Strategic Financial Management

Forex

Practice Problems

CROSS RATE APPLICATION

PROBLEM – 1 *(Similar to problem no.27 of page no.35 in SFM volume I)*

Walgreens Boots Alliance sold Omani Rial 3,22,500 value spot to your customer at ₹167.43 per OMR & covered yourself in Uk stock exchange on the same day, when the exchange rates were

GBP 1	=	OMR 0.4901	0.4941

Local inter bank market rates for GBP were

Spot GBP 1	=	₹ 80.71	80.86

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

Solution :

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

Rupee – GBP selling rate	₹ 80.86
Omani Rial – GBP	OMR 0.4901
Rupee – Hong Kong cross rate	₹ 80.86 /0.4901
	₹ 164.9867

Profit / Loss to the Bank

Amount received from customer (3,22,500 × 167.43)	₹ 539,96,175
Amount paid on cover deal (3,22,500 × 164.9867)	₹ 532,08,211
Profit to Bank	**₹ 7,87,964**

FORWARD COVER

PROBLEM – 2 *(Similar to problem no.11 of page no.15 in SFM volume I)*

HDIL Ltd. is a listed real estate development company in India, with significant operations in the Mumbai Metropolitan Region has an export exposure of HKD 12,00,000 payable August 31, 2014. Hong Kong Dollar (HKD) is not directly quoted against Indian Rupee.

The current spot rates are:

INR/GBP	**₹ 82.05**
HKD/GBP	**HKD 9.93**

It is estimated that Hong Kong Dollar will depreciate to 10.89 level and Indian Rupee to depreciate against GBP to ₹ 84.83.

Forward rates for August 2014 are

INR/ GBP	**₹ 86.33**
HKD /GBP	**HKD 10.77**

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/ GBP = ₹ 82.09
HKD /GBP = HKD 9.99

Is the decision to take forward cover justified?

Solution :

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

₹/GBP x GBP/HKD = ₹/HKD

82.05/9.93 = 8.2628

Spot rate on date of export 1HKD = ₹ 8.2628

Expected Rate of HKD for August 2014 = ₹ 7.7897 (₹ 84.83/HKD 10.89)

Forward Rate of HKD for August 2014 = ₹ 8.0158 (₹ 86.33/HKD 10.77)

i. Calculation of expected loss without hedging

Value of export at the time of export (₹ 8.2628 x HKD 12,00,000)	₹99,15,360
Estimated payment to be received on Aug. 2014 (₹ 7.7897 x HKD 12,00,000)	₹ 93,47,640
Loss	**₹ 5,67,720**

Hedging of loss under Forward Cover

₹ Value of export at the time of export (₹ 8.2628 x HKD 12,00,000)	₹99,15,360
Payment to be received under Forward Cover (₹ 8.0158 x HKD 12,00,000)	₹ 96,18,960
Loss	**₹ 2,96,400**

By taking forward cover loss is reduced to ₹ 2,96,400.

ii. Actual Rate of HKD on August 2014 = ₹ 8.2172 (₹ 82.09/HKD 9.99)

Value of export at the time of export (₹ 8.2628 x HKD 12,00,000)	₹99,15,360
Estimated payment to be received on Aug. 2014 (₹ 8.2172 x HKD 12,00,000)	₹ 98,60,640
Loss	**₹ 54,720**

The decision to take forward cover is not justified because loss under forward cover was bigger i.e., ₹ 2,96,400

PROBLEM – 3 *(Similar to problem no.45 of page no.58 in SFM volume I)*

A company is considering hedging its foreign exchange risk. It has made a purchase on 1st. January, 2008 for which it has to make a payment of British Pound GBP 73,500 on September 30, 2008. The present exchange rate is 1 GBP £ = ₹ 82.3953. It can purchase forward 1 1 GBP £ at ₹81.5375. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 11% per annum and the rate of corporate tax is 45%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:

i. If the exchange rate on September 30, 2008 is ₹ 84.5000 per £.

ii. If the exchange rate on September 30, 2008 is ₹ 83.0000 per £.

Solution :

	₹
Present Exchange Rate ₹82.3953 = 1 GBP	
If company purchases £ 73,500 forward premium is £ 73,500 × 81.5375 × 2%	119860
Interest on ₹119860 for 9 months at 11%	9888
Total hedging cost	**129748**
If exchange rate is ₹84.50/GBP	
Then gain (₹84.5000 – ₹81.5375) for £ 73,500	217744
Less: Hedging cost	129748
Net gain	**87996**
If £ = ₹83.0000	
Then gain (83.00 - 81.5375) for £ 73,500	107494
Less: Hedging Cost	129748
Net Loss	**(22254)**

PROBLEM – 4 *(Similar to problem no.10 of page no.14 in SFM volume I)*

ABC Ltd. of USA has exported goods worth Can $ 3,90,000 receivable in 9 months. The exporter wants to hedge the receipt in the forward market. The following information is available:

Spot Exchange Rate	₹ 64.56/$
Interest Rate in USA	1.25%
Interest Rate In Indian	8%

The forward rates truly reflect the interest rates differential. Find out the gain/loss to USA exporter if Indian ₹ spot rates (i) declines 1.5%, (ii) gains 5.5% or (iii) remains unchanged over next 6 months.

Solution :

Forward Rate

64.56[{1+(0.08) × 9/12}/{1+(0.0125) × 9/12}] = ₹67.7980

i. If spot rate decline by 1.5%

Spot Rate = ₹ 64.56x 1.015 =₹65.5284/$

	$
₹ receipt as per Forward Rate ($ 3,90,000 × ₹67.7980)	26441220
₹ receipt as per exp Spot Rate ($ 3,90,000 × ₹65.5284)	25556076
Profit due to forward contract	**885144**

ii. If spot rate gains by 5.5%

Spot Rate = ₹ 64.56x 0.945=₹61.0092/$

	$
₹ receipt as per Forward Rate ($ 3,90,000 × ₹67.7980)	26441220
₹ receipt as per exp Spot Rate ($ 3,90,000× ₹61.0092)	23793588
Profit due to forward contract	**2647632**

iii. If spot rate remains unchanged

	$
₹ receipt as per Forward Rate ($ 3,90,000 × ₹67.7980)	26441220
₹ receipt as per exp Spot Rate ($ 3,90,000× ₹64.56)	25178400
Profit due to forward contract	**1262820**

PROBLEM – 5 *(Similar to problem no.7 of page no.123 in SFM volume I)*

Dreher Brewery, a company operating in Hungary is a landlocked country in Central Europe, has today effected sales to an Indian FMCG company, the payment being due 6 months from the date of invoice. The invoice amount is 227 lakhs Hungarian Forint (HUF). At today's spot rate, it is equivalent to ₹ 53.92 lakhs. It is anticipated that the exchange rate will decline by 11% over the 6 months period and in order to protect the HUF payments, the importer proposes to take appropriate action in the foreign exchange market. The 6 months forward rate is presently quoted as 3.91 HUF per rupee. You are required to calculate the expected loss and to show how it can be hedged by a forward contract.

Solution :

Spot rate of ₹ 1 against HUF = 227 lakhs HUF/₹ 53.92 lakhs = 4.21 HUF

6 months forward rate of Re. 1 against yen = 3.91 HUF

Anticipated decline in Exchange rate = 11%.

Expected spot rate after 6 months = 4.21 HUF – 11% of 4.21
= 4.21 HUF – 0.46 HUF
= 3.75 HUF per rupee

	₹ (in lakhs)
Present cost of 227 lakhs HUF	53.92
Cost after 6 months: 227 lakhs HUF / 3.75 HUF	60.53
Expected exchange loss	**6.61**

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

Present cost	**53.92**
Cost after 6 months if forward contract is taken 227 lakhs HUF / 3.91 HUF	58.06
Expected loss	**4.14**

Suggestion: If the exchange rate risk is not covered with forward contract, the expected exchange loss is ₹ 6.61 lakhs. This could be reduced to ₹ 4.14 lakhs if it is covered with Forward contract. Hence, taking forward contract is suggested.

PROBLEM – 6 *(Similar to problem no.7 of page no.123 in SFM volume I)*

Ford India Private Limited is a wholly owned subsidiary of the Ford Motor Company in India. The vehicles and engines use as an integral parts import from Ford Motor Company of Canada Ltd. And the Ford Motor Company of Canada Ltd. invoiced the sales to the Indian company, the payment being due three months from the date of invoice. The invoice amount is $ 11,250 and at todays spot rate of $0.015 per ₹.1, is equivalent to ₹ 7,50,000.

It is anticipated that the exchange rate will decline by 10% over the three months period and in order to protect the dollar proceeds, the importer proposes to take appropriate action through foreign exchange market. The three months forward rate is quoted as $0.0145 per ₹ 1.

You are required to calculate the expected loss and to show, how it can be hedged by forward contract.

Solution :

Calculation of the expected loss due to foreign exchange rate fluctuation

Present Cost	
US $11,250 @ today spot rate of US $0.015 per Re. 1	₹ 7,50,000
Cost after 3 months	
US $11,250 @ expected spot rate of US $0.0135 per Re. 1 *(Refer to working note)*	₹ 8,33,333
Expected loss	₹83,333

Forward cover is available today at 1 Re. = US $0.0145 for 3 months

If we take forward cover now for payment after 3 months net amount to be paid is (US $ 11,250/0.0145) = ₹ 7,75,862

Hence, by forward contract the company can cover ₹57,471 (₹83,333 – ₹25,862) i.e. about 69% [(57,471/83,333) × 100] of the expected loss.

***Working Note*:**

Expected spot rate after 3 months

It is anticipated by the company that the exchange rate will decline by 10% over the three months period. The expected rate will be

Present rate - 10% of the present rate.

= US $ 0.015 – 10% of US $ 0.015
= US $ 0.0135

Alternatively, the expected rate may also be calculated as follows:
= US $ 0.015 × 90/100 = US $ 0.0135

FX SWAP

PROBLEM – 7 *(Similar to problem no.67 of page no.92 in SFM volume I)*

Energy Drilling Company an Australian Company has a won a contract in Russia for drilling oil field. The project will require an initial investment of 4700 RUB Million. The oil field along with equipments will be sold to Russian Government for 7700 RUB Million in one year time. Since the Russian Government will pay for the amount in RUB the company is worried about exposure due exchange rate volatility.

You are required to:

i. Construct a swap that will help the Energy Drilling Company to reduce the exchange rate risk.

ii. Assuming that Russian Government offers a swap at spot rate which is 1AUD = 44.89 RUB 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 1AUD = 48.89 RUB. Further you may also assume that the Energy Drilling Company can also take a AUD loan at 5% p.a.

Solution :

i. The following swap arrangement can be entered by Energy Drilling Company.

a. Swap a AUD loan today at an agreed rate with any party to obtain Russian Ruble to make initial investment.

b. After one year swap back the Russian Ruble with AUD at the agreed rate. In such case the company is exposed only on the profit earned from the project.

ii. With the swap

	Year 0 (Million AUD)	Year 1 (Million AUD)
Buy RUB 4700 Million at spot rate of 1AUD = 44.89 RUB	(104.70)	--------
Swap 4700 Million back at agreed rate of 44.89 RUB	------	104.70
Sell 3000 RUB Million at 1 AUD= 48.89 RUB	------	61.36
Interest on AUD loan @5% for one year	-----	(5.24)
	(104.70)	**160.82**

Net result is a net receipt of AUD 56.12 million.

Without the swap

	Year 0 (Million AUD)	Year 1 (Million AUD)
Buy RUB 4700 Million at spot rate of 1AUD = 44.89 RUB	(104.70)	--------
Sell 7700RUB Million at 48.89 RUB	------	157.50
Interest on AUD loan @5% for one year	------	(5.24)
	(104.70)	**152.26**

Net result is a net receipt of AUD 47.56 million.

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

IPR EQUATION

PROBLEM – 8 *(Similar to problem no.20 of page no.27 in SFM volume I)*

On 1st April, 180 days interest rate in the PHP and NPR are 9.18 per cent and 10 per cent per annum respectively. The NPR/PHP spot rate is 0.4844. What would be the forward rate for NPR for delivery on 30th September?

Solution :

	PHP	NPR
Spot	0.4844	1.000
Interest rate p.a.	9.18%	10%
Interest for 180 days	0.0219	0.0493
Amount after 180 days	0.5063	1.0493
Hence forward rate	0.5063	0.4863
	1.0493	

OR

Forward rate $= \dfrac{0.6560 \times \left\{1 + \left(0.065 \times \dfrac{91}{365}\right)\right\}}{\left\{1 + \left(0.045 \times \dfrac{91}{365}\right)\right\}} =$ 0.6592

Forward Rate = 0.4844 ´ [{1+ (0.10×180/365)}/{1+(0.0918×180/365)}]
= 0.4863

PROBLEM – 9 *(Similar to problem no.21 of page no.27 in SFM volume I)*

On April 1, 3 months interest rate in the € and ¥ are 4% and 7% per annum respectively. The € /¥ spot rate is 0.00787. What would be the forward rate for ¥ for delivery on 30th June?

Solution :

As per interest rate parity

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

= 0.00787[{1+ (0.04×3/12)}/{1+(0.07×3/12}]

= 0.00787 × 0.09926

= € /¥ 0.00781

CIA

PROBLEM – 10 *(Similar to problem no.39 of page no.50 in SFM volume I)*

Following are the rates quoted at National Stock Exchange (NSE) for Canadian Dollar:

CAD/₹	49.87/97	Interest Rates	India	Canada
3 m Forward	35/85	3 months	8%	5%
6 m Forward	65/90	6 months	10%	8%

Verify whether there is any scope for covered interest arbitrage if you borrow rupees.

Solution :

Particulars	Option I (3 mths)	Option II (6mths)
Amount borrowed	100000	100000
Pound obtained by converting at spot rate	100000/49.97	100000/49.97
	= 2001.20	= 2001.20
Invest pound for the period	1.25%	4%
Amount of pound received at the end	2001.20 × 1.0125	2001.20× 1.04
Of the period	= 2026.215	= 2081.248
Convert pounds to ₹ At forward rate	2026.215× 50.22	2081.248 × 50.52
	= 1,01,757	= 1,05,145
Amount of Re. Loan to be repaid	100000 × 1.02	100000 × 1.05
	= 102000	= 105000

There is no arbitrage opportunity on 3 months but on 6 months there is an arbitrage opportunity.

PROBLEM – 11 *(sum on CIA involving continuous compounding)*

The risk free rate of interest rate in USA is 8% p.a. and in UK is 5% p.a. The spot exchange rate between US $ and UK £ is 1$ = £ 0.75.

Assuming that is interest is compounded on daily basis then at which forward rate of 2 year there will be no opportunity for arbitrage.

Further, show how an investor could make risk-less profit, if two year forward price is 1 $ = 0.85 £. Given $e^{0.-06} = 0.9413$ & $e^{-0.16} = 0.852$, $e^{0.16} = 1.1735$, $e^{-0.1} = 0.9051$

Solution :

2 year Forward Rate will be calculated as follows:

$$F = Se^{(r_{uk} - r_{us})t}$$

Where F = Forward Rate

S = Spot Rate

r_{UK} = Risk Free Rate in UK

r_{US} = Risk Free Rate in US

t = Time

Accordingly,

$$F = 0.75e^{(0.05-0.08)2}$$

= 0.75 x 0.9413

= 0.706

Thus,

1 US $ = £ 0.706

If forward rate is 1 UK $ = 0.85$ then an arbitrage opportunity exists. Take following steps.

a. Should borrow UK £

b. Buy US $

c. Enter into a short forward contract on US $

Accordingly,

The riskless profit would be

a. Say borrow £ $0.706e^{-(0.05)(2)}$ = £ 0.639 and invest in UK for 2 years.

b. Now buy US $ at US $ $1e^{-(0.08)2}$ = US $ 0.852, so that after two year it can be used to close out the position.

c. After two year the investment in US $ will become US $ 0.852 e(0.08)(2)

= US $ 0.852 x 1.1735 = 1 US $.

d. Sell this US $ for £ 0.85 and repay loan of £ 0.639 along with interest i.e £ 0.706. Thus arbitrage profit will be US$ 0.85 – US$ 0.706 = 0.144 $.

FC VS MMC

PROBLEM – 12 *(Similar to problem no.43 of page no.55 in SFM volume I)*

Barclays is a British multinational bank and financial services company headquartered in London. It is a universal bank with operations in retail, wholesale and investment banking. Barclays provides financial services across the Globe. The Company raised an invoice amount is ¥6,77,500. Credit period is three months. Exchange rates in London are :

Spot Rate (¥/£) 145.4967 – 145.5007
3-month Forward Rate (¥/£) 148.7859 – 148.7890

Rates of interest in Money Market :

	Deposit	Loan
¥	9%	11%
£	5%	8%

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

Solution :

Identify: Foreign currency is an asset. Amount ¥6,77,500.
Create: ¥ Liability.
Borrow: In ¥. The borrowing rate is 11% per annum or 2.75% per quarter.

Amount to be borrowed: ¥6,77,500 / 1.0275 = ¥6,59,367.40

Convert: Sell ¥ and buy £. The relevant rate is the Ask rate, namely, ¥145.5007 per £,

(Note: This is an indirect quote). Amount of £s received on conversion is 4531.71 (¥6,59,367.40/¥145.5007).

Invest: £ 4531.71 will be invested at 5% for 3 months and get **£ 4588.36**

Settle: The liability of ¥6,59,367.40 at interest of 2.75 per cent quarter matures to ¥6,77,500 receivable from customer.

Using forward rate, amount receivable is = ¥6,77,500/ 148.7890 = **£4553.43**

Amount received through money market hedge = **£ 4588.36**

Gain = **£ 4588.36 – £4553.43** = £34.93

So, money market hedge is beneficial for the exporter.

PROBLEM – 13 *(Similar to problem no.44 of page no.56 in SFM volume I)*

Bhawal Steel Agency, are engaged in the manufacturing, supplying, exporting and importing of a wide range of Stainless Steel products. etc from Brazil and Slovak Republic and exports such products to Singapore and Australia after processing. The company has receivables of SGD3,50,000 and payables of AUD$2,45,00 three months from now. The following rates exchanges rates are available in the market:

Exchanges Rates	₹ / SGD	₹ /AUD$
Spot	46.9580 - 47.0080	49.6825 – 49.7025
Three month forward	47.0680 – 47.0880	49.7225 – 49.7425

The current rates (per annum) are as under

Maturity	Rupee (%)	SGD(%)	AUD$(%)
3 months	7.00/8.00	3.00/3.20	5.00/5.20

The company is considering to cover the cover the exposure either through the forward market money market. You are required to advise the company as to which alternative should be better for covering both the payable and receivable.

Solution :

Receivable- SGD 3,50,000 3 month

Alternative - I forward cover :
Sell SGD 3,50,000 3m forward @ 47.0680
Inflow after 3 months = 3,50,000 × ₹47.0680
=₹164,73,800

Alternative -II Money market cover (Borrow- sell-invest)

Step I Borrow the PV of SGD 3,50,000 at 3.20%

∴ PV of SGD = SGD 3,50,000/1.008

= SGD 3,47,222

Step II Sell SGD 3,47,222 @ 46.9580

Getting = SGD 3,47,222 × ₹46.9580/SGD

= ₹163,04,861

Step III Invest ₹ 163,04,861 @ 7% i.e. 1.75%

Inflow =163,04,861 × 1.0175

=₹165,90,196

Since ₹ inflow is higher in alternative II, Firm should choose money market cover.

Payable AUD 2,45,000 after 3 months

Alternative - I forward cover :

Buy AUD 2,45,000 for 3 month forward at 49.7425

So, outflow after 3 month = ₹49.7425 × AUD 2,45,000

₹121,86,913

Alternative II Money market Cover (Invest- Buy- Borrow)

Step I : Invest the PV of $ 100,000 @5/4 i.e., 1.25%

$$\frac{\text{AUD } 245{,}000}{1.0125}$$

AUD 2,41,975

Step II : Buy AUD 2,41,975 spot at ₹49.7025

Requiring [2,41,975 × ₹49.7025]

₹120,26,778

Step III : Borrow ₹1,20,26,778 at 8/4 i.e., 2%

So outflow after 3 month ₹120,26,778 × 1.02

=₹122,67,313

Since Rupee outflow is lower under alternative I forward cover is recommended.

PROBLEM – 14 *(general sum on FC vs MMC including bridge loan)*

Techinfo Ltd. Has imported specialty computer equipments worth US$ 250,000 from a company in US. The amount due for the imports is payable after 3 months. Mr. Garg, the treasury manager of Techinfo has collected the following market quotes:

Exchange rates:

Sport	Rs./$	47.15/47.30
Forward	3 month	55/60

Interest rates(p.a.):

Dollar	(3 months)	6.00%/6.50%
Rupee	(3 months)	10.00%/11.00%

The supplier of the equipments has offered a discount of $5000 if the payable is settled at the current date. Mr.Garg is reviewing the following alternatives to settle the payable:

i. Cover through forward market.

ii. Cover through money market.

iii. Avail the cash discount of $5000 by taking a bridge loan at 9% p.a. from a lending institution.

Solution :

Spot	Rs./$	47.15/47.30
3m forward		47.70/47.90

Forward market cover:

Rupee outflow after 3 month = 250,000×47.90
=Rs.119.75 lakh.

Money market cover:

As the company has to pay dollar 3 months hence, so it will borrow in rupees, convert into dollar at spot and invest in dollar.

Dollar amount to be invested today

$$= \frac{\$250,000}{1+\frac{0.06}{4}} = \$246,305.42$$

∴ Rupee amount to be borrowed today

=$246,305.42 × 47.30 = Rs. 116.50 lakh

∴ Rupee outflow after 3 months

$$= 116.50\left(1+\frac{0.11}{4}\right) = \text{Rs.}119.70\,\text{lakh.}$$

Availing cash discount

Amount to be paid if cash discount is availed = $245,000

Rupee equivalent of $ 245,000 at the spot rate = 245,000 × 47.30 = Rs. 115.89 lakh

∴ Rupee outflow after 3 months

$$= 115.89\left(1+\frac{0.09}{4}\right) = \text{Rs.}118.50\,\text{lakhs}$$

So it is better to avail cash discount as the outflow is minimum in this case

FOREIGN CURRENCY EXPOSURE

PROBLEM – 15 *(Similar to problem no.63 of page no.84 in SFM volume I)*

Bharat Electronics Limited in Bangalore exports space vehicles to Belgium by importing all the components from south Korea. Imports are invoiced in Hong Kong dollars and exports in Euro. The company is exporting 6000 unit at a pries of Euro 165 per unit. The cost of imported components is HK$ 75. The fixed cost and other variable costs per unit per unit are ₹1200 and ₹2500 respectively. The cash flows in foreign currencies are due in six months. The current exchange rates are as follows :

₹/Euro : 59.60/62

₹/HK$: 5.96/5.98

After six months the exchanges rates (at the time of receipts and payments of foreign currency) turn out as follows :

₹/Euro : 60.30/32

₹/HK$: 6.23/25

You are required to :

i. Calculate the loss/gain due to the transaction exposure.

ii. Based on the following additional information, calculate the loss/gain due to transaction and operating exposure if the life contracted price of washing marching is ₹9500.

- The current exchange rates change to
  ₹/Euro : 59.85/87
  ₹/HK$: 6.00/02
- Price elasticity of demand of the product in Germany is estimated as 2.5.
- Payment and receipts are to be settled/received at the end of six months.

Solution :

i. Firm faces the following transaction exposure

receivable = 6000 × 165 = ∈ 990,000

payable = 6000 × 75 = HK $ 4,50,000

∴Gain in Euro receivable = 6,93,000
9,90,000 ×[60.30-59.60]
Loss on HK $ payable = 1,21,500
HK $ 4,50,000 [6.25 - 5.98]
∴ Net gain due to transaction Exposure 5,71,500

ii. Step I

We are required to calculate the change in profit on account of transaction and Economic exposure. Transaction exposure is still there relating to $ payable.

∴ $ payable = 6000 × $75 = HK$ 4,50,000

∴ loss due to transaction Exposure = ₹/HK$ (6.25 -6.02) × 450,000
= ₹1,03,500

Step II

Invoice price = ₹9500

Euro equivalent price at the old currency rate $\frac{9500}{59.60}$ = 159.40

Euro equivalent price at the new current rate = $\frac{9500}{59.85}$ = 158.73

% fall in price = $\frac{159.40-158.73}{159.40}\times 100 = 0.42\%$

Increase on demand = 0.42% × 2.5 = 1.05%

∴ New demand = 6000 + 1.05% of 6000 = 6063

old profit [Based on 6000 units and revised currency rates)

= 6000[₹9500 - 75 × 6.02 - 2500] - 6000×1200 = 3,20,91,000

New profit [Based on 6063 units and exchange rate after 6 m]

= 6063[₹9500 - 75×6.25 - 2500] - 6000 × 1200 = ₹ 3,23,98,969

So, Gain due transaction exposure & economic exposure

= 32398969 - 32091000

= 3,07,969

∴ Hence, Gain due to Economic exposure = ₹[3,07,969 + 1,03,500] = ₹4,11,469

PROBLEM – 16 *(Similar to problem no.63 of page no.84 in SFM volume I)*

Pacific Leather Goods Ltd. an Indian manufacturer exports leather goods to USA. The company is exporting 5000 units at a price of $60. The company has imported some specialty chemicals from Europe to produce the export items. The cost of chemicals per unit of leather good stands at Euro 10. The fixed overhead costs per unit comes at Rs.250 and other variable overheads, including the freight cost, add upto Rs.1250 per unit. The payments for both exports and imports are due in six months.

The current exchange rate are as follows:

Rs./$	46.90
Rs./Euro	40.40

After six months (at the time of settlement of payments) the exchange rate turns out as follows:

Rs./$	47.90
Rs./Euro	41.25

You are required to:

i. Calculate the loss/gain due to transaction exposure.

ii. Based on the following additional information calculate the losses/gains due to transaction and operating exposure if the contracted export price per unit is Rs.2700:

- The current exchange rate changes to
  Rs./$: 47.50
  Rs./Euro : 40.80
- Price elasticity of demand for the company's product in the USA is estimated to be 1.60.
- The payments are to be settled at the end of sixth month.

Solution :

i. Profit at the current exchange rates
=5000[60×46.90-(10×40.40+250+1250)]
=500[2841-1904]
=5000×910=Rs.45.50 lakhs

Profit after the change in exchange rate
=5000[60×47.90-(10×41.25+250+1250)]
=5000[2874-1912.5]
=5000×961.5=Rs.48.075 lakhs

∴Gain due to transaction exposure
=48.075-45.50
=Rs.2.575 lakh.

ii. Profit based on new exchange rate
=5000[2700-(10×40.80+250+1250)] = Rs.39.60 lakh
Profit after change of exchange rate at the end of 6 month
=5000[2700-(10×41.25+250+1250)] = Rs.39.375 lakh
∴Decline in profit due to transaction exposure =39.60-39.375 = Rs.0.225 lakhs

Current price of each unit in dollar term = $\frac{2700}{46.90} = \$57.57$

After the change in exchange price per unit in dollar term = $\frac{2700}{47.50} = \$56.84$

∴% reduction in price = $\frac{57.57 - 56.84}{57.57} = 1.27\%$

Increase in demand due to reduction in price =1.27×1.60 = 2.03%
Size of the increased order = 5000(1+0.0203)=5102 units

∴Profit
=5102[2700-(10×41.25+250+1250)]
=5102×787.5
=Rs.40.18 lakhs
∴Increase in profit due to operating exporter =40.18 - 39.60 = Rs.0.58 lakhs

LEADING, LAGGING, & NETTING

PROBLEM – 17 *(Similar to problem no.33 of page no.43 in SFM volume I)*

An Indian importer has a payable of £100,000. The seller has given the Indian importer the following two options.

i. Pay immediately with a cash discount of 1% on the payable.

ii. Pay after. 3 months with interest at 4% P.a.

The borrowing rate for the importer in Rupees is 12% P.a. The following are the exchange rates as on December 02,2002.

Rs/£	Spot	74.76/80
	3 month	38/40

Which of the above two options is advisable for the importer?

Solution :

Payable £ 1,00,000

Option 1

Pay now, by availing a cash discount of 1%

Amount payable is £99,000

Borrow at 12% for 3 months

Amount to be borrowed=99,000 × 74.80 = 74,05,200

Rupee out flow after 3 months

$$=74,05,200\left(1+\frac{0.12}{4}\right)=76,27,356$$

Option 2:

Pay after 3 months

Payment in foreign currency

$$=1,00,000\times\left(1+\frac{0.04}{4}\right)=£1,01,000$$

Obtain forward cover for £ 1,01,000 at the rate of Rs. 75.20/£

Rupee outflow = 75,95,200

Option 2 is beneficial to the Indian importer as the rupee outflow is lower, by Rs.32,156

INTERNATIONAL WORKING CAPITAL MANAGEMENT

PROBLEM – 18

True view Ltd. a group of companies controlled from the United Kingdom includes subsidiaries in India, Malaysia and the United States. As per the CFO's forecast that , at the end of the June 2010 the position of inter-company is as follows:

i. The Indian subsidiary will be owned or will receive ₹1,44,38,100 by the Malaysian subsidiary and will to owe or will pay the US subsidiary US$ 1,06,007.

ii. The Malaysian subsidiary will be owed or will receive MYR 14,43,800 by the US subsidiary and will owe it or will pay US$ 80,000

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

Solution :

	India	Malaysia	US
India	-	₹1,44,38,100	(US$ 1,06,007)
Malaysia	(₹1,44,38,100)	-	MYR 14,43,800
(US$ 80,000)			
US	US$ 1,06,007	MYR 14,43,800	-
US$ 80,000			

Table showing conversion of above position into pound sterling

	India £	Malaysia £	US £	Total £
India	-	2,12,013	(74,917)	1,37,096
Malaysia	(2,12,013)	-	1,41,341	
(56,537)	(1,27,209)			
US	74,917	(1,41,341)		
56,537	-	(9,887)		NIL

Decision : Central treasury department will instruct the Malaysia subsidiary to pay the Indian subsidiary.
£1,27,209 and the US subsidiary to pay the Indian subsidiary £9,887.

TRIANGULAR ARBITRAGE

PROBLEM – 19 *(Similar sum done in class)*

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

USD/INR	59.25/ 59.35 in Mumbai
GBP/INR	102.50/103.00 in London
GBP/USD	1.70/ 1.72 in New York

The arbitrageur has USD1,00,00,000. Assuming that bank wishes to retain an exchange margin of 0.125%, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

Solution :

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

i. Buy GBP at New York for USD USD 1,00,00,000

GBP/USD	1.72
Add: Exchange Margin @ 0.125%	0.002
	1.722

Accordingly, GBP acquired in exchange of USD1,00,00,000 is GBP 58,07,200

ii. Sell these GBP at London Market and get INR

GBP/INR	102.50
Less: Exchange Margin@ 0.125%	0.13
	102.37

INR on conversion of GBP (58,07,200 X 102.37) = INR 59,44,83,064

iii. Acquire USD by selling INR at Mumbai

USD/INR	59.35
Add: Exchange Margin @ 0.125%	0.07
	59.42

Accordingly, USD acquired in exchange of INR $\frac{59,44,83,064}{59.42}$ is USD 1,00,04,763

Net Gain (USD 1,00,04,763 - USD 1,00,00,000) = USD 4,763

FOREIGN CURRENCY ACCOUNT

PROBLEM – 20 *(Similar to problem no.68 of page no.94 in SFM volume I)*

You as a dealer in foreign exchange have the following position in Great British Pound on 31st November, 2015 :

	GBP
Balance in the Nostro A/c Credit	5,00,000
Opening Position Overbought	100,000
Purchased a bill on London	90,000
Sold forward TT	80,000
Forward purchase contract cancelled	40,000
Remitted by TT	125,000
Draft on London cancelled	60,000

What steps would you take, if you are required to maintain a credit Balance of GBP 80,000 in the Nostro A/c and keep as overbought position on GBP 40,000 ?

Solution :

A/c Statement (£)

Particulars	Dr.	Cr.
1. Op. Balance		5,00,000
2. Returned by TT	1,25,000	
Total	1,25,000	5,00,000
Cl A/c Total		3,75,000

Position Statement (£)

Particulars	Long	Short
1. Op Position	1,00,000	
2. Purchased a bill on London	90,000	
3. Sold forward TT		80,000
4. Forward purchase contract cancelled		40,000
5. Resulted by TT		1,25,000
6. Draft on London Cancelled	60,000	
Total	**2,50,000**	**2,45,000**

i.e. closing position £5,000

Target closing A/c Balance = £ 80,000 cr.

To achieve this, dealer should sell £ 2,95,000 spot. However this makes

Our position = 5,000 long and 2,95,000 short i.e. £ 2,90,000 short.

Target Position = £ 40,000 long.

So, to achieve this dealer should buy £ 3,30,000 forward.

Final suggestion 1, spot sale £ 2,95,000

2, Forward buy £ 3,30,000

CANCELLATIONS AND EXTENSION OF FORWARD CONTRACTS

PROBLEM – 21

An Indian importer has a payable of C$ 5,00,000 due on 31.3.2002. On 01.01.2002, the importer covers the payable through forward buying of C$ at Rs. 30.34 from his banker.

On 3l-3-2002, he requests the banker to extend the contract till 30-4-2002. The exchange rates as on 31-3-2002 are

Rs./C$	Spot	30.54/63
1 month forward		30.56/68

You are required to find out the net cash outflow for the importer.

Solution :

The bank must have bought C$5,00,000 in inter- bank market for delivering to the importer on 31.3.2002. When, the importer requests for extension, the bank has to take the delivery of C$ from inter-bank market and sell the same at the spot rate and book a fresh forward contract at 30.68 for which bank will again cover it in the inter-bank market. The customer enjoys gain/incurs loss in the spot market.

On 31.3.2002

Gain on selling C$ in the spot market
(30.54 - 30.34) × 5,00,000
Rs. 1,00,000

On 30.4.2002

Cash outflow on account of C$ bought at 30.68
in the forward market = 30.68 × 5,00.000 = 153,40,000
Less gain 1,00,000
Net cash outflow Rs. 152,40,000

PROBLEM – 22

An Indian software company had approached State Bank of India (SBI) for forward sale of £100,000 delivery on May 31, 2001. The bank had quoted a rate of Rs.65.60/£ for the purchase of pound sterling from the customer. But on May 31st, the customer informed the bank that it was not able to deliver the pound sterling as anticipated receivable from London has not materialized and requested the bank to extend the contract for delivery July 31st.

The following are the market quotes available on May 31, 2001:

	Rs/£
Spot	66.60/65
1m forward	20/25
2m forward	41/46
3m forward	62/68

You are required to find out the extension charges payable by the software company.

Solution :

The forward purchase contract will be first cancelled at the spot rate.

Sterling bought from the customer under original contract at	65.60
Sterling sold to customer under cancellation contract at	66.65
Exchange difference per sterling payable by customer	1.05

Exchange difference for £ 100,000 is Rs.105,000 charges for cancellation :

Exchange difference	Rs.105,000
(+) Flat charge	Rs.100
	Rs.105,100

The bank will book a fresh forward purchase of sterling on 31st July.

Spot buying rate for sterling	66.60
(+) Two month premium	0.41
	Rs. 67.01

On extension of the forward contract, Rs.105,100 will be recovered as cancellation charges from the customer and fresh contract will be booked at Rs.67.01

INTERNATIONAL PROJECT APPRAISAL

PROBLEM – 23

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

	SA$ 000	Forward rates of exchange to the £ Sterling [SA$/£]
Year 1	4,250	10
Year 2	6,500	15
Year 3	8,350	21

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

Assume you are financial adviser retained by OJ Limited to advise on the proposed joint venture.

i. Calculate NPV of the project under the two assumptions explained below. Use a discount rate of 16% for both assumptions.

Assumption 1 : The South American country has exchange controls which prohibit the payment of cash flows above 50% of the annual cash flows for the first three years of the project. The accumulated balance can be repatriated at the end of the third year.

Assumption 2 : The government of the South American country is considering removing exchange controls and restriction on repatriation of profits. If this happens all cash flows will be distributed to the partner companies at the end of each year.

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

Solution :

i. With Exchange Controls

Year	Profit After Tax SA$000	O.J. Share 50% SA$0000	50% div. ER[£/$] SA$ 000	OJ Share in £000		PVF @ 16%	Present Value £000
0	-				(450)	1.000	(450)
1	4,250	2,125	1,062	.1	106	0.862	91
2	6,500	3,250	1,625	.067	108	0.743	80
3	8,350	4,175	2,088	.0476	100	0.641	64
3	-	-	4,775	.0476	227	0.641	146
Net Present Value							(69)

Exchange controls removed and all earnings distributed as divide

Year	Profit After Tax SA$000	OJ Share SA$0000	ER[£/$] S	OJ Share in £000		PVF @ 16%	Present Value flow £000
0					(450)	(1.000)	(450)
1		4,250	2,125	.1	212	0.862	183
2		6,500	3,250	.067	217	0.743	161
3		8,350	4,175	.0476	199	0.641	127
Net Present Value							21

ii. Decision :

If exchange controls exist in the South American Country the project has a negative and NPV should not be undertaken.

If exchange control are removed then project may be undertaken as then the project has a positive NPV. Investing in countries with a history of high inflation and political volatility adds to the risk of the project and OJ Ltd. Should proceeds with caution.