK£	30	20	10	0.41	4.10
Japan Yen	15	25	-10	-0.80	8.00

(ii) The exposure of Japanese yen position is being offset by a better forward rate

Question 17

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

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

Required:

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

(ii) How many Rupees is the firm required to pay to obtain US $ 2,00,000 in the spot market?

(iii) Assume the firm has US $ 69,000 in current account earning no interest. ROI on Rupee investment is 10% p.a. Should the firm encash the US $ now or 2 months later?

Answer

(i) US $ required to get ₹ 25 lakhs after 2 months at the Rate of ₹ 47/$

$$\frac{₹\ 25,00,000}{₹\ 47} = \text{US \$ } 53191.489$$

(ii) ₹ required to get US$ 2,00,000 now at the rate of ₹ 46.25/$

∴ US $ 200,000 × ₹ 46.25 = ₹ 92,50,000

(iii) Encashing US $ 69000 Now Vs 2 month later

Proceed if we can encash in open mkt $ 69000 × ₹46 = ₹ 31,74,000

Opportunity gain

$$= 31,74,000 \times \frac{10}{100} \times \frac{2}{12}$$ ₹ 52,900

Likely sum at end of 2 months 32,26,900

Proceeds if we can encash by forward rate :

$ 69000 × ₹47.00 32,43,000

It is better to encash the proceeds after 2 months and get opportunity gain.

Question 18

Z Ltd. importing goods worth USD 2 million, requires 90 days to make the payment. The overseas supplier has offered a 60 days interest free credit period and for additional credit for 30 days an interest of 8% per annum.

The bankers of Z Ltd offer a 30 days loan at 10% per annum and their quote for foreign exchange is as follows:

	₹
Spot 1 USD	*56.50*
60 days forward for 1 USD	*57.10*
90 days forward for 1 USD	*57.50*

You are required to evaluate the following options:

(I) Pay the supplier in 60 days, or

(II) Avail the supplier's offer of 90 days credit.

Answer

(I) Pay the supplier in 60 days

If the payment is made to supplier in 60 days the applicable forward rate for 1 USD	₹ 57.10
Payment Due	USD 2,000,000
Outflow in Rupees (USD 2000000 × ₹57.10)	₹114,200,000
Add: Interest on loan for 30 days@10% p.a.	₹ 9,51,667
Total Outflow in ₹	₹11,51,51,667

(II) Availing supplier's offer of 90 days credit

Amount Payable	USD 2,000,000
Add: Interest on credit period for 30 days@8% p.a.	USD 13,333
Total Outflow in USD	USD 2,013,333
Applicable forward rate for 1 USD	₹57.50
Total Outflow in ₹ (USD 2,013,333 ×₹57.50)	₹115,766,648

Alternative 1 is better as it entails lower cash outflow.

Question 19

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

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

The arbitrageur has USD1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

Answer

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

(i) Buy ₹ from USD 10,000,000 At Mumbai 48.30 × 10,000,000 ₹483,000,000

(ii) Convert these ₹ to GBP at London $\left(\frac{₹\ 483,000,000}{\text{Rs. } 77.52}\right)$ GBP 6,230,650.155

(iii) Convert GBP to USD at New York GBP 6,230,650.155 × 1.6231 USD 10,112,968.26

There is net gain of USD 10,112968.26 less USD 10,000,000 i.e. USD 112,968.26

Question 20

The US dollar is selling in India at ₹55.50. If the interest rate for a 6 months borrowing in India is 10% per annum and the corresponding rate in USA is 4%.

(i) Do you expect that US dollar will be at a premium or at discount in the Indian Forex Market?

(ii) What will be the expected 6-months forward rate for US dollar in India? and

(iii) What will be the rate of forward premium or discount?

Answer

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

(ii) Calculation of the forward rate:

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

Where: R_h is home currency interest rate, R_f is foreign currency interest rate, F_1 is end of the period forward rate, and E_o is the spot rate.

Therefore $\frac{1+(0.10/2)}{1+(0.04/2)} = \frac{F_1}{55.50}$

$$\frac{1+0.05}{1+0.02} = \frac{F_1}{55.50}$$

or $\frac{1.05}{1.02} \times 55.50 = F_1$

or $\frac{58.275}{1.02} = F_1$

or F_1 = ₹57.13

(iii) Rate of premium:

$$\frac{57.13 - 55.50}{55.50} \times \frac{12}{6} \times 100 = 5.87\%$$

Question 21

In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

$/Pound	*Probability*
1.60	*0.15*

1.70	*0.20*
1.80	*0.25*
1.90	*0.20*
2.00	*0.20*

(i) What is the expected spot rate for 1.9.2009?

(ii) If, as of March, 2009, the 6-month forward rate is $ 1.80, should the firm sell forward its pound receivables due in September, 2009?

Answer

(i) Calculation of expected spot rate for September, 2009:

$ for £ (1)	*Probability* (2)	*Expected $/£* (1) × (2) = (3)
1.60	0.15	0.24
1.70	0.20	0.34
1.80	0.25	0.45
1.90	0.20	0.38
2.00	0.20	0.40
	1.00	EV = 1.81

Therefore, the expected spot value of $ for £ for September, 2009 would be $ 1.81.

(ii) If the six-month forward rate is $ 1.80, the expected profits of the firm can be maximised by retaining its pounds receivable.

Question 22

An importer customer of your bank wishes to book a forward contract with your bank on 3rd September for sale to him of SGD 5,00,000 to be delivered on 30th October.

The spot rates on 3rd September are USD 49.3700/3800 and USD/SGD 1.7058/68. The swap points are:

USD /₹		***USD/SGD***	
Spot/September	*0300/0400*	*1st month forward*	*48/49*
Spot/October	*1100/1300*	*2nd month forward*	*96/97*
Spot/November	*1900/2200*	*3rd month forward*	*138/140*
Spot/December	*2700/3100*		
Spot/January	*3500/4000*		

Calculate the rate to be quoted to the importer by assuming an exchange margin of paisa.

Answer

USD/ ₹ on 3rd September	49.3800
Swap Point for October	0.1300
	49.5100
Add: Exchange Margin	0.0500
	49.5600
USD/ SGD on 3rd September	1.7058
Swap Point for 2nd month Forward	0.0096
	1.7154

Cross Rate for SGD/ ₹ of 30th October

USD/ ₹ selling rate = ₹ 49.5600

SGD/ ₹ buying rate = SGD 1.7154

SGD/ ₹ cross rate = ₹ 49.5600 / 1.7154

= ₹ 28.8912

Question 23

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

Answer

Spot rate of ₹ 1 against yen = 108 lakhs yen/₹ 30 lakhs = 3.6 yen

3 months forward rate of Re. 1 against yen = 3.3 yen

Anticipated decline in Exchange rate = 10%.

Expected spot rate after 3 months = 3.6 yen – 10% of 3.6 = 3.6 yen – 0.36 yen = 3.24 yen per rupee

	₹ (in lakhs)
Present cost of 108 lakhs yen	30
Cost after 3 months: 108 lakhs yen/ 3.24 yen	33.33
Expected exchange loss	3.33

If the expected exchange rate risk is hedged by a Forward contract:

Present cost	30
Cost after 3 months if forward contract is taken 108 lakhs yen/ 3.3 yen	32.73
Expected loss	2.73

Suggestion: If the exchange rate risk is not covered with forward contract, the expected exchange loss is ₹ 3.33 lakhs. This could be reduced to ₹ 2.73 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.

Question 24

ABC Co. have taken a 6 month loan from their foreign collaborators for US Dollars 2 millions. Interest payable on maturity is at LIBOR plus 1.0%. Current 6-month LIBOR is 2%.

Enquiries regarding exchange rates with their bank elicits the following information:

Spot USD 1	*₹ 48.5275*
6 months forward	*₹ 48.4575*

(i) What would be their total commitment in Rupees, if they enter into a forward contract?

(ii) Will you advise them to do so? Explain giving reasons.

Answer

Firstly, the interest is calculated at 3% p.a. for 6 months. That is:

USD 20,00,000 × 3/100 × 6/12 = USD 30,000

From the forward points quoted, it is seen that the second figure is less than the first, this means that the currency is quoted at a discount.

(i) The value of the total commitment in Indian rupees is calculated as below:

Principal Amount of loan	USD 20,00,000
Add: Interest	USD 30,000
Amount due	USD 20,30,000
Spot rate	₹ 48.5275
Forward Points (6 months)	(–) 0.0700
Forward Rate	₹ 48.4575
Value of Commitment	₹ 9,83,68,725

(ii) It is seen from the forward rates that the market expectation is that the dollar will depreciate. If the firm's own expectation is that the dollar will depreciate more than what the bank has quoted, it may be worthwhile not to cover forward and keep the exposure open.

If the firm has no specific view regarding future dollar price movements, it would be better to cover the exposure. This would freeze the total commitment and insulate the firm from undue market fluctuations. In other words, it will be advisable to cut the losses at this point of time.

Given the interest rate differentials and inflation rates between India and USA, it would be unwise to expect continuous depreciation of the dollar. The US Dollar is a stronger currency than the Indian Rupee based on past trends and it would be advisable to cover the exposure.

Question 25

Excel Exporters are holding an Export bill in United States Dollar (USD) 1,00,000 due 60 days hence. They are worried about the falling USD value which is currently at ₹ 45.60 per USD. The concerned Export Consignment has been priced on an Exchange rate of ₹ 45.50 per USD. The Firm's Bankers have quoted a 60-day forward rate of ₹ 45.20.

Calculate:

(i) Rate of discount quoted by the Bank

(ii) The probable loss of operating profit if the forward sale is agreed to.

Answer

(i) Rate of discount quoted by the bank

$$= \frac{(45.20 - 45.60) \times 365 \times 100}{45.60 \times 60} = 5.33\%$$

(ii) Probable loss of operating profit:

(45.20 – 45.50) × 1,00,000 = ₹ 30,000

Question 26

Airlines Company entered into an agreement with Airbus for buying latest plans for a total value of F.F. (French Francs) 1,000 Million payable after 6 months. The current spot exchange rate is INR (Indian Rupees) 6.60/FF. The Airlines Company cannot predict the exchange rate in the future. Can the Airlines Company hedge its Foreign Exchange risk? Explain by examples.

Answer

Airlines Company can hedge its foreign exchange risk by the following ways:

(i) **Hedging through Forward Contract:** The Company can take full forward cover against foreign exchange exposure and entirely hedge its risk. It can contract with a bank to buy French franc forward at an agreed exchange rate e.g. suppose the 6 months forward rate is INR 6.77/FF. The liability is fixed and the airlines can concentrate on operation. Cost of forward contract

$$= \frac{6.60 - 6.77}{6.60} \times \frac{360}{\text{days}}$$

(ii) **Foreign Currency Option:** Foreign currency option is the right (not an obligation) to buy or sell a currency at an agreed exchange rate (exercise price) on or before an agreed maturity period. The right to buy is called a call option and right to sell is put option. Suppose, the airlines wants to purchase a 6 months put option. The call option exercise rate (say) is INR 6.70. The Airlines will be required to pay a premium for purchasing the option say 5% of the value of call option INR 6700 × 0.05 = INR 335

Maximum final cost = 6700 + 335 = INR 7035

Suppose at the end of 6 months the exchange rate stay at INR 6.8/FF

Airlines will exercise its put option hence it will buy FF at INR 6.7

Suppose exchange rate at the end of 6 months is INR 6.35, Airlines should not exercise its option. In the open market it need to pay only INR 6.35 (instead of INR 6.70) to buy one FF. However, it has already paid the option premium.

(iii) **Money Market Operations:** Airlines can borrow in Indian Rupee an amount and get it converted in FFs at Spot Rate. This amount can be invested in France for 6 months so that this amount along with interest due on it becomes equal to FFs 1000 million and is used for making the payment. The loan in Indian Rupee can be repaid back after 6 months along with the interest due thereon. If interest rate parity holds, the difference in the forward rate and the spot rate is the reflection of the difference in the interest rates in two countries.

Thus Airlines will be able to hedge against the changes in the exchange rate. The problem with money market is that all markets are not open and all countries are not fully convertible.

Question 27

(a) On 1st April, 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 June?

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

Answer

(a)

	USD	DM
Spot	0.6560	1.000

Interest rate p.a.	6.5%	4.5%
Interest for 91 days	0.0106	0.0112
Amount after 91 days	0.6666	1.0112
Hence forward rate	0.6666	0.6592
	1.0112	

OR

$$\text{Forward rate} = \frac{0.6560 \times \left\{1 + \left(0.065 \times \frac{91}{365}\right)\right\}}{\left\{1 + \left(0.045 \times \frac{91}{365}\right)\right\}}$$

= 0.6592

(b) Buy £ 62500 × 1.2806 = $ 80037.50

Sell £ 62500 × 1.2816 = $ 80100.00

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 $ 62.5.

Question 28

An Indian importer has to settle an import bill for $ 1,30,000. The exporter has given the Indian exporter two options:

(i) Pay immediately without any interest charges.

(ii) Pay after three months with interest at 5 percent per annum.

The importer's bank charges 15 percent per annum on overdrafts. The exchange rates in the market are as follows:

Spot rate (₹/$) : 48.35 /48.36

3-Months forward rate (₹/$) : 48.81 /48.83

The importer seeks your advice. Give your advice.

Answer

If importer pays now, he will have to buy US$ in Spot Market by availing overdraft facility. Accordingly, the outflow under this option will be

	₹
Amount required to purchase $130000[$130000X₹48.36]	6286800

Add: Overdraft Interest for 3 months @15% p.a.	235755
	6522555

If importer makes payment after 3 months then, he will have to pay interest for 3 months @ 5% p.a. for 3 month along with the sum of import bill. Accordingly, he will have to buy $ in forward market. The outflow under this option will be as follows:

	$
Amount of Bill	130000
Add: Interest for 3 months @5% p.a.	1625
	131625

Amount to be paid in Indian Rupee after 3 month under the forward purchase contract

₹ 6427249 (US$ 131625 X ₹ 48.83)

Since outflow of cash is least in (ii) option, it should be opted for.

Question 29

DEF Ltd. has imported goods to the extent of US$ 1 crore. The payment terms are 60 days interest-free credit. For additional credit of 30 days, interest at the rate of 7.75% p.a. will be charged.

The banker of DEF Ltd. has offered a 30 days loan at the rate of 9.5% p.a. Their quote for the foreign exchange is as follows:

Spot rate INR/US$	*62.50*
60 days forward rate INR/US$	*63.15*
90 days forward rate INR/US$	*63.45*

Which one of the following options would be better?

(i) Pay the supplier on 60th day and avail bank loan for 30 days.

(ii) Avail the supplier's offer of 90 days credit.

Answer

(i) Pay the supplier in 60 days

If the payment is made to supplier in 60 days the applicable forward rate for 1 USD	₹ 63.15
Payment Due	USD 1 crore
Outflow in Rupees (USD 1 crore × ₹ 63.15)	₹ 63.15 crore

Add: Interest on loan for 30 days@9.5% p.a.	₹ 0.50 crore
Total Outflow in ₹	₹ 63.65 crore

(ii) Availing supplier's offer of 90 days credit

Amount Payable	USD 1.00000 crore
Add: Interest on credit period for 30 days@7.75% p.a.	USD 0.00646 crore
Total Outflow in USD	USD 1.00646 crore
Applicable forward rate for 1 USD	₹ 63.45
Total Outflow in ₹ (USD 1.00646 crore ×₹ 63.45)	₹ 63.86 crore

Alternative 1 is better as it entails lower cash outflow.

Question 30

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

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

(i) ₹ 68 per US $.

(ii) ₹ 62 per US $.

(iii) ₹ 70 per US $.

(iv) ₹ 65 per US $.

Answer

	(₹)
Present Exchange Rate ₹65 = 1 US$	
If company purchases US$ 60,000 forward premium is	
60000 × 64 × 2%	76,800
Interest on ₹76,800 for 6 months at 12%	4,608
Total hedging cost	81,408
If exchange rate is ₹68	
Then gain (₹68 – ₹64) for US$ 60,000	2,40,000
Less: Hedging cost	81,408
Net gain	1,58,592
If US$ = ₹62	

Then loss (₹64 – ₹62) for US$ 60,000	1,20,000
Add: Hedging Cost	81,408
Total Loss	2,01,408
If US$ = ₹70	
Then Gain (₹70 – ₹64) for US$ 60,000	3,60,000
Less: Hedging Cost	81,408
Total Gain	2,78,592
If US$ = ₹65	
Then Gain (₹ 65 – ₹ 64) for US$ 60,000	60,000
Less: Hedging Cost	81,408
Net Loss	21,408

Question 31

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

Cost and Sales information:

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

Foreign exchange rate information:

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

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

Answer

If foreign exchange risk is hedged

				Total (₹)
Sum due	Yen 78,00,000	US$1,02,300	Euro 95,920	
Unit input price	Yen 650	US$10.23	Euro 11.99	

Unit sold	12000	10000	8000	
Variable cost per unit	₹225/-	395	510	
Variable cost	₹27,00,000	₹ 39,50,000	₹ 40,80,000	₹ 1,07,30,000
Three months forward rate for selling	2.427	0.0216	0.0178	
Rupee value of receipts	₹32,13,844	₹ 47,36,111	₹ 53,88,764	₹ 1,33,38,719
Contribution	₹5,13,844	₹ 7,86,111	₹ 13,08,764	₹ 26,08,719
Average contribution to sale ratio				19.56%
If risk is not hedged				
Rupee value of receipt	₹31,72,021	₹ 47,44,898	₹ 53,58,659	₹ 1,32,75,578
Total contribution				₹ 25,45,578
Average contribution to sale ratio				19.17%

AKC Ltd. Is advised to hedge its foreign currency exchange risk.

Question 32

XYZ Ltd. is an export oriented business house based in Mumbai. The Company invoices in customers' currency. Its receipt of US $ 1,00,000 is due on September 1, 2009.

Market information as at June 1, 2009 is:

Exchange Rates		*Currency Futures*		
US $/₹		*US $/₹*	*Contract size*	*₹4,72,000*
Spot	*0.02140*	*June*	*0.02126*	
1 Month Forward	*0.02136*	*September*	*0.02118*	
3 Months Forward	*0.02127*			
		Initial Margin		*Interest Rates in India*
June		*₹ 10,000*		*7.50%*
September		*₹ 15,000*		*8.00%*

On September 1, 2009 the spot rate US $Re. is 0.02133 and currency future rate is 0.02134. Comment which of the following methods would be most advantageous for XYZ Ltd.

(a) Using forward contract

(b) Using currency futures

(c) Not hedging currency risks.

It may be assumed that variation in margin would be settled on the maturity of the futures contract.

Answer

Receipts using a forward contract (1,00,000/0.02127)	= ₹47,01,457
Receipts using currency futures	
The number of contracts needed is (1,00,000/0.02118)/4,72,000 = 10	
Initial margin payable is 10 x ₹15,000 = ₹1,50,000	
On September 1 Close at 0.02134	
Receipts = US$1,00,000/0.02133	= 46,88,233
Variation Margin = [(0.02134 – 0.02118) x 10 x 472000/-]/0.02133	
OR (0.00016x10x472000)/.02133 = 755.2/0.02133	35,406
	47,23,639
Less: Interest Cost – 1,50,000 x 0.08 x 3/12	₹3,000
Net Receipts	₹47,20,639
Receipts under different methods of hedging	
Forward contract	₹47,01,457
Futures	₹47,20,639
No hedge	
US$ 1,00,000/0.02133	₹46,88,233
The most advantageous option would have been to hedge with futures.	

Question 33

EFD Ltd. is an export business house. The company prepares invoice in customers' currency. Its debtors of US$. 10,000,000 is due on April 1, 2015.

Market information as at January 1, 2015 is:

Exchange rates US$/INR		***Currency Futures US$/INR***	
Spot	*0.016667*	*Contract size: ₹ 24,816,975*	
1-month forward	*0.016529*	*1-month*	*0.016519*
3-months forward	*0.016129*	*3-month*	*0.016118*

	Initial Margin	***Interest rates in India***
1-Month	*₹17,500*	*6.5%*
3-Months	*₹22,500*	*7%*

On April 1, 2015 the spot rate US$/INR is 0.016136 and currency future rate is 0.016134.

Which of the following methods would be most advantageous to EFD Ltd?

(i) Using forward contract

(ii) Using currency futures

(iii) Not hedging the currency risk

Answer

Receipts using a forward contract = $10,000,000/0.016129	=	₹	620,001,240
Receipts using currency futures			
The number of contracts needed is ($10,000,000/0.016118)/24,816,975 = 25			
Initial margin payable is 25 contracts x ₹ 22,500	=	₹	5,62,500
On April 1,2015Close at 0.016134			
Receipts = US$10,000,000/0.016136	=	₹	619,732,276
Variation Margin =			
[(0.016134 – 0.016118) x 25 x 24,816,975/-]/0.016136			
OR (0.000016x 25 x 24,816,975)/.016136 = 9926.79/0.016136	=	₹	615,195
Less: Interest Cost – ₹ 5,62,500x 0.07 x 3/12	=	₹	9,844
Net Receipts		₹	620,337,627

Receipts under different methods of hedging

Forward contract	₹	620,001,240
Futures	₹	620,337,627
No hedge (US$ 10,000,000/0.016136)	₹	619,732,276

The most advantageous option would have been to hedge with futures.

Question 34

Spot rate 1 US $ = ₹48.0123

180 days Forward rate for 1 US $ = ₹48.8190

Annualised interest rate for 6 months – Rupee = 12%

Annualised interest rate for 6 months – US $ = 8%

Is there any arbitrage possibility? If yes how an arbitrageur can take advantage of the situation, if he is willing to borrow ₹ 40,00,000 or US $83,312.

Answer

Spot Rate = ₹40,00,000 /US$83,312 = 48.0123

Forward Premium on US$ = [(48.8190 – 48.0123)/48.0123] x 12/6 x 100

= 3.36%

Interest rate differential = 12% - 8%

= 4%

Since the negative Interest rate differential is greater than forward premium there is a possibility of arbitrage inflow into India.

The advantage of this situation can be taken in the following manner:

1. Borrow US$ 83,312 for 6 months

   Amount to be repaid after 6 months

   = US $ 83,312 (1+0.08 x 6/12) = US$86,644.48

2. Convert US$ 83,312 into Rupee and get the principal i.e. ₹40,00,000

   Interest on Investments for 6 months – ₹40,00,000/- x 0.06= ₹2,40,000/-

   Total amount at the end of 6 months = ₹(40,00,000 + 2,40,000) = ₹42,40,000/-

   Converting the same at the forward rate

   = ₹42,40,000/ ₹48.8190= US$ 86,851.43

Hence the gain is US $ (86,851.43 – 86,644.48) = US$ 206.95 OR

₹10,103 i.e., ($206.95 x ₹48.8190)

Question 35

Given the following information:

Exchange rate – Canadian dollar 0.665 per DM (spot)

Canadian dollar 0.670 per DM (3 months)

Interest rates – DM 7% p.a.

Canadian Dollar – 9% p.a.

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

Answer

In this case, DM is at a premium against the Can$.

Premium = [(0.67 – 0.665) /0.665] x (12/3) x 100 = 3.01 per cent

Interest rate differential = 9% - 7% = 2 per cent.

Since the interest rate differential is smaller than the premium, it will be profitable to place money in Deutschmarks the currency whose 3-months interest is lower.

The following operations are carried out:

(i) Borrow Can$ 1000 at 9 per cent for 3- months;

(ii) Change this sum into DM at the spot rate to obtain DM

= (1000/0.665) = 1503.76

(iii) Place DM 1503.76 in the money market for 3 months to obtain a sum of DM

Principal:	1503.76
Add: Interest @ 7% for 3 months =	26.32
Total	1530.08

(iv) Sell DM at 3-months forward to obtain Can$= (1530.08x0.67) = 1025.15

(v) Refund the debt taken in Can$ with the interest due on it, i.e.,

	Can$
Principal	1000.00
Add: Interest @9% for 3 months	22.50
Total	1022.50

Net arbitrage gain = 1025.15 – 1022.50 = Can$ 2.65

Question 36

An Indian exporting firm, Rohit and Bros., would be cover itself against a likely depreciation of pound sterling. The following data is given:

Receivables of Rohit and Bros	:	*£500,000*
Spot rate	:	*₹ 56.00/£*
Payment date	:	*3-months*
3 months interest rate	:	*India : 12 per cent per annum*
	:	*UK : 5 per cent per annum*

What should the exporter do?

Answer

The only thing lefts Rohit and Bros to cover the risk in the money market. The following steps are required to be taken:

(i) Borrow pound sterling for 3- months. The borrowing has to be such that at the end of three months, the amount becomes £ 500,000. Say, the amount borrowed is £ x. Therefore

$$x\left[1+0.05\times\frac{3}{12}\right] = 500{,}000 \text{ or } x = £493{,}827$$

(ii) Convert the borrowed sum into rupees at the spot rate. This gives: £493,827 × ₹ 56 = ₹ 27,654,312

(iii) The sum thus obtained is placed in the money market at 12 per cent to obtain at the end of 3- months:

$$S = ₹\ 27,654,312 \times \left[1 + 0.12 \times \frac{3}{12}\right] = ₹\ 28,483,941$$

(iv) The sum of £500,000 received from the client at the end of 3- months is used to refund the loan taken earlier.

From the calculations. It is clear that the money market operation has resulted into a net gain of ₹ 483,941 (₹ 28,483,941 – ₹ 500,000 × 56).

If pound sterling has depreciated in the meantime. The gain would be even bigger.

Question 37

An exporter is a UK based company. Invoice amount is $3,50,000. Credit period is three months. Exchange rates in London are :

Spot Rate ($/£) 1.5865 – 1.5905
3-month Forward Rate ($/£) 1.6100 – 1.6140

Rates of interest in Money Market :

	Deposit	*Loan*
$	*7%*	*9%*
£	*5%*	*8%*

Compute and show how a money market hedge can be put in place. Compare and contrast the outcome with a forward contract.

Answer

Identify: Foreign currency is an asset. Amount $ 3,50,000.

Create: $ Liability.

Borrow: In $. The borrowing rate is 9% per annum or 2.25% per quarter.

Amount to be borrowed: 3,50,000 / 1.0225 = $ 3,42,298.29

Convert: Sell $ and buy £. The relevant rate is the Ask rate, namely, 1.5905 per £,

(**Note:** This is an indirect quote). Amount of £s received on conversion is 2,15,214.27 (3,42,298.29/1.5905).

Invest: £ 2,15,214.27 will be invested at 5% for 3 months and get £ 2,17,904.45

Settle: The liability of $3,42,298.29 at interest of 2.25 per cent quarter matures to $3,50,000 receivable from customer.

Using forward rate, amount receivable is = 3,50,000 / 1.6140 = £2,16,852.54

Amount received through money market hedge = £2,17,904.45

Gain = 2,17,904.45 – 2,16,852.54 = £1,051.91

So, money market hedge is beneficial for the exporter

Question 38

The rate of inflation in India is 8% per annum and in the U.S.A. it is 4%. The current spot rate for USD in India is ₹ 46. What will be the expected rate after 1 year and after 4 years applying the Purchasing Power Parity Theory.

Answer

The differential inflation is 4%. Hence the rate will keep changing adversely by 4% every year. Assuming that the change is reflected at the end of each year, the rates will be:

End of Year	₹	₹ /USD
1	₹ 46.00 x 1.04	47.84
2	₹ 47.84 x 1.04	49.75
3	₹ 49.75 x 1.04	51.74
4	₹ 51.74 x 1.04	53.81

Alternative Answer

End of Year	₹	₹ /USD
1	₹ 46.00 x $\frac{(1+0.08)}{(1+0.04)}$	47.77
2	₹ 47.77 x $\frac{(1+0.08)}{(1+0.04)}$	49.61
3	₹ 49.61 x $\frac{(1+0.08)}{(1+0.04)}$	51.52
4	₹ 51.52 x $\frac{(1+0.08)}{(1+0.04)}$	53.50

Question 39

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

(ii) *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?*

Answer

(i) According to Purchasing Power Parity forward rate is

$$\text{Spot rate}\left[\frac{1+{}^{r}H}{1+{}^{r}F}\right]^{t}$$

So spot rate after one year

$$= ₹\ 43.40\left[\frac{1+0.065}{1+\ 0.03}\right]^{1}$$

= ₹ 43.4 (1.03399)

= ₹ 44.8751

After 3 years

$$₹\ 43.40\left[\frac{1+0.065}{1+0.03}\right]^{3}$$

= ₹ 43.40 $(1.03398)^3$

= ₹ 43.40 (1.10544) = ₹ 47.9761

(ii) As per interest rate parity

$$S_1 = S_0\left[\frac{1+\text{in A}}{1+\text{in B}}\right]$$

$$S_1 = £0.7570\left[\frac{1+(0.075)\times 3/12}{1+(0.035)\times 3/12}\right]$$

$$= £0.7570\left[\frac{1.01875}{1.00875}\right]$$

= £0.7570 × 1.0099 = £0.7645

= UK £0.7645 / US$

Question 40

Shoe Company sells to a wholesaler in Germany. The purchase price of a shipment is 50,000 deutsche marks with term of 90 days. Upon payment, Shoe Company will convert the DM to dollars. The present spot rate for DM per dollar is 1.71, whereas the 90-day forward rate is 1.70.

You are required to calculate and explain:

(i) If Shoe Company were to hedge its foreign-exchange risk, what would it do? What transactions are necessary?

(ii) Is the deutsche mark at a forward premium or at a forward discount?

(iii) What is the implied differential in interest rates between the two countries?

(Use interest-rate parity assumption).

Answer

(i) If Shoe Company were to hedge its foreign exchange risk, it would enter into forward contract of selling deutsche marks 90 days forward. It would sell 50,000 deutsche marks 90 days forward. Upon delivery of 50,000 DM 90 days hence, it would receive US $ 29,412 i.e. 50,000 DM/1.70. If it were to receive US $ payment today it would receive US $ 29,240 i.e. 50,000 DM/1.71. Hence, Shoe Company will be better off by $ 172 if it hedges its foreign exchange risk.

(ii) The deutsche mark is at a forward premium. This is because the 90 days forward rate of deutsche marks per dollar is less than the current spot rate of deutsche marks per dollar. This implies that deutsche mark is expected to be strengthen i.e. Fewer deutsche mark will be required to buy dollars.

(iii) The interest rate parity assumption is that high interest rates on a currency are offset by forward discount and low interest rate on a currency is offset by forward premiums.

Further, the spot and forward exchange rates move in tandem, with the link between them based on interest differential. The movement between two currencies to take advantage of interest rates differential is a major determinant of the spread between forward and spot rates. The forward discount or premium is approximately equal to interest differential between the currencies i.e.

$$\frac{F_{(DM/US\$)} - S_{(DM/US\$)}}{S_{(DM/US\$)}} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

$$\text{or } \frac{1.70 - 1.71}{1.71} \times \frac{365}{90} = r_{DM} - r_{US\$}$$

0r $-0.0237 = r_{DM} - r_{US\$}$

Therefore, the differential in interest rate is –2.37%, which means if interest rate parity holds, interest rate in the US should be 2.37% higher than in Germany.

Question 41

The following table shows interest rates for the United States Dollar and French Franc. The spot exchange rate is 7.05 Franc per Dollar. Complete the missing entries:

	3 Months	*6 Months*	*1 Year*
Dollar interest rate (annually compounded)	*11½%*	*12¼%*	*?*
Franc interest rate (annually compounded)	*19½%*	*?*	*20%*
Forward Franc per Dollar	*?*	*?*	*7.5200*
Forward discount per Franc percent per year	*?*	*6.3%*	

Answer

Computation of Missing Entries in the Table: For computing the missing entries in the table we will use Interest Rates Parity (IRP) theorem. This theorem states that the exchange rate of two countries will be affected by their interest rate differential. In other words, the currency of one country with a lower interest rate should be at a forward premium in terms of currency of country with higher interest rates and vice versa. This implies that the exchange rate (forward and spot) differential will be equal to the interest rate differential between the two countries i.e.

Interest rate differential = Exchange rate differential

$$\text{or } \frac{(1+r_f)}{(1+r_d)} = \frac{S_{f/d}}{F_{f/d}}$$

Where r_f is the rate of interest of country F (say the foreign country), r_d is rate of interest of country D (say domestic country), $S_{f/d}$ is the spot rate between the two countries F and D and $F_{f/d}$ is the forward rate between the two countries F and D.

3 months

Dollar interest rate = $11\frac{1}{2}\%$ (annually compounded)

Franc interest rate = $19\frac{1}{2}\%$ (annually compounded)

Then Forward Franc per Dollar rate would be

$$= 7.05 \left(\frac{1+\frac{0.195}{4}}{1+\frac{0.115}{4}} \right) = 7.05 \left(\frac{1+0.04875}{1+0.02875} \right)$$

= Franc 7.19 per US Dollar

Further Forward discount per Franc per cent per year = Interest Differential i.e.

$= 19\frac{1}{2}\% - 11\frac{1}{2}\% = 8\%$

Alternatively, more precisely it can also be computed as follows:

Spot Per Franc Rate = 1 / 7.05 = US Dollar 0.142 per Franc

One Year Forward Rate = $0.142\left(\frac{1+0.115}{1+0.195}\right)$ = US Dollar 0.132 per Franc

Accordingly, the discount per annuam will be = $\frac{0.142-0.132}{0.142}\times 100$ = 7.04%

6 months

Forward discount on Franc % per year = – 6.3% or – 3.15% for 6 months

Hence 6 months Forward rate = 7.05/ (100% – 3.15%)

Forward Francs per Dollar = 7.28 Francs

Let r be the Franc interest rate (annually compounded) then as per IRP Theory:

$$7.05\left(\frac{1+\frac{r}{2}}{1+\frac{0.1225}{2}}\right) = \text{Franc 7.28 per Dollar}$$

On solving the equation we get the value of r = 19.17% i.e. Franc interest rate (annually compounded)

1 Year

Franc interest rate = 20% (annually compounded)

Forward Franc per Dollar = 7.5200

As per Interest Rate Parity the relationship between the two countries rate and spot rate is

i.e. $\frac{1+\text{Dollar interest rate}}{1+0.20}=\frac{7.05}{7.52}$

Accordingly, the Dollar interest rate = 1.20 × 0.9374 – 1 = 1.125 – 1 = 0.125 or 12.5%

The completed Table will be as follows:

	3 Months	*6 Months*	*1 Year*
Dollar interest rate			

(annually compounded)	*11½%*	*12¼%*	*12.50%*
Franc interest rate			
(annually compounded)	*19½%*	*19.17%*	*20%*
Forward Franc per Dollar	*7.19*	*7.28*	*7.5200*
Forward discount per Franc			
percent per year	*8% or 7.04%*	*6.3%*	

Question 42

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

Contracted Rate – US$ 1= ₹ 42.32

The US Dollar quoted on 30-10-2010:-

Spot – 41.5000/41.5200

3 months' Premium -0.87% /0.93%

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

Compute:

(i) The cost to the importer in respect of the extension of the forward contract, and

(ii) The rate of new forward contract.

Answer

(i) The contract is to be cancelled on 30-10-2010 at the spot buying rate of US$ 1 = ₹ 41.5000

Less: Margin Money 0.075% = ₹ 0.0311

= ₹ 41.4689 or ₹ 41.47

US$ 20,000 @ ₹ 41.47 = ₹ 8,29,400

US$ 20,000 @ ₹ 42.32 = ₹ 8,46,400

The difference in favour of the Bank/Cost to the importer ₹ 17,000

(ii) The Rate of New Forward Contract

Spot Selling Rate US$ 1 = ₹ 41.5200

Add: Premium @ 0.93% = ₹ 0.3861

= ₹ 41.9061

Add: Margin Money 0.20% = ₹ 0.0838

= ₹ 41.9899 or ₹ 41.99

Question 43

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

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

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

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

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

For excess or balance of JY covered, the firm would use forward rate as future spot rate.

You are required to recommend cheaper hedging alternative for XYZ.

Answer

(i) Forward Cover

$$\text{3-month Forward Rate} = \frac{1}{1.9726} = ₹\ 0.5070/\text{JY}$$

Accordingly, INR required for JY 5,00,000 (5,00,000 X ₹ 0.5070) ₹ 2,53,500

(ii) Option Cover

To purchase JY 5,00,000, XYZ shall enter into a Put Option @ JY 2.125/INR

Accordingly, outflow in INR $\left(\frac{\text{JY } 5,00,000}{2.125}\right)$	₹ 2,35,294
Premium $\left(\frac{\text{INR } 2,35,294 \times 0.098}{1.9516}\right)$	₹ 11,815
	₹ 2,47,109

Since outflow of cash is least in case of Option same should be opted for. Further if price of INR goes above JY 2.125/INR the outflow shall further be reduced.

Question 44

ABC Technologic is expecting to receive a sum of US$ 4,00,000 after 3 months. The company decided to go for future contract to hedge against the risk. The standard size of future contract available in the market is $1000. As on date spot and futures $ contract are quoting at ₹ 44.00 & ₹ 45.00 respectively. Suppose after 3 months the company closes out its position futures

are quoting at ₹ 44.50 and spot rate is also quoting at ₹ 44.50. You are required to calculate effective realization for the company while selling the receivable. Also calculate how company has been benefitted by using the future option.

Answer

The company can hedge position by selling future contracts as it will receive amount from outside.

Number of Contracts = $\frac{\$4,00,000}{\$1,000}$ = 400 contracts

Gain by trading in futures = (₹ 45 – ₹ 44.50) 4,00,000= ₹ 2,00,000

Net Inflow after after 3 months = ₹ 44.50 x ₹ 4,00,000+ 2,00,000 = ₹ 1,80,00,000

Effective Price realization = $\frac{₹1,80,00,000}{\$4,00,000}$ = ₹ 45 Per US$

Question 45

Gibralater Limited has imported 5000 bottles of shampoo at landed cost in Mumbai, of US $ 20 each. The company has the choice for paying for the goods immediately or in 3 months' time. It has a clean overdraft limited where 14% p.a. rate of interest is charged.

Calculate which of the following method would be cheaper to Gibralter Limited.

(i) Pay in 3 months' time with interest @ 10% and cover risk forward for 3 months.

(ii) Settle now at a current spot rate and pay interest of the over draft for 3 months.

The rates are as follows:

Mumbai ₹/$ spot	:	*60.25-60.55*
3 months swap	:	*35/25*

Answer

Option - I

$20 x 5000 = $ 1,00,000

Repayment in 3 months time = $1,00,000 x (1 + 0.10/4) = $ 1,02,500

3-months outright forward rate = ₹ 59.90/ ₹ 60.30

Repayment obligation in ₹ ($1,02,500 X ₹ 60.30) = ₹ 61,80,750

Option -II

Overdraft ($1,00,000 x ₹ 60.55)	₹ 60,55,000
Interest on Overdraft (₹ 60,55,000 x 0.14/4)	₹ 2,11,925
	₹ 62,66,925

Option I should be preferred as it has lower outflow.

Question 46

Suppose you are a treasurer of XYZ plc in the UK. XYZ have two overseas subsidiaries, one based in Amsterdam and one in Switzerland. The Dutch subsidiary has surplus Euros in the amount of 725,000 which it does not need for the next three months but which will be needed at the end of that period (91 days). The Swiss subsidiary has a surplus of Swiss Francs in the amount of 998,077 that, again, it will need on day 91. The XYZ plc in UK has a net balance of £75,000 that is not needed for the foreseeable future.

Given the rates below, what is the advantage of swapping Euros and Swiss Francs into Sterling?

Spot Rate (€)	*£0.6858- 0.6869*
91 day Pts	*0.0037 0.0040*
Spot Rate(£)	*CHF 2.3295- 2.3326*
91 day Pts	*0.0242 0.0228*

Interest rates for the Deposits

Amount of Currency	***91 day Interest Rate % pa***		
	£	***€***	***CHF***
0 – 100,000	*1*	*¼*	*0*
100,001 – 500,000	*2*	*1 ½*	*¼*
500,001 – 1,000,000	*4*	*2*	*½*
Over 1,000,000	*5.375*	*3*	*1*

Answer

Individual Basis

	Interest	**Amt. after 91 days**	**Conversion in £**
Holland € 725,000 x 0.02 x 91/360 =	€ 3,665.28	€ 728,665.28	£502,414.71 (728,665.28 x 0.6895)
Switzerland CHF 998,077 x 0.005 x 91/360 =	CHF 1,261.46	CHF 999,338.46	£432,651.51 (999,338.46÷2.3098)
UK £ 75,000 x 0.01 x 91/360 =	£ 189.58	£ 75,189.58	£ 75,189.58
Total GBP at 91 days			£ 1,010,255.80

Swap to Sterling

Sell € 7,25,000 (Spot at 0.6858) buy £	£ 4,97,205.00

Sell CHF 9,98,077(Spot at 2.3326) buy £	£ 4,27,881.76
Independent GBP amount	£ 75,000.00
	£ 1,000,086.76
Interest (£ 1,000,086.76 x 0.05375 x 91/360)	£ 13,587.98
Total GBP at 91 days	£ 1,013,674.74
Less: Total GBP at 91 days as per individual basis	£ 1,010,255.80
Net Gain	£ 3,418.94

Question 47

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

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

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

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

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

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

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

Answer

Forward Market Cover

Hedge the risk by buying Can$ in 1 and 3 months time will be:

July - 1010000 X 0.9301 = US $ 939401

Sept. - 705000 X 0.9356 = US $ 659598

Option Contracts

July Payment = 1010000/ 50,000 = 20.20

September Payment = 705000/ 50,000 = 14.10

Company would like to take out 20 contracts for July and 14 contracts for September respectively. Therefore costs, if the options were exercised, will be:-

	July		Sept.	
	Can $	US $	Can $	US $
Covered by Contracts	1000000	940000	700000	665000
Balance bought at spot rate	10000	9301	5000	4678
Option Costs:				
Can $ 50000 x 20 x 0.0102		10200	---	
Can $ 50000 x 14 x 0.0164	---			11480
Total cost in US $ of using Option Contract		959501		681158

Decision: As the firm is stated as risk averse and the money due to be paid is certain, a fixed forward contract, being the cheapest alternative in the both the cases, would be recommended.

Question 48

Zaz plc, a UK Company is in the process of negotiating an order amounting €2.8 million with a large German retailer on 6 month's credit. If successful, this will be first time for Zaz has exported goods into the highly competitive German Market. The Zaz is considering following 3 alternatives for managing the transaction risk before the order is finalized.

(a) Mr. Peter the Marketing head has suggested that in order to remove transaction risk completely Zaz should invoice the German firm in Sterling using the current €/£ average spot rate to calculate the invoice amount.

(b) Mr. Wilson, CE is doubtful about Mr. Peter's proposal and suggested an alternative of invoicing the German firm in € and using a forward exchange contract to hedge the transaction risk.

(c) Ms. Karen, CFO is agreed with the proposal of Mr. Wilson to invoice the German first in €, but she is of opinion that Zaz should use sufficient 6 month sterling further contracts (to the nearest whole number) to hedge the transaction risk.

Following data is available

Sport Rate	*€ 1.1960 - €1.1970/£*
6 months forward points	*0.60 – 0.55 Euro Cents.*
6 month further contract is currently trading at	*€ 1.1943/£*
6 month future contract size is	*£62,500*
After 6 month Spot rate and future rate	*€ 1.1873/£*

You are required to

(a) Calculate (to the nearest £) the £ receipt for Zaz plc, under each of 3 above proposals.

(b) In your opinion which alternative you consider to be most appropriate.

Answer

(i) Receipt under three proposals

(a) Proposal of Mr. Peter

Invoicing in £ will produce = $\frac{€\,2.8 \text{ million}}{1.1965}$ = £ 2.340 million

(b) Proposal of Mr. Wilson

Forward Rate = €1.1970-0.0055 = 1.1915

Using Forward Market hedge Sterling receipt would be $\frac{€\,2.8 \text{ million}}{1.1915}$ = £ 2.35 million

(c) Proposal of Ms. Karen

The equivalent sterling of the order placed based on future price (€1.1943)

= $\frac{€\,2.8 \text{ million}}{1.1943}$ = £ 2,344,470 (rounded off)

Number of Contracts = $\frac{£2,344,470}{62,500}$ = 37 Contracts (to the nearest whole number)

Thus, € amount hedged by future contract will be = 37 × £62,500 = £23,12,500

Buy Future at	€1.1943
Sell Future at	€1.1873
	€0.0070

Total loss on Future Contracts = 37 × £62,500 × €0.0070 =€16,188

After 6 months

Amount Received	€28,00,000

Less: Loss on Future Contracts	€ 16,188
	€ 27,83,812

Sterling Receipts

On sale of € at spot = $\frac{€\,27,83,812}{1.1873}$ = £ 2.3446 million

(ii) Proposal of option (b) is preferable because the option (a) & (c) produces least receipts. Further, in case of proposal (a) there must be a doubt as to whether this would be acceptable to German firm as it is described as a competitive market and Zaz is moving into it first time.

Question 49

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:	*10.0% – 12.0% p.a.*
France:	*14.0% – 16.0% p.a.*
USA:	*11.5% – 13.0% p.a.*

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

Answer

£ Exposure

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.

(i) Forward market hedge

Buy 3 months' forward contract accordingly, amount payable after 3 months will be

£ 342,000 / 0.9520 = US$ 359,244

(ii) Money market hedge

To pay £ after 3 months' Columbus shall requires to borrow in US$ and translate to £ and then deposit in £.

For payment of £ 342,000 in 3 months (@2.5% interest) amount required to be deposited now (£ 342,000 ÷ 1.025) = £ 333,658

With spot rate of 0.9830 the US$ loan needed will be = US$ 339,429

Loan repayable after 3 months (@3.25% interest) will be = US$ 350,460

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

€ Receipt

Amount to be hedged = € 590,000

(i) Forward market hedge

Sell 4 months' forward contract accordingly, amount receivable after 4 months will be

(€ 590,000 x1.9510) = US$ 1,151,090

(ii) Money market hedge

For money market hedge Columbus shall borrow in € and then translate to US$ and deposit in US$

For receipt of € 590,000 in 4 months (@ 5.33% interest) amount required to be borrowed now (€590,000 ÷ 1.0533) = € 560,144

With spot rate of 1.8890 the US$ deposit will be = US$ 1,058,113

Deposit amount will increase over 3 months (@3.83% interest) will be = US$ 1,098,639

In this case, more will be received in US$ under the forward hedge.

Question 50

XYZ Ltd. a US firm will need £ 3,00,000 in 180 days. In this connection, the following information is available:

Spot rate 1 £ = $ 2.00

180 days forward rate of £ as of today = $1.96

Interest rates are as follows:

	U.K.	*US*
180 days deposit rate	*4.5%*	*5%*
180 days borrowing rate	*5%*	*5.5%*

A call option on £ that expires in 180 days has an exercise price of $ 1.97 and a premium of $ 0.04.

XYZ Ltd. has forecasted the spot rates 180 days hence as below:

Future rate	*Probability*
$ 1.91	*25%*
$ 1.95	*60%*
$ 2.05	*15%*

Which of the following strategies would be most preferable to XYZ Ltd.?

(a) A forward contract;

(b) A money market hedge;

(c) An option contract;

(d) No hedging.

Show calculations in each case

Answer

(a) Forward contract: Dollar needed in 180 days = £3,00,000 x $ 1.96 = $5,88,000/-

(b) Money market hedge: Borrow $, convert to £, invest £, repay $ loan in 180 days

Amount in £ to be invested = 3,00,000/1.045 = £ 2,87,081

Amount of $ needed to convert into £ = 2,87,081 x 2 = $ 5,74,162

Interest and principal on $ loan after 180 days = $5,74,162 x 1.055 = $ 6,05,741

(c) Call option:

Expected Spot rate in 180 days	*Prem./unit*	*Exercise Option*	*Total price per unit*	*Total price for £3,00,000xi*	*Prob. Pi*	*pixi*
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01*	6,03,000	0.15	90,450
						5,94,900
Add: Interest on Premium @ 5.5% (12,000 x 5.5%)						660
						5,95,560

* ($1.97 + $0.04)

(d) No hedge option:

Expected Future spot rate	*Dollar needed Xi*	*Prob. Pi*	*Pi xi*
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

No hedge strategy appears to be most preferable because least number of $ are needed under this option to arrange £3,00,000.

Question 51

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

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

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

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

The company has 3 choices:

(i) Forward cover

(ii) Money market cover, and

(iii) Currency option

Which of the alternatives is preferable by the company?

Answer

In the given case, the exchange rates are indirect. These can be converted into direct rates as follows:

Spot rate

$$GBP = \frac{1}{USD\,1.5617} \quad \text{to} \quad \frac{1}{USD\,1.5673}$$

USD = GBP 0.64033 - GBP 0.63804

6 months' forward rate

$$GBP = \frac{1}{USD\,1.5455} \quad \text{to} \quad \frac{1}{USD\,1.5609}$$

USD = GBP 0.64704 - GBP 0.64066

Payoff in 3 alternatives

i. Forward Cover

Amount payable	USD 3,64,897
Forward rate	GBP 0.64704
Payable in GBP	GBP 2,36,103

ii. Money market Cover

Amount payable	USD 3,64,897
PV @ 4.5% for 6 months i.e. $\frac{1}{1.0225} = 0.9779951$	USD 3,56,867
Spot rate purchase	GBP 0.64033
Borrow GBP (USD 3,56,867 x 0.64033)	GBP 2,28,512
Interest for 6 months @ 7 %	7,998
	-
Payable after 6 months	GBP 2,36,510

iii. Currency options

Amount payable	USD 3,64,897
Unit in Options contract	GBP 12,500
Value in USD at strike rate of 1.70 (GBP 12,500 x 1.70)	USD 21,250

Number of contracts USD 3,64,897/ USD 21,250	17.17
Exposure covered USD 21,250 x 17	USD 3,61,250
Exposure to be covered by Forward (USD 3,64,897 – USD 3,61,250)	USD 3,647
Options premium 17 x GBP 12,500 x 0.096	USD 20,400
Premium in GBP (USD 20,400 x 0.64033)	GBP 13,063
Total payment in currency option	
Payment under option (17 x 12,500)	GBP 2,12,500
Premium payable	GBP 13,063
Payment for forward cover (USD 3,647 x 0.64704)	GBP 2,360
	GBP 2,27,923

Thus total payment in:

(i)	Forward Cover	2,36,103 GBP
(ii)	Money Market	2,36,510 GBP
(iii)	Currency Option	2,27,923 GBP

The company should take currency option for hedging the risk.

Note: Even interest on Option Premium can also be considered in the above solution.

Question 52

Nitrogen Ltd, a UK company is in the process of negotiating an order amounting to €4 million with a large German retailer on 6 months credit. If successful, this will be the first time that Nitrogen Ltd has exported goods into the highly competitive German market. The following three alternatives are being considered for managing the transaction risk before the order is finalized.

(i) Invoice the German firm in Sterling using the current exchange rate to calculate the invoice amount.

(ii) Alternative of invoicing the German firm in € and using a forward foreign exchange contract to hedge the transaction risk.

(iii) Invoice the German first in € and use sufficient 6 months sterling future contracts (to the nearly whole number) to hedge the transaction risk.

Following data is available:

Spot Rate	*€ 1.1750 - €1.1770/£*
6 months forward premium	*0.60-0.55 Euro Cents*
6 months future contract is currently trading at	*€1.1760/£*
6 months future contract size is	*£62500*
Spot rate and 6 months future rate	*€1.1785/£*

Required:

(a) Calculate to the nearest £ the receipt for Nitrogen Ltd, under each of the three proposals.

(b) In your opinion, which alternative would you consider to be the most appropriate and the reason thereof.

Answer

(i) Receipt under three proposals

(a) Invoicing in Sterling

Invoicing in £ will produce = $\frac{€\,4\,\text{million}}{1.1770}$ = £3398471

(b) Use of Forward Contract

Forward Rate = €1.1770+0.0055 = 1.1825

Using Forward Market hedge Sterling receipt would be $\frac{€\,4\,\text{million}}{1.1825}$ = £ 3382664

(c) Use of Future Contract

The equivalent sterling of the order placed based on future price (€1.1760) = $\frac{€\,4.00\,\text{million}}{1.1760}$ = £ 3401360

Number of Contracts = $\frac{£3401360}{62,500}$ = 54 Contracts (to the nearest whole number)

Thus, € amount hedged by future contract will be = 54 × £62,500 = £3375000

Buy Future at	€1.1760
Sell Future at	€1.1785
	€0.0025

Total profit on Future Contracts = 54 × £62,500 × €0.0025 = €8438

After 6 months

Amount Received	€4000000
Add: Profit on Future Contracts	€ 8438
	€ 4008438

Sterling Receipts

On sale of € at spot = $\frac{€\,4008438}{1.1785}$ = €3401305

(ii) Proposal of option (c) is preferable because the option (a) & (b) produces least receipts.

Alternative solution:

Assuming that 6 month forward premium is considered as discount, because generally premium is mentioned in ascending order and discount is mentioned in descending order.

(i) Receipt under three proposals

(a) Invoicing in Sterling

Invoicing in £ will produce = $\frac{€\,4\,\text{million}}{1.1770}$ = £3398471

(b) Use of Forward Contract

Forward Rate = €1.1770-0.0055 = 1.1715

Using Forward Market hedge Sterling receipt would be $\frac{€\,4\,\text{million}}{1.1715}$ = £ 3414426

(c) Use of Future Contract

The equivalent sterling of the order placed based on future price (€1.1760) = $\frac{€\,4.00\,\text{million}}{1.1760}$ = £ 3401360

Number of Contracts = $\frac{£3401360}{62,500}$ = 54 Contracts (to the nearest whole number)

Thus, € amount hedged by future contract will be = 54 × £62,500 = £3375000

Buy Future at	€1.1760
Sell Future at	€1.1785
	€0.0025

Total profit on Future Contracts = 54 × £62,500 × €0.0025 = €8438

After 6 months

Amount Received	€4000000
Add: Profit on Future Contracts	€ 8438
	€ 4008438

Sterling Receipts

On sale of € at spot = $\frac{€\,4008438}{1.1785}$ = €3401305

(ii) Proposal of option (b) is preferable because the option (a) & (c) produces least receipts.

Question 53

Sun Ltd. is planning to import equipment from Japan at a cost of 3,400 lakh yen. The company may avail loans at 18 percent per annum with quarterly rests with which it can import the equipment. The company has also an offer from Osaka branch of an India based bank extending credit of 180 days at 2 percent per annum against opening of an irrecoverable letter of credit.

Additional information:

Present exchange rate *₹ 100 = 340 yen*

180 day's forward rate *₹ 100 = 345 yen*

Commission charges for letter of credit at 2 per cent per 12 months.

Advice the company whether the offer from the foreign branch should be accepted.

Answer

Option I (To finance the purchases by availing loan at 18% per annum):

Cost of equipment	*₹ in lakhs*
3400 lakh yen at ₹100 = 340 yen	1,000.00
Add: Interest at 4.5% I Quarter	45.00
Add: Interest at 4.5% II Quarter (on ₹1045 lakhs)	47.03
Total outflow in Rupees	1,092.03
Alternatively, interest may also be calculated on compounded basis, i.e., ₹1000 × $[1.045]^2$	₹1092.03

Option II (To accept the offer from foreign branch):

Cost of letter of credit	
At 1 % on 3400 lakhs yen at ₹100 = 340 yen	₹ 10.00 lakhs
Add: Interest for 2 Quarters	₹ 0.90 lakhs
(A)	₹ 10.90 lakhs
Payment at the end of 180 days:	
Cost	3400.00 lakhs yen
Interest at 2% p.a. [3400 × 2/100 × 180/365]	33.53 lakhs yen
	3433.53 lakhs yen
Conversion at ₹100 = 345 yen [3433.53 / 345 ×100] (B)	₹ 995.23 lakhs
Total Cost: (A) + (B)	₹ 1006.13 lakhs

Advise: Option 2 is cheaper by (1092.03 – 1006.13) lakh or ₹ 85.90 lakh. Hence, the offer may be accepted.

Question 54

NP and Co. has imported goods for US $ 7,00,000. The amount is payable after three months. The company has also exported goods for US $ 4,50,000 and this amount is receivable in two months. For receivable amount a forward contract is already taken at ₹ 48.90.

The market rates for Rupee and Dollar are as under:

Spot	*₹ 48.50/70*
Two months	*25/30 points*
Three months	*40/45 points*

The company wants to cover the risk and it has two options as under :

(A) To cover payables in the forward market and

(B) To lag the receivables by one month and cover the risk only for the net amount. No interest for delaying the receivables is earned. Evaluate both the options if the cost of Rupee Funds is 12%. Which option is preferable?

Answer

(A) To cover payable and receivable in forward Market

Amount payable after 3 months	$7,00,000
Forward Rate	₹ 48.45
Thus Payable Amount (₹) (A)	₹ 3,39,15,000
Amount receivable after 2 months	$ 4,50,000
Forward Rate	₹ 48.90
Thus Receivable Amount (₹) (B)	₹ 2,20,05,000
Interest @ 12% p.a. for 1 month (C)	₹ 2,20,050
Net Amount Payable in (₹) (A) – (B) – (C)	₹ 1,16,89,950

(B) Assuming that since the forward contract for receivable was already booked it shall be cancelled if we lag the receivables. Accordingly any profit/ loss on cancellation of contract shall also be calculated and shall be adjusted as follows:

Amount Payable ($)	$7,00,000
Amount receivable after 3 months	$ 4,50,000
Net Amount payable	$2,50,000
Applicable Rate	₹ 48.45
Amount payable in (₹) (A)	₹ 1,21,12,500
Profit on cancellation of Forward cost (48.90 – 48.30) × 4,50,000 (B)	₹ 2,70,000
Thus net amount payable in (₹) (A) + (B)	₹ 1,18,42,500

Since net payable amount is least in case of first option, hence the company should cover payable and receivables in forward market.

Note: In the question it has not been clearly mentioned that whether quotes given for 2 and 3 months (in points terms) are premium points or direct quotes. Although above solution is based on the assumption that these are direct quotes, but students can also consider them as premium points and solve the question accordingly.

Question 55

On January 28, 2010 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, 2010. The interbank market rates were as follows:

	January, 28	*February 4*
Bombay US$1	*= ₹ 45.85/45.90*	*45.91/45.97*
London Pound 1	*= US$ 1.7840/1.7850*	*1.7765/1.7775*
Pound 1	*= SGD 3.1575/3.1590*	*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 rate in multiples of .0001)

Answer

On January 28, 2010 the importer customer requested to remit SGD 25 lakhs.

To consider sell rate for the bank:

US $ = ₹ 45.90

Pound 1 = US$ 1.7850

Pound 1 = SGD 3.1575

Therefore, SGD 1 = $\frac{₹\ 45.90 * 1.7850}{SGD\ 3.1575}$

SGD 1 = ₹ 25.9482

Add: Exchange margin (0.125%) ₹ 0.0324

₹ 25.9806

On February 4, 2010 the rates are

US $ = ₹ 45.97

Pound 1 = US$ 1.7775

Pound 1 = SGD 3.1380

Therefore, SGD 1 = $\frac{₹\ 45.97 * 1.7775}{SGD\ 3.1380}$

SGD 1 =	₹ 26.0394
Add: Exchange margin (0.125%)	₹ 0.0325
	₹ 26.0719

Hence, loss to the importer

= SGD 25,00,000 (₹26.0719 – ₹25.9806)= ₹ 2,28,250

Question 56

A customer with whom the Bank had entered into 3 months' forward purchase contract for Swiss Francs 10,000 at the rate of ₹ 27.25 comes to the bank after 2 months and requests cancellation of the contract. On this date, the rates, prevailing, are:

Spot	*CHF 1 =*	*₹ 27.30*	*27.35*
One month forward		*₹ 27.45*	*27.52*

What is the loss/gain to the customer on cancellation?

Answer

The contract would be cancelled at the one month forward sale rate of ₹ 27.52.

	₹
Francs bought from customer under original forward contract at:	27.25
It is sold to him on cancellation at:	27.52
Net amount payable by customer per Franc	0.27

At ₹ 0.27 per Franc, exchange difference for CHF 10,000 is ₹ 2,700.

Loss to the Customer:

Exchange difference (Loss) ₹ 2,700

Note: The exchange commission and other service charges are ignored.

Question 57

A bank enters into a forward purchase TT covering an export bill for Swiss Francs 1,00,000 at ₹ 32.4000 due 25th April and covered itself for same delivery in the local inter bank market at ₹ 32.4200. However, on 25th March, exporter sought for cancellation of the contract as the tenor of the bill is changed.

In Singapore market, Swiss Francs were quoted against dollars as under:

Spot	*USD 1 = Sw. Fcs.*	*1.5076/1.5120*
One month forward		*1.5150/ 1.5160*
Two months forward		*1.5250 / 1.5270*

Three months forward		*1.5415/ 1.5445*

and in the interbank market US dollars were quoted as under:

Spot	*USD 1 = ₹*	*49.4302/.4455*
Spot / April		*.4100/.4200*
Spot/May		*.4300/.4400*
Spot/June		*.4500/.4600*

Calculate the cancellation charges, payable by the customer if exchange margin required by the bank is 0.10% on buying and selling.

Answer

First the contract will be cancelled at TT Selling Rate

USD/ Rupee Spot Selling Rate	₹ 49.4455	
Add: Premium for April	₹ 0.4200	
	₹ 49.8655	
Add: Exchange Margin @ 0.10%	₹ 0.04987	
	₹ 49.91537	Or 49.9154
USD/ Sw. Fcs One Month Buying Rate	Sw. Fcs. 1.5150	
Sw. Fcs. Spot Selling Rate (₹49.91537/1.5150)	₹ 32.9474	
Rounded Off	₹ 32.9475	
Bank buys Sw. Fcs. Under original contract	₹ 32.4000	
Bank Sells under Cancellation	₹ 32.9475	
Difference payable by customer	₹ 00.5475	

Exchange difference of Sw. Fcs. 1,00,000 payable by customer ₹ 54,750

(Sw. Fcs. 1,00,000 x ₹ 0.5475)

Question 58

An importer booked a forward contract with his bank on 10th April for USD 2,00,000 due on 10th June @ ₹ 64.4000. The bank covered its position in the market at ₹ 64.2800.

The exchange rates for dollar in the interbank market on 10th June and 20th June were:

	10th June	***20th June***
Spot USD 1=	*₹ 63.8000/8200*	*₹ 63.6800/7200*
Spot/June	*₹ 63.9200/9500*	*₹ 63.8000/8500*
July	*₹ 64.0500/0900*	*₹ 63.9300/9900*

August	*₹ 64.3000/3500*	*₹ 64.1800/2500*
September	*₹ 64.6000/6600*	*₹ 64.4800/5600*

Exchange Margin 0.10% and interest on outlay of funds @ 12%. The importer requested on 20th June for extension of contract with due date on 10th August.

Rates rounded to 4 decimal in multiples of 0.0025.

On 10th June, Bank Swaps by selling spot and buying one month forward.

Calculate:

(i) Cancellation rate

(ii) Amount payable on $ 2,00,000

(iii) Swap loss

(iv) Interest on outlay of funds, if any

(v) New contract rate

(vi) Total Cost

Answer

(i) Cancellation Rate:

The forward sale contract shall be cancelled at Spot TT Purchase for $ prevailing on the date of cancellation as follows:

$/ ₹ Market Buying Rate	₹ 63.6800
Less: Exchange Margin @ 0.10%	₹ 0.0636
	₹ 63.6163

Rounded off to ₹ 63.6175

(ii) Amount payable on $ 2,00,000

Bank sells $2,00,000 @ ₹ 64.4000	₹ 1,28,80,000
Bank buys $2,00,000 @ ₹ 63.6163	₹ 1,27,23,260
Amount payable by customer	₹ 1,56,740

(iii) Swap Loss

On 10th June the bank does a swap sale of $ at market buying rate of ₹ 63.8000 and forward purchase for June at market selling rate of ₹ 63.9500.

Bank buys at	₹ 63.9500
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.1500

Swap Loss for $ 2,00,000 in ₹ = ₹ 30,000

(iv) Interest on Outlay of Funds

On 10th June, the bank receives delivery under cover contract at ₹ 64.2800 and sell spot at ₹ 63.8000.

Bank buys at	₹ 64.2800
Bank sells at	₹ 63.8000
Amount payable by customer	₹ 0.4800

Outlay for $ 2,00,000 in ₹ 96,000

Interest on ₹ 96,000 @ 12% for 10 days ₹ 320

(v) New Contract Rate

The contract will be extended at current rate

$/ ₹ Market forward selling Rate for August	₹ 64.2500
Add: Exchange Margin @ 0.10%	₹ 0.0643
	₹ 64.3143

Rounded off to ₹ 64.3150

(vi) Total Cost

Cancellation Charges	₹ 1,56,740.00
Swap Loss	₹ 30,000.00
Interest	₹ 320.00
	₹ 1,87,060.00

Question 59

On 10th July, an importer entered into a forward contract with bank for US $ 50,000 due on 10th September at an exchange rate of ₹ 66.8400. The bank covered its position in the interbank market at ₹ 66.6800.

How the bank would react if the customer requests on 20th September:

(i) to cancel the contract?

(ii) to execute the contract?

(iii) to extend the contract with due date to fall on 10th November?

The exchange rates for US$ in the interbank market were as below:

		10th September	***20th September***
Spot	*US$1 =*	*66.1500/1700*	*65.9600/9900*
Spot/September		*66.2800/3200*	*66.1200/1800*

Spot/October	*66.4100/4300*	*66.2500/3300*
Spot/November	*66.5600/6100*	*66.4000/4900*

Exchange margin was 0.1% on buying and selling.

Interest on outlay of funds was 12% p.a.

You are required to show the calculations to:

(i) cancel the Contract,

(ii) execute the Contract, and

(iii) extend the Contract as above.

Answer

In each of the case first the FEADI Rule of Automatic Cancellation shall be applied and customer shall pay the charges consisted of following:

(a) Exchange Difference

(b) Swap Loss

(c) Interest on Outlay Funds

(a) Exchange Difference

(1) Cancellation Rate:

The forward sale contract shall be cancelled at Spot TT Purchase for $ prevailing on the date of cancellation as follows:

$/ ₹ Market Buying Rate	₹ 65.9600
Less: Exchange Margin @ 0.10%	₹ 0.0660
	₹ 65.8940

Rounded off to ₹ 65.8950

(2) Amount payable on $ 50,000

Bank sells $50,000 @ ₹ 66.8400	₹ 33,42,000
Bank buys $50,000 @ ₹ 65.8950	₹ 32,94,750
Amount payable by customer	₹ 47,250

(b) Swap Loss

On 10th September the bank does a swap sale of $ at market buying rate of ₹ 66.1500 and forward purchase for September at market selling rate of ₹ 66.3200.

Bank buys at	₹ 66.3200
Bank sells at	₹ 66.1500
Amount payable by customer	₹ 0.1700

Swap Loss for $ 50,000 in ₹ = ₹ 8,500

(c) Interest on Outlay of Funds

On 10th September, the bank receives delivery under cover contract at ₹ 66.6800 and sell spot at ₹ 66.1500.

Bank buys at	₹ 66.6800
Bank sells at	₹ 66.1500
Amount payable by customer	₹ 0.5300

Outlay for $ 50,000 in ₹ 26,500

Interest on ₹ 26,500 @ 12% for 10 days ₹ 87

(d) Total Cost

Cancellation Charges	₹ 47,250.00
Swap Loss	₹ 8,500.00
Interest	₹ 87.00
	₹ 55,837.00

(e) New Contract Rate

The contract will be extended at current rate

$/ ₹ Market forward selling Rate for November	₹ 66.4900
Add: Exchange Margin @ 0.10%	₹ 0.0665
	₹ 66.5565

Rounded off to ₹ 66.5575

(i) Charges for Cancellation of Contract = ₹ 55,838.00 or ₹ 55,837.00

(ii) Charges for Execution of Contract

Charges for Cancellation of Contract	₹ 55,837.00
Spot Selling US$ 50,000 on 20th September at ₹ 65.9900 + 0.0660 (Exchange Margin) = ₹ 66.0560 rounded to ₹ 66.0550	₹ 33,02,750.00
	₹ 33,58,587.00

(iii) Charges for Extension of Contract

Charges for Cancellation of Contract	55837
New Forward Rate	₹ 66.5575

Question 60

Your forex dealer had entered into a cross currency deal and had sold US $ 10,00,000 against EURO at US $ 1 = EURO 1.4400 for spot delivery.

However, later during the day, the market became volatile and the dealer in compliance with his management's guidelines had to square – up the position when the quotations were:

Spot US $ 1	*INR 31.4300/4500*
1 month margin	*25/20*
2 months margin	*45/35*
Spot US $ 1	*EURO 1.4400/4450*
1 month forward	*1.4425/4490*
2 months forward	*1.4460/4530*

What will be the gain or loss in the transaction?

Answer

The amount of EURO bought by selling US$

US$ 10,00,000 * EURO 1.4400	=	EURO 14,40,000
The amount of EURO sold for buying USD 10,00,000 * 1.4450	=	EURO 14,45,000
Net Loss in the Transaction	=	EURO 5,000

To acquire EURO 5,000 from the market @

(a) USD 1 = EURO 1.4400 &

(b) USD1 = INR 31.4500

Cross Currency buying rate of EUR/INR is ₹ 31.4500 / 1.440 i.e. ₹ 21.8403

Loss in the Transaction ₹ 21.8403 * 5000 = ₹ 1,09,201.50

Alternatively, if delivery to be affected then computation of loss shall be as follows:

EURO to be surrendered to acquire $ 10,00,000	= EURO 14,45,000
EURO to be received after selling $ 10,00,000	= EURO 14,40,000
Loss	= EURO 5,000

To acquire EURO 5,000 from market @

US $ 1 = EURO 1.4400

US $ 1 = INR 31.45

Cross Currency = $\frac{31.45}{1.440}$ = ₹ 21.8403

Loss in Transaction (21.8403 x EURO 5,000) = ₹ 1,09,201.50

Question 61

AMK Ltd. an Indian based company has subsidiaries in U.S. and U.K.

Forecasts of surplus funds for the next 30 days from two subsidiaries are as below:

U.S.	*$12.5 million*
U.K.	*£ 6 million*

Following exchange rate information is obtained:

	$/₹	*£/₹*
Spot	*0.0215*	*0.0149*
30 days forward	*0.0217*	*0.0150*

Annual borrowing/deposit rates (Simple) are available.

₹	*6.4%/6.2%*
$	*1.6%/1.5%*
£	*3.9%/3.7%*

The Indian operation is forecasting a cash deficit of ₹500 million.

It is assumed that interest rates are based on a year of 360 days.

(i) Calculate the cash balance at the end of 30 days period in ₹ for each company under each of the following scenarios ignoring transaction costs and taxes:

(a) Each company invests/finances its own cash balances/deficits in local currency independently.

(b) Cash balances are pooled immediately in India and the net balances are invested/borrowed for the 30 days period.

(ii) Which method do you think is preferable from the parent company's point of view?

Answer

Cash Balances: **('000)**

Acting independently

	Capital	Interest	₹ in 30 days
India	-5,00,000	-2,666.67	-5,02,667
U.S.	12,500	15.63	5,76,757
U.K.	6,000	18.50	4,01,233
			4,75,323

Cash Balances:-

Immediate Cash pooling

		₹
India	–	5,00,000
U.S. $\frac{12,500}{0.0215}$ =		5,81,395
U.K. $\frac{6,000}{0.0149}$ =		4,02,685
		4,84,080

Immediate cash pooling is preferable as it maximizes interest earnings

Note: If the company decides to invest pooled amount of ₹4,84,080/- @ 6.2% p.a. for 30 days an interest of ₹2,501/- will accrue.

Question 62

On 19th April following are the spot rates

Spot EURO/USD 1.20000 USD/INR 44.8000

Following are the quotes of European Options:

Currency Pair	*Call/Put*	*Strike Price*	*Premium*	*Expiry date*
EUR/USD	*Call*	*1.2000*	*$ 0.035*	*July 19*
EUR/USD	*Put*	*1.2000*	*$ 0.04*	*July 19*
USD/INR	*Call*	*44.8000*	*₹0.12*	*Sep. 19*
USD/INR	*Put*	*44.8000*	*₹0.04*	*Sep. 19*

(i) A trader sells an at-the-money spot straddle expiring at three months (July 19). Calculate gain or loss if three months later the spot rate is EUR/USD 1.2900.

(ii) Which strategy gives a profit to the dealer if five months later (Sep. 19) expected spot rate is USD/INR 45.00. Also calculate profit for a transaction USD 1.5 million.

Answer

(i) Straddle is a portfolio of a CALL & a PUT option with identical Strike Price. A trader will be selling a Call option & a Put option with Strike Price of USD per EURO.

He will receive premium of $ 0.035 + $ 0.040 = $ 0.075

At the expiry of three months Spot rate is 1.2900 i.e. higher than Strike Price. Hence, buyer of the Call option will exercise the option, but buyer of Put option will allow the option to lapse.

Profit or Loss to a trader is

Premium received $0.075

Loss on call option exercised 1.2900 – 1.2000 $0.090

Net Loss of $ 0.015 per EURO

(ii) Strategy i.e. either Call or Put

Price is expected to go up then buy call option is beneficial.

On 19th April to pay Premium US$ 15,00,000 @ ₹ 0.12 i.e.	INR 1,80,000
On 19th September exercise call option to gain US$15,00,000 @ ₹ 0.20	INR 3,00,000
Net Gain or Profit	INR 1,20,000

Or Sell of Put option will be beneficial.

On 19th April to receive Premium US$ 15,00,000 @ ₹ 0.04 i.e.	INR 60,000
On 19th September option buyer shall not exercise the option hence no loss	INR -
Net Gain or Profit	INR 60,000

Question 63

You have following quotes from Bank A and Bank B:

	Bank A	*Bank B*
SPOT	*USD/CHF 1.4650/55*	*USD/CHF 1.4653/60*
3 months	*5/10*	
6 months	*10/15*	
SPOT	*GBP/USD 1.7645/60*	*GBP/USD 1.7640/50*
3 months	*25/20*	
6 months	*35/25*	

Calculate :

(i) How much minimum CHF amount you have to pay for 1 Million GBP spot?

(ii) Considering the quotes from Bank A only, for GBP/CHF what are the Implied Swap points for Spot over 3 months?

Answer

(i) To Buy 1 Million GBP Spot against CHF

1. First to Buy USD against CHF at the cheaper rate i.e. from Bank A. 1 USD = CHF 1.4655
2. Then to Buy GBP against USD at a cheaper rate i.e. from Bank B 1 GBP=USD 1.7650

   By applying chain rule Buying rate would be

   1 GBP = 1.7650 * 1.4655 CHF

1 GBP = CHF 2.5866

Amount payable CHF 2.5866 Million or CHF 25,86,600

(ii) Spot rate Bid rate GBP 1 = CHF 1.4650 * 1.7645 = CHF 2.5850

Offer rate GBP 1 = CHF 1.4655 * 1.7660 = CHF 2.5881

GBP / USD 3 months swap points are at discount

Outright 3 Months forward rate GBP 1 = USD 1.7620 / 1.7640

USD / CHF 3 months swap points are at premium

Outright 3 Months forward rate USD 1 = CHF 1.4655 / 1.4665

Hence

Outright 3 Months forward rate GBP 1 = CHF 2.5822 / 2.5869

Spot rate GBP 1 = CHF 2.5850 / 2.5881

Therefore 3 month swap points are at discount of 28/12.

Question 64

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 Euro 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 flows in Foreign currencies are due in six months. The current exchange rates are as follows:

₹/Euro	*51.50/55*
₹/S$	*27.20/25*

After six months the exchange rates turn out as follows:

₹/Euro	*52.00/05*
₹/S$	*27.70/75*

(1) You are required 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 :

(i) the current exchange rate changes to

₹/Euro	*51.75/80*
₹/S$	*27.10/15*

(ii) Price elasticity of demand is estimated to be 1.5

(iii) Payments and receipts are to be settled at the end of six months.

Answer

(i) Profit at current exchange rates

2400 [€ 500 × ₹ 51.50 – (S$ 800 × ₹ 27.25 + ₹ 1,000 + ₹ 1,500)]

2400 [₹ 25,750 - ₹ 24,300] = ₹ 34,80,000

Profit after change in exchange rates

2400[€500× ₹ 52 – (S$ 800 × ₹ 27.75 + ₹ 1000 + ₹ 1500)]

2400[₹ 26,000 - ₹ 24,700] = ₹ 31,20,000

LOSS DUE TO TRANSACTION EXPOSURE

₹ 34,80,000 – ₹ 31,20,000 = ₹ 3,60,000

(ii) Profit based on new exchange rates

2400[₹ 25,000 - (800 × ₹ 27.15 + ₹ 1,000 + ₹ 1,500)]

2400[₹ 25,000 - ₹ 24,220] = ₹ 18,72,000

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

2400 [₹ 25,000 - (800 × ₹ 27.75 + ₹ 1,000 + ₹ 1,500)]

2400 [₹. 25,000 - ₹ 24,700] = ₹ 7,20,000

Decline in profit due to transaction exposure

₹ 18,72,000 - ₹ 7,20,000 = ₹ 11,52,000

Current price of each unit in € = $\frac{₹\ 25,000}{₹\ 51.50}$ = € 485.44

Price after change in Exch. Rate = $\frac{₹\ 25,000}{₹\ 51.75}$ = € 483.09

Change in Price due to change in Exch. Rate

€ 485.44 - € 483.09 = € 2.35 or (-) 0.48%

Price elasticity of demand = 1.5

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

Size of increased order = 2400 ×1.0072 = 2417 units

Profit = 2417 [₹ 25,000 – (800 × ₹ 27.75 + ₹ 1,000 + ₹ 1,500)]

= 2417 [₹ 25,000 - ₹ 24,700] = ₹ 7,25,100

Therefore, decrease in profit due to operating exposure ₹ 18,72,000 – ₹ 7,25,100 = ₹ 11,46,900

Alternatively, if it is assumed that Fixed Cost shall not be changed with change in units then answer will be as follows:

Fixed Cost = 2400[₹ 1,000] = ₹ 24,00,000

Profit = 2417 [₹ 25,000 – (800 × ₹ 27.75 + ₹ 1,500)] – ₹ 24,00,000

= 2417 (₹ 1,300) – ₹ 24,00,000 = ₹ 7,42,100

Therefore, decrease in profit due to operating exposure ₹ 18,72,000 – ₹ 7,42,100 = ₹ 11,29,900

Question 65

Your bank's London office has surplus funds to the extent of USD 5,00,000/- for a period of 3 months. The cost of the funds to the bank is 4% p.a. It proposes to invest these funds in London, New York or Frankfurt and obtain the best yield, without any exchange risk to the bank. The following rates of interest are available at the three centres for investment of domestic funds there at for a period of 3 months.

London	*5 % p.a.*
New York	*8% p.a.*
Frankfurt	*3% p.a.*

The market rates in London for US dollars and Euro are as under:

London on New York	
Spot	*1.5350/90*
1 month	*15/18*
2 month	*30/35*
3 months	*80/85*
London on Frankfurt	
Spot	*1.8260/90*
1 month	*60/55*
2 month	*95/90*
3 month	*145/140*

At which centre, will be investment be made & what will be the net gain (to the nearest pound) to the bank on the invested funds?

Answer

(i) If investment is made at London

Convert US$ 5,00,000 at Spot Rate (5,00,000/1.5390) = £ 3,24,886

Add: £ Interest for 3 months on £ 324,886 @ 5%		= £ 4,061
		= £ 3,28,947
Less: Amount Invested	$ 5,00,000	
Interest accrued thereon	$ 5,000	
	= $ 5,05,000	
Equivalent amount of £ required to pay the above sum ($ 5,05,000/1.5430*)		= £ 3,27,285
Arbitrage Profit		= £ 1,662

(ii) If investment is made at New York

Gain $ 5,00,000 (8% - 4%) x 3/12	= $ 5,000
Equivalent amount in £ 3 months ($ 5,000/ 1.5475)	£ 3,231

(iii) If investment is made at Frankfurt

Convert US$ 500,000 at Spot Rate (Cross Rate) 1.8260/1.5390	= € 1.1865
Euro equivalent US$ 500,000	= € 5,93,250
Add: Interest for 3 months @ 3%	= € 4,449
	= € 5,97,699
3 month Forward Rate of selling € (1/1.8150)	= £ 0.5510
Sell € in Forward Market € 5,97,699 x £ 0.5510	= £ 3,29,332
Less: Amounted invested and interest thereon	= £ 3,27,285
Arbitrage Profit	= £ 2,047

Since out of three options the maximum profit is in case investment is made in New York. Hence it should be opted.

***** Due to conservative outlook.

Question 66

Drilldip Inc. a US based company has a won a contract in India for drilling oil field. The project will require an initial investment of ₹ 500 crore. The oil field along with equipments will be sold to Indian Government for ₹ 740 crore in one year time. Since the Indian Government will pay for the amount in Indian Rupee (₹) the company is worried about exposure due exchange rate volatility.

You are required to:

(a) Construct a swap that will help the Drilldip to reduce the exchange rate risk.

(b) Assuming that Indian Government offers a swap at spot rate which is 1US$ = ₹ 50 in one

year, then should the company should opt for this option or should it just do nothing. The spot rate after one year is expected to be 1US$ = ₹ 54. Further you may also assume that the Drilldip can also take a US$ loan at 8% p.a.

Answer

(a) The following swap arrangement can be entered by Drilldip.

(i) Swap a US$ loan today at an agreed rate with any party to obtain Indian Rupees (₹) to make initial investment.

(ii) After one year swap back the Indian Rupees with US$ at the agreed rate. In such case the company is exposed only on the profit earned from the project.

(b) With the swap

	Year 0 (Million US$)	Year 1 (Million US$)
Buy ₹ 500 crore at spot rate of 1US$ = ₹ 50	(100.00)	----
Swap ₹ 500 crore back at agreed rate of ₹ 50	----	100.00
Sell ₹ 240 crore at 1US$ = ₹ 54	----	44.44
Interest on US$ loan @8% for one year	----	(8.00)
	(100.00)	136.44

Net result is a net receipt of US$ 36.44 million.

Without the swap

	Year 0 (Million US$)	Year 1(Million US$)
Buy ₹ 500 crore at spot rate of 1US$ = ₹ 50	(100.00)	----
Sell ₹ 740 crore at 1US$ = ₹ 54	----	137.04
Interest on US$ loan @8% for one year	----	(8.00)
	(100.00)	129.04

Net result is a net receipt of US$ 29.04 million.

Decision: Since the net receipt is higher in swap option the company should opt for the same.

Question 67

You as a dealer in foreign exchange have the following position in Swiss Francs on 31st October, 2009:

	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 A/c and keep as overbought position on Swiss Francs 10,000?

Answer

Exchange Position:

Particulars	*Purchase Sw. Fcs.*	*Sale Sw. Fcs.*
Opening Balance Overbought	50,000	
Bill on Zurich	80,000	
Forward Sales – TT		60,000
Cancellation of Forward Contract		30,000
TT Sales		75,000
Draft on Zurich cancelled	30,000	—
	1,60,000	1,65,000
Closing Balance Oversold	5,000	—
	1,65,000	1,65,000

Cash Position (Nostro A/c)

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

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

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

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