

Foreign Exchange Exposure and Risk Management

BASIC CONCEPTS AND FORMULAE

1. Foreign Exchange Market

The foreign exchange market is the market in which individuals, firms and banks buy and sell foreign currencies or foreign exchange. The purpose of the foreign exchange market is to permit transfers of purchasing power denominated in one currency to another i.e. to trade one currency for another. Like any other market buyer and seller exist in this market and the demand and supply functions play a big role in determination of exchange rate of the currency.

2. Exchange Rate Determination

An exchange rate is, simply, the price of one nation's currency in terms of another currency, often termed as the reference currency. The foreign exchange market includes both the spot and forward exchange rates.

(a) **The Spot Market:** A spot rate occurs when buyers and sellers of currencies agree for immediate delivery of the currency.

(b) **The Forward Market:** A forward exchange rate occurs when buyers and sellers of currencies agree to deliver the currency at some future date. The forward exchange rate is set and agreed by the parties and remains fixed for the contract period regardless of the fluctuations in the spot exchange rates in future.

3. Exchange Rate Quotation

(a) **Direct and Indirect Quote:** A foreign exchange quotation can be either a direct quotation and or an indirect quotation, depending upon the home currency of the person concerned. A direct quote (also called the European terms) is the home currency price of one unit of foreign currency. An indirect quote (also called the American terms) is the foreign currency price of one unit of the home currency. Mathematically, expressed as follows:

Direct quote = $1/\text{indirect quote}$ and vice versa

(b) **Bid, Offer and Spread:** Foreign exchange quotes are two-way quotes, expressed as a 'bid and an offer' (or ask) price. Bid is the price at which the

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dealer is willing to buy another currency. The offer is the rate at which he is willing to sell another currency.

4. Exchange Rate Forecasting

Corporates need to do the exchange rate forecasting for taking decisions regarding hedging, short-term financing, short-term investment, capital budgeting, earnings assessments and long-term financing. Investors and traders need tools to select and analyze the right data from the vast amount of data available to them to help them make good decisions.

5. Techniques of Exchange Rate Forecasting

There are numerous methods available for forecasting exchange rates. They can be categorized into four general groups- technical, fundamental, market-based, and mixed.

- (a) **Technical Forecasting:** It involves the use of historical data to predict future values. For example time series models.
- (b) **Fundamental Forecasting:** It is based on the fundamental relationships between economic variables and exchange rates. For example subjective assessments, quantitative measurements based on regression models and sensitivity analyses.
- (c) **Market-Based Forecasting:** It uses market indicators to develop forecasts. The current spot/forward rates are often used, since speculators will ensure that the current rates reflect the market expectation of the future exchange rate.
- (d) **Mixed Forecasting:** It refers to the use of a combination of forecasting techniques. The actual forecast is a weighted average of the various forecasts developed.

6. Exchange Rate Theories

- (a) **Interest Rate Parity (IRP):** This 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.

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 $\frac{F}{S} (1 + r_F)$ is the amount that an investor by investing in the foreign market at r_F so that the investment of one rupee yield same return in the domestic as well as in the foreign market.

Uncovered Interest Rate Parity equation is given by:

$$(1 + r_D) = \frac{S_1}{S} (1 + r_F)$$

Where,

S_1 = Expected future spot rate when the receipts denominated in foreign currency is converted into domestic currency.

- (b) **Purchasing Power Parity (PPP):** This theory focuses on the 'inflation-exchange rate' relationship.

There are two forms of PPP theory:

- **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.
- **Relative Form** – 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.'

In Equilibrium Form:

$$S = a \frac{P_D}{P_F}$$

Where,

$S (\text{₹}/\$)$ = spot rate

P_D = is the price level in India, the domestic market.

P_F = is the price level in the foreign market, the US in this case.

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A = Sectoral price and sectoral shares constant.

- (c) **International Fisher Effect (IFE):** According to this theory, 'nominal risk-free interest rates contain a real rate of return and anticipated inflation'. This means if investors of all countries require the same real return, interest rate differentials between countries may be the result of differential in expected inflation.

The IFE equation can be given by:

$$r_D - P_D = r_F - DP_F \text{ or } P_D - P_F = DS = r_D - r_F$$

7. Comparison of PPP, IRP AND IFE Theories

Theory	Key	Variables	Summary
Interest Rate Parity (IRP)	Forward rate premium (or discount)	Interest rate differential	The forward rate of one currency will contain a premium (or discount) that is determined by the differential in interest rates between the two countries.
Purchasing Power Parity (PPP)	Percentage change in spot exchange rate	Inflation rate differential	The spot rate of one currency with respect to another will change in reaction to the differential in inflation rates between two countries.
International Fisher Effect (IFE)	Percentage change in spot exchange rate	Interest rate differential	The spot rate of one currency with respect to another will change in accordance with the differential in interest rates between the two countries.

8. Risk Management

A 'risk' is anything that can lead to results that deviate from the requirements. Risk Management is, "any activity which identifies risks, and takes action to remove or control 'negative results' (deviations from the requirements)." Unpredictable changes in interest rates, yield curve structures, exchange rates, and commodity prices, exacerbated by the explosion in international expansion, have made the financial environment riskier today than it ever was in the past. For this reason, boards of directors, shareholders, and executive and tactical management need to be seriously concerned that corporate risk management activities be adequately assessed, prioritized, driven by strategy, controlled, and reported.

9. Risk Considerations

There are several types of risk that an investor should consider and pay careful attention to. Some types of risk are as follows:

- (a) **Financial Risk:** It is the potential loss or danger due to the uncertainty in movement of foreign exchange rates, interest rates, credit quality, liquidity position, investment price, commodity price, or equity price, as well as the unpredictability of sales price, growth, and financing capabilities.
- (b) **Business Risk:** This risk, also known as investment risk, may materialize because of forecasting errors made in market acceptance of products, future technological changes, and changes in costs related to projects.
- (c) **Credit or Default Risk:** This type of risk is of particular concern to investors who hold bonds within their portfolio.
- (d) **Country Risk:** This refers to the risk that a country would not be able to honour its financial commitments. When a country defaults it can harm the performance of all other financial instruments in that country as well as other countries it has relations with.
- (e) **Interest Rate Risk:** It refers to the change in the interest rates. A rise in interest rates during the term of an investor's debt security hurts the performance of stocks and bonds.
- (f) **Political Risk:** This represents the financial risk that a country's government will suddenly change its policies.
- (g) **Market Risk:** It is the day-to-day fluctuations in a stock's price. It is also referred to as volatility.
- (h) **Foreign Exchange Risk:** Foreign exchange risk applies to all financial instruments that are in a currency other than the domestic currency.

10. Foreign Exchange Exposure

Foreign exchange exposure refers to those parts of a company's business that would be affected if exchange rate changes.

11. Types of Exposures

- (a) **Transaction Exposure:** It measures the effect of an exchange rate change on outstanding obligations that existed before exchange rates changed but were settled after the exchange rate changed. Thus, it deals with cash flows that result from existing contractual obligations.

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- (b) **Translation Exposure:** Also known as accounting exposure, it refers to gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for accounting purposes.
- (c) **Economic Exposure:** It refers to the extent to which the economic value of a company can decline due to changes in exchange rate. It is the overall impact of exchange rate changes on the value of the firm.

12. Techniques for Managing Exposure

The aim of foreign exchange risk management is to stabilize the cash flows and reduce the uncertainty from financial forecasts. Various techniques for managing the exposure are as follows:

- (A) **Derivatives:** A derivatives transaction is a bilateral contract or payment exchange agreement whose value depends on - derives from - the value of an underlying asset, reference rate or index. Every derivatives transaction is constructed from two simple building blocks that are fundamental to all derivatives: forwards and options. They include:

- (a) **Forwards-based Derivatives:** There are three divisions of forwards-based derivatives:

- (i) **The Forward Contract-**The simplest form of derivatives is the forward contract. It obliges one party to buy, and the other to sell, a specified quantity of a nominated underlying financial instrument at a specific price, on a specified date in the future.
- (ii) **Swaps-**Swaps are infinitely flexible. They are a method of exchanging the underlying economic basis of a debt or asset without affecting the underlying principal obligation on the debt or asset.

Swaps can be classified into the following groups:

- Interest rate;
- Currency;
- Commodity; and
- Equity.

- (iii) **Futures Contracts-** A basic futures contract is very similar to the forward contract in its obligation and payoff profile. Some important distinctions between futures and forwards and swaps are:

- The contract terms of futures are standardized.

- All transactions are carried out through the exchange clearing system thus avoiding the other party risk.

(b) **Options:** They offer, in exchange for a premium, the right - but *not* the obligation - to buy or sell the underlying at the strike price during a period or on a specific date. So the owner of the option can choose not to exercise the option and let it expire.

An option is a contract which has one or other of the two key attributes:

- to buy (**call option**)- It is a contract that gives the buyer the right, but not the obligation, to buy a specified number of units of commodity or a foreign currency from the seller of option at a fixed price on or up to a specific date.
- to sell (**put option**)- It is a contract that gives the buyer the right, but not the obligation, to sell a specified number of units of commodity or a foreign currency to a seller of option at a fixed price on or up to a specific date.

The holder of an **American option** has the right to exercise the contract at any stage during the period of the option, whereas the holder of a **European option** can exercise his right only at the end of the period.

- (B) **Money Market Hedge:** A money market hedge involves simultaneous borrowing and lending activities in two different currencies to lock in the home currency value of a future foreign currency cash flow. The simultaneous borrowing and lending activities enable a company to create a homemade forward contract.
- (C) **Forward Market Hedge:** In a forward market hedge, a company that has a long position in a foreign currency will sell the foreign currency forward, whereas a company that has a short position in a foreign currency will buy the foreign currency forward. In this manner, the company can fix the dollar value of future foreign currency cash flow.
- (D) **Netting:** Netting involves associated companies, which trade with each other. The technique is simple. Group companies merely settle inter affiliate indebtedness for the net amount owing. Gross intra-group trade, receivables and payables are netted out.
- (E) **Matching:** Matching is a mechanism whereby a company matches its foreign currency inflows with its foreign currency outflows in respect of amount and

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approximate timing. Receipts in a particular currency are used to make payments in that currency thereby reducing the need for a group of companies to go through the foreign exchange markets to the unmatched portion of foreign currency cash flows.

- (F) **Leading and Lagging:** Leading means paying an obligation in advance of the due date. Lagging means delaying payment of an obligation beyond its due date. Leading and lagging are foreign exchange management tactics designed to take advantage of expected devaluations and revaluations of currencies.
- (G) **Price Variation:** Price variation involves increasing selling prices to counter the adverse effects of exchange rate change.
- (H) **Invoicing in Foreign Currency:** Sellers usually wish to sell in their own currency or the currency in which they incur cost. This avoids foreign exchange exposure. For the buyer, the ideal currency is usually its own or one that is stable relative to it, or it may be a currency of which the purchaser has reserves.
- (I) **Asset and Liability Management:** Asset and liability management can involve aggressive or defensive postures. In the aggressive attitude, the firm simply increases exposed cash inflows denominated in currencies expected to be strong or increases exposed cash outflows denominated in weak currencies. By contrast, the defensive approach involves matching cash inflows and outflows according to their currency of denomination, irrespective of whether they are in strong or weak currencies.
- (J) **Arbitrage:** The simple notion in arbitrage is to purchase and sell a currency simultaneously in more than one foreign exchange markets. Arbitrage profits are the result of the difference in exchange rates at two different exchange centres and the difference, due to interest yield which can be earned at different exchanges.

13. Strategies for Exposure Management

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 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

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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

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.

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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)	<u>₹ 5,64,71,000</u>
Profit to Bank	<u>₹ 5,29,000</u>

Question 5

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 6

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/\$

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

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

$$\backslash \text{ US \$ } 200,000 \times \text{₹}46.25 = \text{₹}92,50,000$$

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

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

Opportunity gain

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

Likely sum at end of 2 months

32,26,900

Proceeds if we can encash by forward rate :

$$\text{\$ } 69000 \times \text{₹}47.00 \quad 32,43,000$$

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

Question 7

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

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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 $48.30 \times 10,000,000$ ₹483,000,000

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

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

There is net gain of USD 10,112,968.26 less USD 10,000,000 i.e. USD 12,968.26

Question 8

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	<u>0.20</u>	<u>0.40</u>
	<u>1.00</u>	EV = <u>1.81</u>

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 9

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 Re. 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	<u>33.33</u>
Expected exchange loss	<u>3.33</u>

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	<u>32.73</u>
Expected loss	<u>2.73</u>

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.

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Question 10

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:

$$\text{USD } 20,00,000 \times 3/100 \times 6/12 = \text{USD } 30,000$$

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	<u>USD 30,000</u>
Amount due	<u>USD 20,30,000</u>
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 11

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:

$$(45.20 - 45.50) \times 1,00,000 = ₹ 30,000$$

Question 12

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 put option exercise rate (say) is INR 6.70. The Airlines will be required to pay a

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premium for purchasing the option say 5% of the value of put 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 sell (pay) INR 6.7

The exercise price to obtain one French Franc in this market, it will be required to pay INR 6.80.

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 13

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

- (i) *Do you expect United States Dollar to be at a premium or at discount in the Indian forward market?*
- (ii) *What is the expected 6-months forward rate for United States Dollar in India; and*
- (iii) *What is 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:

$$\frac{1+R_h}{1+R_f} = \frac{F_1}{E_0}$$

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_0 is the spot rate.

$$\text{Therefore } \frac{1 + (0.08/2)}{1 + (0.02/2)} = \frac{F_1}{45.50}$$

$$\frac{1 + 0.04}{1 + 0.01} = \frac{F_1}{45.50}$$

$$\text{or } \frac{(1.04)}{1.01} \cdot 45.50 = F_1$$

$$\text{or } \frac{47.32}{1.01} = F_1$$

$$\text{or } F_1 = 46.85$$

(iii) Rate of premium:

$$\frac{46.85 - 45.50}{45.50} \cdot \frac{12}{6} \cdot 100 = 5.93\%$$

Question 14

- (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	<u>0.6666</u> 1.0112	0.6592

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OR

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

(b) Buy £ 62500 × 1.2806	= \$ 80037.50
Sell £ 62500 × 1.2816	= <u>\$ 80100.00</u>
Profit	<u>\$ 62.50</u>

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 15

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 US \$ 50,000 on September 30, 2008. The present exchange rate is 1 US \$ = ₹ 40. It can purchase forward 1 US \$ at ₹ 39. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 10% per annum and the rate of corporate tax is 50%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:

- If the exchange rate on September 30, 2008 is ₹ 42 per US \$.
- If the exchange rate on September 30, 2008 is ₹ 38 per US \$.

Answer

	(₹)
Present Exchange Rate ₹40 = 1 US\$	
If company purchases US\$ 50,000 forward premium is	
50000 × 39 × 2%	39,000
Interest on ₹39,000 for 9 months at 10%	<u>2,925</u>
Total hedging cost	<u>41,925</u>
If exchange rate is ₹42	

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Then gain (₹42 – ₹39) for US\$ 50,000	1,50,000
Less: Hedging cost	<u>41,925</u>
Net gain	<u>1,08,075</u>
If US\$ = ₹38	
Then loss (39 – 38) for US\$ 50,000	50,000
Add: Hedging Cost	<u>41,925</u>
Total Loss	<u>91,925</u>

Question 16

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	

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Unit input price	Yen 650	US\$10.23	Euro11.99	
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 17

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, 2005 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 $10 \times ₹15,000 = ₹1,50,000$

On September 1 Close at 0.02133

Receipts = $US\$1,00,000/0.02133$ = 46,88,233

Variation Margin = $[(0.02134 - 0.02118) \times 10 \times 472000/-]/0.02133$

OR $(0.00016 \times 10 \times 472000)/.02133 = 755.2/0.02133$ 35,406

47,23,639

Less: Interest Cost – $1,50,000 \times 0.08 \times 3/12$

₹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.

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Question 18

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\$ = $[(48.8190 - 48.0123)/48.0123] \times 12/6 \times 100$
= 3.36%

Interest rate differential = 12% - 8%
= 4% (Negative Interest rate differential)

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 $(1 + 0.08 \times 6/12)$ = 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/- $\times 0.06$
= ₹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., $(\$206.95 \times ₹48.8190)$

Question 19

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 = $[(0.67 - 0.665) / 0.665] \times (12/3) \times 100 = 3.01$ 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 =	<u>26.32</u>
Total	1530.08
- (iv) Sell DM at 3-months forward to obtain Can\$ = $(1530.08 \times 0.67) = 1025.15$
- (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	<u>22.50</u>
Total	<u>1022.50</u>
Net arbitrage gain = $1025.15 - 1022.50 = \text{Can\$ } 2.65$	

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Question 20

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

$$x \times \frac{₹}{£} + 0.05 \times \frac{3}{12} \times x = 500,000 \text{ or } x = £493,827$$

- (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:

$$S = ₹ 27,654,312 \times \frac{₹}{£} + 0.12 \times \frac{3}{12} \times S = ₹ 28,483,941$$

- (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 21

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 22

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:

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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 23

- (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

$$\text{Spot rate} \frac{e^{1+H} \bar{u}}{e^{1+F} \bar{u}}$$

So spot rate after one year

$$= ₹ 43.40 \frac{e^{1+0.065} \bar{u}}{e^{1+0.03} \bar{u}}$$

$$= ₹ 43.4 (1.03399)$$

$$= ₹ 44.8751$$

After 3 years

$$₹ 43.40 \frac{₹1 + 0.065 \frac{3}{12}}{₹1 + 0.03 \frac{3}{12}}$$

$$= ₹ 43.40 (1.03398)^3$$

$$= ₹ 43.40 (1.10544)$$

$$= ₹ 47.9761$$

(ii) As per interest rate parity

$$S_1 = S_0 \frac{₹1 + \text{in A} \frac{3}{12}}{₹1 + \text{in B} \frac{3}{12}}$$

$$S_1 = £0.7570 \frac{₹1 + (0.075) \frac{3}{12}}{₹1 + (0.035) \frac{3}{12}}$$

$$= £0.7570 \frac{₹1.01875}{₹1.00875}$$

$$= £0.7570 \times 1.0099 = £0.7645$$

$$= \text{UK } £0.7645 / \text{US\$}$$

Question 24

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

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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.

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

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

$$\text{Or } -0.0237 = r_{DM} - r_{US\$}$$

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 25

The following table shows interest rates for the United States dollar and French francs. The spot exchange rate is 7.05 francs per dollars. 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 per cent 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 theorem (IRP). 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)

Now, Differential in interest rate = Differential between forward and spot rate

i.e. $\frac{1+.115}{1+.195}$ = Differential between forward and spot rate

Or Differential between forward and spot rate = 93.3%

Therefore, Forward discount on franc per cent per year = $93.3\% - 100\% = - 6.7\%$

Forward discount on franc per cent for 3 months = $- 6.7/4$ or $- 1.675\%$

Forward franc = Today's spot rate (Difference between forward and Spot rate)
= 0.141844 dollar (100% - 1.675%)

Forward franc = 0.1394681 dollar

Forward franc per dollar = $1/.1394681 = 7.17$

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6 months

$$\text{Dollar interest rate} = 12\frac{1}{4}\%$$

(annually compounded)

Forward discount on franc % per year = - 6.3% or - 3.15% for 6 months

$$\begin{aligned}\text{Hence 6 months Forward rate} &= 0.141844 \text{ dollar (Spot rate) (100\% - 3.15)} \\ &= 0.13737 \text{ dollars}\end{aligned}$$

$$\text{Forward francs per dollar} = 1/0.13737$$

$$\text{or Forward francs per dollar} = 7.28 \text{ francs}$$

Again, Differential in interest rate = Differential between forward
between the two countries and spot rate

$$\text{Now, } \frac{1 + \text{Dollar interest rate}}{1 + \text{Franc interest rate}} = \text{Differential between forward and spot rate}$$

$$\text{Or } \frac{1 + .1225}{1 + \text{Franc interest rate}} = (100\% - 6.3\%)$$

$$\text{Or } \frac{1 + .1225}{1 + \text{Franc interest rate}} = 93.7\%$$

$$\text{Or } 1 + \text{Franc interest rate} = \frac{1.1225}{93.7\%}$$

$$\text{Or Franc interest rate} = 1.19797 - 1$$

$$\text{Or} = 0.19797$$

$$\text{Or} = 19.8\%$$

1 Year

Franc interest rate = 20%

(annually compounded)

Forward franc per dollar = 7.5200

$$\text{Today's spot rate is 7.05 (given) francs per dollar i.e. 1 Franc} = 0.141844 \text{ dollar}$$

$$\text{Forward francs is 7.52 francs per dollar i.e. franc} = 0.132978 \text{ dollar}$$

$$\text{Difference} = \underline{0.008866 \text{ dollar}}$$

$$\begin{aligned}
 \text{Forward discount on Francs per cent per year} &= \frac{0.008866}{0.141844} \times 100 \\
 &= -6.25\% \text{ or } -6.3\% \\
 &\text{(rounded off)}
 \end{aligned}$$

Again, Differential in interest rates = Differential between forward
Between the two countries rate and spot rate

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

$$\begin{aligned}
 \text{Or Dollar interest rate} &= 1.20 \times 0.9374 - 1 \\
 &= 1.125 - 1 \\
 &= 0.125 \text{ or } 12.5\%
 \end{aligned}$$

Question 26

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

$$\begin{aligned}
 \text{(i) The contract is to be cancelled on 30-10-2010 at the spot buying rate of US\$ 1} &= ₹ 41.5000 \\
 \text{Less: Margin Money 0.075\%} &= ₹ \underline{0.0311} \\
 &= ₹ 41.4689 \text{ or } ₹ 41.47 \\
 \text{US\$ 20,000 @ ₹ 41.47} &= ₹ 8,29,400 \\
 \text{US\$ 20,000 @ ₹ 42.32} &= ₹ \underline{8,46,400} \\
 \text{The difference in favour of the Bank/Cost to the importer} &= ₹ \underline{17,000}
 \end{aligned}$$

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(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 27

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 = $3,00,000 / 1.045 = \text{£ } 2,87,081$

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

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

(c) Call option:

<i>Expected Spot rate in 180 days</i>	<i>Prem. /unit</i>	<i>Exercise Option</i>	<i>Total price per unit</i>	<i>Total price for £3,00,000 xi</i>	<i>Prob. Pi</i>	<i>pixi</i>
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

(d) No hedge option:

<i>Expected Future spot rate</i>	<i>Dollar needed Xi</i>	<i>Prob. Pi</i>	<i>Pi xi</i>
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

The probability distribution of outcomes for no hedge strategy appears to be most preferable because least number of \$ are needed under this option to arrange £3,00,000.

Question 28

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.

12.36 Strategic Financial Management

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

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

$$\text{USD} = \text{GBP } 0.64033 - \quad \text{GBP } 0.63804$$

6 months' forward rate

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

$$\text{USD} = \text{GBP } 0.64704 \quad - \quad \text{GBP } 0.64066$$

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 3,56,867 x 0.64033	GBP 2,28,512
Interest for 6 months @ 7 %	7,998

Payable after 6 months	<u>GBP 2,36,510</u>
------------------------	---------------------

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)	<u>GBP 2,360</u>
	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.

Question No. 29

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

12.38 Strategic Financial Management

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
Add: Interest at 4.5% I Quarter	45
Add: Interest at 4.5% II Quarter (on ₹1045 lakhs)	<u>47.03</u>
Total outflow in Rupees	<u>1,092.03</u>
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	₹ in lakhs
At 1 % on 3400 lakhs yen at ₹100 = 340 yen	10.00
Add: Interest I Quarter	0.45
Add: Interest II Quarter	<u>0.47</u>
(A)	<u>10.92</u>

Payment at the end of 180 days:

Cost	3400.00 lakhs yen
Interest at 2% p.a. [3400 × 2/100 × 180/365]	<u>33.53</u> lakhs yen
	<u>3433.53</u> lakhs yen

Conversion at ₹100 = 345 yen [3433.53 / 345 × 100] (B) = ₹995.23

Total Cost: (A) + (B) = 1006.15 lakhs

Advise: Option 2 is cheaper by (1092.03 – 1006.15) lakh or 85.88 lakh. Hence, the offer may be accepted.

Question 30

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	=	$\frac{\text{Rs. } 45.90 \times 1.7850}{\text{SGD } 3.1575}$	
SGD 1	=	₹ 25.9482	
Add: Exchange margin (0.125%)			<u>₹ 0.0324</u>
			<u>₹ 25.9806</u>

On February 4, 2010 the rates are

US \$	=	₹ 45.97	
Pound 1	=	US\$ 1.7775	
Pound 1	=	SGD 3.1380	
Therefore, SGD 1	=	$\frac{\text{Rs. } 45.97 \times 1.7775}{\text{SGD } 3.1380}$	
SGD 1 =			₹ 26.0394
Add: Exchange margin (0.125%)			<u>₹ 0.0325</u>
			<u>₹ 26.0719</u>

Hence, loss to the importer

$$= \text{SGD } 25,00,000 (\text{₹}26.0719 - \text{₹}25.9806) = \text{₹ } 2,28,250$$

12.40 Strategic Financial Management

Question 31

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:	<u>27.52</u>
Net amount payable by customer per Franc	<u>0.27</u>

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 32

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

Spot	CHF 1 = ₹ 36.30	36.35
One month forward	36.45	36.52

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

Answer

Original contract for Swiss Francs 1,00,000 @ 36.25 - amount receivable by the customer. To cancel the purchase contract 1 month before the due date - The contract will be cancelled at 1 month forward sale rate i.e. Swiss Francs 1 = 36.52 payable by the customer.

Hence, Swap profit / loss to the customer:

₹ 36.52	payable by the customer
<u>₹ 36.25</u>	receivable by the customer
<u>₹ 0.27</u>	Net payable by the customer i.e. loss

Therefore, total loss to the customer is

Swiss Francs 1,00,000 × ₹ 0.27 = ₹ 27,000

Question 33

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

Question 34

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:

12.42 Strategic Financial Management

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

	<u>Capital</u>	<u>Interest</u>	<u>₹ in 30 days</u>
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
			<u>4,75,323</u>

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
		<u>4,84,080</u>

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 35

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 sells Straddle of At the Money Straddle 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.

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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) BUY Strategy i.e. either Call or Put

Price is expected to go up then 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

Question 36

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 :

- How much minimum CHF amount you have to pay for 1 Million GBP spot?
- 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 1GBP=USD 1.7650

By applying chain rule Buying rate would be

$$1 \text{ GBP} = 1.7650 * 1.4655 \text{ CHF}$$

$$1 \text{ GBP} = \text{CHF } 2.5866$$

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

(ii) Spot rate Bid rate GBP 1 = CHF $1.4650 * 1.7645 = \text{CHF } 2.5850$

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 37

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
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₹/S\$	27.20/25
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After six months the exchange rates turn out as follows:

₹/Euro	52.00/05
--------	----------

₹/S\$	27.70/75
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- (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*

Rs/Euro	51.75/80
---------	----------

Rs/S\$	27.10/15
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- (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

Profit at current exchange rates

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

12.46 Strategic Financial Management

$$2400 [\text{₹ } 25,750 - \text{₹ } 24,300] = \text{₹ } 34,80,000$$

Profit after change in exchange rates

$$2400[\text{€}500 \times \text{₹ } 52 - (\text{S\$ } 800 \times \text{₹ } 27.75 + \text{₹ } 1000 + \text{₹ } 1500)]$$

$$2400[\text{₹ } 26,000 - \text{₹ } 24,700] = \text{₹ } 31,20,000$$

LOSS DUE TO TRANSACTION EXPOSURE

$$\text{₹ } 34,80,000 - \text{₹ } 31,20,000 = \text{₹ } 3,60,000$$

Profit based on new exchange rates

$$2400[\text{₹ } 25,000 - (800 \times \text{₹ } 27.15 + \text{₹ } 1,000 + \text{₹ } 1,500)]$$

$$2400[\text{₹ } 25,000 - \text{₹ } 24,220] = \text{₹ } 18,72,000$$

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

$$2400 [\text{₹ } 25,000 - (800 \times \text{₹ } 27.75 + \text{₹ } 1,000 + \text{₹ } 1,500)]$$

$$2400 [\text{₹ } 25,000 - \text{₹ } 24,700] = \text{₹ } 7,20,000$$

Decline in profit due to transaction exposure

$$\text{₹ } 18,72,000 - \text{₹ } 7,20,000 = \text{₹ } 11,52,000$$

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

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

Change in Price due to change in Exch. Rate

$$\text{S\$ } 485.44 - \text{S\$ } 483.09 = \text{S\$ } 2.35$$

or (-) 0.48%

Price elasticity of demand = 1.5

Increase in demand due to fall in price $0.48 \times 1.5 = 0.72\%$

Size of increased order = $2400 \times 1.0072 = 2417$ units

$$\begin{aligned} \text{Profit} &= 2417 [\text{₹ } 25,000 - (800 \times \text{₹ } 27.75 + \text{₹ } 1,000 + \text{₹ } 1,500)] \\ &= 2417 [\text{₹ } 25,000 - \text{₹ } 24,700] = \text{₹ } 7,25,100 \end{aligned}$$

Therefore, decrease in profit due to operating exposure $\text{₹ } 18,72,000 - \text{₹ } 7,25,100 = \text{₹ } 11,46,900$

Question 38

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

	<i>Swiss Francs</i>
<i>Balance in the Nostro A/c Credit</i>	<i>1,00,000</i>
<i>Opening Position Overbought</i>	<i>50,000</i>
<i>Purchased a bill on Zurich</i>	<i>80,000</i>
<i>Sold forward TT</i>	<i>60,000</i>
<i>Forward purchase contract cancelled</i>	<i>30,000</i>
<i>Remitted by TT</i>	<i>75,000</i>
<i>Draft on Zurich cancelled</i>	<i>30,000</i>

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/Currency Position:

<i>Particulars</i>	<i>Purchase Sw. Fcs.</i>	<i>Sale Sw. Fcs.</i>
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	<u>30,000</u>	—
	1,60,000	1,65,000
Closing Balance Oversold	<u>5,000</u>	—
	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.