FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

LEARNING OUTCOMES

After going through the chapter student shall be able to understand

❑ Factors affecting foreign exchange rate

❑ Role of SWIFT in Foreign Exchange

❑ National and International Payment Gateways

❑ Exchange rate determination

❑ Foreign currency market

❑ Management of Foreign Exchange Risk

1. INTRODUCTION

Coupled with globalization of business, the raising of capital from the international capital markets has assumed significant proportion during the recent years. The volume of finance raised from international capital market is steadily increasing over a period of years, across the national boundaries. Every day new institutions are emerging on the international financial scenario and introducing new derivative financial instruments (products) to cater to the requirements of multinational organizations and the foreign investors.

To accommodate the underlying demands of investors and capital raisers, financial institutions and instruments have also changed dramatically. Financial deregulation, first in the United States and

then in Europe and Asia, has prompted increased integration of world financial markets. As a result of the rapidly changing scenario, the finance manager today has to be global in his approach.

In consonance with these remarkable changes, the Government of India has also opened Indian economy to foreign investments and has taken a number of bold and drastic measures to globalize the Indian economy. Various fiscal, trade and industrial policy decisions have been taken and new avenues provided to foreign investors like Foreign Institutional Investors (FII's) and NRI's etc., for investment especially in infrastructural sectors like power and telecommunication etc.

The basic principles of financial management i.e., efficient allocation of resources and raising of funds on most favourable terms and conditions etc. are the same, both for domestic and international enterprises. However, the difference lies in the environment in which these multi-national organizations function. The environment relates to political risks, Government's tax and investment policies, foreign exchange risks and sources of finance etc. These are some of the crucial issues which need to be considered in the effective management of international financial transactions and investment decisions.

Under the changing circumstances as outlined above, a finance manager, naturally cannot just be a silent spectator and wait and watch the developments. He has to search for "best price" in a global market place (environment) through various tools and techniques. Sometimes he uses currency and other hedges to optimize the utilization of financial resources at his command.

However, the problems to be faced by him in the perspective of financial management of the multinational organizations are slightly more complex than those of domestic organizations. While the concepts developed earlier in the previous chapters are also applicable here, the environment in which decisions are made in respect of international financial management is different and it forms the subject matter of this chapter for discussion. In this chapter we shall describe how a finance manager can protect his organization from the vagaries of international financial transactions.

An exchange rate is, simply, the price of one nation's currency in terms of another currency, often termed the reference currency. For example, the rupee/dollar exchange rate is just the number of rupees that one dollar will buy. If a dollar will buy 100 rupees, the exchange rate would be expressed as ₹ 100/$ and the rupee would be the reference currency.

Equivalently, the dollar/ rupee exchange rate is the number of dollars one rupee will buy. Continuing the previous example, the exchange rate would be $0.01/₹ (1/100) and the dollar would now be the reference currency. Exchange rates can be for spot or forward delivery.

The foreign exchange market includes both the spot and forward exchange rates. The spot rate is the rate paid for delivery within two business days after the day the transaction takes place. If the

rate is quoted for delivery of foreign currency at some future date, it is called the forward rate. In the forward rate, the exchange rate is established at the time of the contract, though payment and delivery are not required until maturity. Forward rates are usually quoted for fixed periods of 30, 60, 90 or 180 days from the day of the contract.

(a)   The Spot Market: The most common way of stating a foreign exchange quotation is in terms of the number of units of foreign currency needed to buy one unit of home currency. Thus, India quotes its exchange rates in terms of the amount of rupees that can be exchanged for one unit of foreign currency.

Illustration 1

If the Indian rupee is the home currency and the foreign currency is the US Dollar then what is the exchange rate between the rupee and the US dollar?

Solution

❖   One can buy 0.0217 US dollars for one Indian rupee.

❖   ₹ 46.08 Indian rupees are needed to buy one US dollar.

(b)   The Forward Market: A forward exchange contract occurs when buyers and sellers of currencies agree to deliver the currency at some future date. They agree to transact a specific amount of currency at a specific rate at a specified 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. The forward exchange transactions can be understood by an example.

A US exporter of computer peripherals might sell computer peripherals to a German importer with immediate delivery but not require payment for 60 days. The German importer has an obligation to pay the required dollars in 60 days, so he may enter into a contract with a trader (typically a local banker) to deliver Euros for dollars in 60 days at a forward rate – the rate today for future delivery.

So, a forward exchange contract implies a forward delivery at specified future date of one currency for a specified amount of another currency. The exchange rate is agreed today, though the actual transactions of buying and selling will take place on the specified date only. The forward rate is not the same as the spot exchange rate that will prevail in future. The actual spot rate that may prevail on the specified date is not known today and only the forward rate for that day is known. The actual spot rate on that day will depend upon the supply and demand forces on that day. The actual spot rate on that day may be lower or higher than the forward rate agreed today.

An Indian exporter of goods to London could enter into a forward contract with his banker to sell pound sterling 90 days from now. This contract can also be described as a contract to purchase Indian Rupees in exchange for delivery of pound sterling. In other words, foreign exchange markets are the only markets where barter happens – i.e., money is delivered in exchange for money.

2.   ROLE OF SWIFT IN FOREIGN EXCHANGE

Foreign Exchange Dealers/Traders use a network of communication to carry out their business transactions called SWIFT (Society for Worldwide Interbank Financial Telecommunication) which is purely a messaging system. It was founded in 1973 and headquartered at La Hulpe, Belgium, near Brussels. It is a non-profit organization. It has offices around the world. It employs a dedicated computer network system for communicating fund transfers. Since each country has their own symbol to communicate their currency, to avoid miscommunication SWIFT has assigned codes to currencies of each country. These codes are 3 lettered codes and are used internationally in cross border communications. Some of the common codes used in communication are as follows:

Country/ Region	Currency	Code
USA	US Dollar	USD
UK	Pound	GBP
China	Chinese Renminbi/Yuan	CNY
Canada	Canadian Dollar	CAD
Australia	Australian Dollar	AUD
Hong Kong	Hong Kong Dollar	HKD
India	Indian Rupee	INR
Japan	Japanese Yen	JPY
New Zealand	New Zealand Dollar	NZD
Singapore	Singapore Dollar	SGD
Sweden	Swedish Krona	SEK
Switzerland	Swiss Franc	CHF
Europe	Euro	EUR

SWIFT uses common language for financial transactions and uses a centralized data processing system. It is important to note that SWIFT is only a standardized communication system and not a transaction settlement system.

The SWIFT connects various financial institutions in more than 200 countries. The SWIFT plays an important role in Foreign Exchange dealings because of the following reasons:

∗   In addition to validation statements and documentation it is a form of quick settlement as messaging takes place within seconds.

∗   Because of security and reliability helps to reduce Operational Risk.

∗   Since it enables its customers to standardise transaction it brings operational efficiencies and reduced costs.

∗   It also ensures full backup and recovery system.

∗   Acts as a catalyst that brings financial agencies to work together in a collaborative manner for mutual interest.

3. NATIONAL AND INTERNATIONAL PAYMENT GATEWAYS

A Payment Gateway is a virtual mode equivalent to physical mode of transfer of cash that authenticates and routes payment details in an extremely secure environment. The services ranges from collecting and sending payments to banks or to e-commerce sites for carrying out commercial transactions.

The Payment Gateway functions in essence as an "encrypted" channel, which securely passes transaction details from the buyer's Personal Computer (PC)/ Mobile Phone or Tablet to banks for authorization and approval. It involves the transfer of data in an encrypted manner from entry point to the Point of Sale (POS)/ and after approval from banker of Debit/ Credit Cards it completes the transaction/ order along with verification vide a reference number

A Payment Gateway provides multiple benefits such as:

•   24x7x365 convenience.

•   Real time authorisation of credit/debit cards.

•   Rapid, efficient transaction processing.

- Multiple payment options.

- Minimising risk by encrypting transactions and verifying other information.

- Flexible, powerful real-time reports generation.

- Facility for customer refund.

- Merchants can get rid of operating complex software and maintaining huge data.

- CA (Certifying Authority) authenticated secure servers.

- Collection of bulk data in a cost-efficient manner, with the additional benefit of being checked for card validity.

- Provision for multiple host interfaces.

- Comprehensive, simple administrative control.

- Gaining customers' support and merchants' trust.

Despite so many benefits there are some challenges that are hampering the growth of payment gateways such as:

(a)   Payments may not happen at all simply because the customer may not have an account with the banks supporting the payment gateway.

(b)   Some payment gateways have only limited number of banks.

(c)   There are problems of reliability, delivery, and limited payment avenues and general lack of trust among customers, and doubts about the service provider.

Similar to domestic payment gateways there are International Payment Gateways that offers global/multi-currency payments, as well as an interface with multiple languages. Chances of customer conversion increases when a prospective customer sees the price of a product or service in their currency. International Payment Gateways let merchants offer their international customers the ability to pay in the currency they know best – their own. These Payment gateways not only accelerate but also make international payments and transactions easy. Customers can easily benchmark prices if it is quoted in their own currency. If anybody travels to the US or China or the UK or any other country, any expenditure is preceded by a conversion to the Indian rupee.

4. NOSTRO, VOSTRO AND LORO ACCOUNTS

In interbank transactions, foreign exchange is transferred from one account to another account and from one centre to another centre. Therefore, the banks maintain three types of current accounts in order to facilitate quick transfer of funds in different currencies. These accounts are Nostro, Vostro and Loro accounts meaning "our", "your" and "their". A bank's foreign currency account maintained by the bank in a foreign country and in the home currency of that country is known as Nostro Account or "our account with you". For example, An Indian bank's Swiss franc account with a bank in Switzerland.

Vostro account is the account which is held by a foreign bank with a local bank, so if Citibank maintains an account with State bank of India it will be a Vostro account for State bank of India. The account which is Nostro for one bank is Vostro for another.

When domestic banks use the account of third party banks which holds a Nostro account to settle foreign exchange transactions these type of transactions are included under the Loro Account e.g. HDFC Bank has an account with Citi Bank but IDBI Bank doesn't have any Nostro account with Citi Bank. IDBI Bank has to pay the bill of imported machinery from the USA on behalf of its customers IDBI Bank approaches to HDFC Bank and ask to settle the invoice on its own behalf. HDFC bank worked as an intermediary between Citi Bank and IDBI Bank.

4.1 Exchange Position

It is referred to as total of purchase and sale commitments of a bank to purchase or sale foreign exchange whether actual delivery has taken place or not. In other words, all transactions for which bank has agreed with counter party are entered into exchange position on the date of the contract.

4.2 Cash Position

It is outstanding balance (debit or credit) in bank's Nostro account. Since all foreign exchange dealings of bank are routed through Nostro account it is credited for all purchases and debited for sales by the bank.

It should however be noted that all dealings whether delivery has taken place or not effects the Exchange Position but Cash Position is effected only when actual delivery has taken place.

Therefore, all transactions affecting Cash position will affect Exchange Position not vice versa.

Illustration 2

Suppose you are a dealer of ABC Bank and on 20.10.2014 you found that balance in your Nostro account with XYZ Bank in London is £65,000 and you had overbought £35,000. During the day following transaction have taken place:

	£
DD purchased	12,500
Purchased a Bill on London	40,000
Sold forward TT	30,000
Forward purchase contract cancelled	15,000
Remitted by TT	37,500
Draft on London cancelled	15,000

What steps would you take, if you are required to maintain a credit Balance of £7,500 in the Nostro A/c and keep as overbought position on £7,500?

Solution

Exchange Position:

Particulars	Purchase £	Sale £
Opening Balance Overbought	35,000	—
DD Purchased	12,500	—
Purchased a Bill on London	40,000	—
Sold forward TT	—	30,000
Forward purchase contract cancelled	—	15,000
TT Remittance		37,500
Draft on London cancelled	15,000	—
	1,02,500	82,500
Closing Balance Overbougt	—	20,000
	1,02,500	1,02,500

Cash Position (Nostro A/c)

	Credit £	Debit £
Opening balance credit	65,000	—
TT Remittance	—	37,500

	65,000	37,500
Closing balance (credit)	—	27,500
	65,000	65,000

To maintain Cash Balance in Nostro Account at £7,500 you have to sell £20,000 in Spot which will bring Overbought exchange position to Nil. Since bank require Overbought position of £7,500 it has to buy the same in forward market.

5. EXCHANGE RATE QUOTATION

5.1 American Term and European Term

Quotes in *American terms* are the rates quoted in amounts of U.S. dollar per unit of foreign currency. While rates quoted in amounts of foreign currency per U.S. dollar are known as quotes in *European terms*.

For example, U.S. dollar 0.2 per unit of Indian rupee is an American quote while INR 44.92 per unit of U.S. dollar is a European quote.

Most foreign currencies in the world are quoted in terms of the number of units of foreign currency needed to buy one U.S. dollar i.e. the European term.

5.2 Direct and Indirect Quote

As indicated earlier, a currency quotation is the price of a currency in terms of another currency. For example, $1 = ₹ 48.00, means that one dollar can be exchanged for ₹ 48.00. Alternatively, we may pay ₹ 48.00 to buy one dollar. 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 is the home currency price of one-unit foreign currency. Thus, in the aforesaid example, the quote $1 = ₹ 48.00 is a direct-quote for an Indian.

An indirect quote is the foreign currency price of one unit of the home currency. The quote Re.1 = $0.0208 is an indirect quote for an Indian. ($1/₹ 48.00 = $0.0208 approximately)

Direct and indirect quotes are reciprocals of each other, which can be mathematically expressed as follows.

Direct quote = 1/indirect quote and vice versa

5.3   Bid, Offer and Spread

A foreign exchange quotes are two-way quotes, expressed as a 'bid' (sell) and an offer' (or ask/Buy) price. Bid is the price at which the dealer is willing to buy another currency. The offer is the rate at which he is willing to sell another currency. Thus, a bid in one currency is simultaneously an offer in another currency. For example, a dealer may quote Indian rupees as ₹48.80 - 48.90 vis-a-vis dollar. That means that he is willing to buy dollars at ₹48.80/$ (sell rupees and buy dollars), while he will sell dollar at ₹ 48.90/$ (buy rupees and sell dollars). The difference between the bid and the offer is called the spread. The offer is always higher than the bid as inter-bank dealers make money by buying at the bid and selling at the offer.

$$\% \text{ Spread} = \frac{\text{Bid - Offer}}{\text{Bid}} \times 100$$

It must be clearly understood that while a dealer buys a currency, he at the same time is selling another currency. When a dealer wants to buy a currency, he/she will ask the other dealer a quote for say a million dollars. The second dealer does not know whether the first dealer is interested in buying or selling one million dollars. The second dealer would then give a two-way quote (a bid/offer quote). When the first dealer is happy with the 'ask' price given by the second dealer, he/she would convey "ONE MINE", which means "I am buying one million dollars from you". If the first dealer had actually wanted to sell one million dollars and had asked a quote and he is happy with the 'bid' price given by the second dealer, he/she would convey "ONE YOURS", which means "I am selling one million dollars to you".

5.4   Cross Rates

It is the exchange rate which is expressed by a pair of currency in which none of the currencies is the official currency of the country in which it is quoted. For example, if the currency exchange rate between a Canadian dollar and a British pound is quoted in Indian newspapers, then this would be called a cross rate since none of the currencies of this pair is of Indian rupee.

The following table is an extract from the Bloomberg website showing the Foreign Exchange Cross rates prevailing on 14/09/2012.

	USD	CNY	JPY	HKD	INR	KRW	SGD	EUR
USD		0.1583	0.0128	0.129	0.0184	0.0009	0.8197	1.3089
CNY	6.3162		0.0809	0.8147	0.1161	0.0057	5.177	8.2667
JPY	78.08	12.362		10.072	1.435	0.0701	64	102.17
HKD	7.7526	1.2274	0.0993		0.143	0.0069	6.3546	10.148
INR	54.405	8.613	0.6955	7.005		0.0488	44.505	71.067
KRW	1,114.65	176.5476	14.2965	143.9908	20.4965		914.8582	1,459.05
SGD	1.2202	0.1932	0.0156	0.1574	0.0224	0.0011		1.5961
EUR	0.7642	0.121	0.0098	0.0986	0.014	0.0007	0.6263	

Source :http://www.bloomberg.com/markets/currencies/cross-rates/

Students will notice that the rates given in the rows are direct quotes for each of the currencies listed in the first column and the rates given in the columns are the indirect quotes for the currencies listed in the first row. Students can also verify that in every case above.

5.5 Pips

This is another technical term used in the market. PIP is the Price Interest Point. It is the smallest unit by which a currency quotation can change. e.g., USD/INR quoted to a customer is INR 61.75. The minimum value this rate can change is either INR 61.74 or INR 61.76. In other words, for USD/INR quote, the pip value is 0.01. Pip in foreign currency quotation is similar to the tick size in share quotations. However, in Indian interbank market, USD-INR rate is quoted upto 4 decimal points. Hence, minimum value change will be to the tune of 0.0001. Spot EUR/USD is quoted at a bid price of 1.0213 and an ask price of 1.0219. The difference is USD 0.0006 i.e. equal to 6 "pips".

5.6 Forward exchange rate quotation

Forward outright contracts are contracts where two parties agree to deliver a certain amount of currency at a fix rate at some time in future. Ideally, the way in which exchange rate for a forward date [forward exchange rate] is quoted should be the same as that for spot date e.g., if the spot rate is 61.53/54, then the [say six months] forward rate quoting should look like say 61.93/98. However, the market convention is different. Forward rate is not quoted like this but always quoted with spot rate and the forward margin separately. In other words, forward quote is not a foreign exchange rate quotation but is quoted as a difference between spot & forward rates.

The reader or user has to calculate the forward rate applicable by loading the forward margin into the spot rate. Thus e.g., in the above case, the foreign exchange dealer will quote the six month forward rate as 40/44. He will even presume that the ongoing spot rate is known to the counterparty

and may not even mention it. Even if he were to mention, he will only mention 53/54, because the 'big figure' [in this case, "61"] is supposed to be known to the counterparty without ambiguity. Since the rate fluctuation is very high, the dealer has no time to quote rates in very detailed English sentences and these conventions have come into practice! The numbers 40 & 44 are arrived at as the differential between 61.93 – 61.53 and 61.98 – 62.54 respectively. These numbers 40 & 44 are called forward margins representing the factor by which the forward rate is different from the spot rate i.e. the margin to be 'loaded' onto the spot rate. Though looks silly, it is worth reiterating that this margin is not the profit margin of the trader!

If the price on a future date is higher, then the currency is said to be at forward premium and then the number represents the forward premium for that forward period. If the price on a future date is lower, then the currency is said to be at forward discount and then the number represents the forward discount for that forward period. In the above example, US dollar is at a premium and the forward premium of USD for six months is 40/44 paise for buying and selling rate respectively in the interbank market. Generally, the margin is quoted in annualized percentage terms. e.g., in this case, extrapolating the premium of six months to twelve months, it can be said that US dollar is likely to have a premium of 80 paise per year [40 paise per six months X 2] which means on a base rate of 61.53, the annualized premium [=0.4*2*100/61.53] is 1.30% p.a. In market parlance, forward premium is quoted in percentage terms and this is the basis of calculation. Actually, the forward market in foreign exchange is an interest rate market and is not a foreign exchange market. Because it compares interest rate of one currency with that of another over a period of time. In fact, some banks include FX forward traders under their interest rate segment rather than FX segment.

5.7 Forward point determination

The number of 'basis points' from the spot rate to arrive at the forward rate in the above discussions is also referred to as forward points. The points are added to the spot rate when the [foreign] currency is at a premium and deducted from the spot rate when the [foreign] currency is at a discount, to arrive at the forward rate. This is when the rates are quoted in direct method. In case of indirect rate quotations, the process will be exactly the opposite. The forward point may be positive or negative and marked accordingly or specifically mentioned so. The forward points represent the interest rate differential between the two currencies e.g., if the spot exchange rate is GBP 1 = 1.6000 - 1.6010 USD and if the outright forward points are 5-8, then the outright forward exchange rate quote is GBP 1 = $ 1.6005 - 1.6018. The number of forward points between the spot and forward is influenced by the present and forward interest rates, the 'length' of the forward and other market factors. Forward point is not a rate but a difference in the rate between two currencies, the currency which carries lower interest rate is always at a premium versus the other currency. This is the same as stating that

if a currency has a relatively higher 'yield', then it will cost less in the forward market and a currency having lower yield will cost more in the forward market. If there is an aberration to this, arbitrage opportunity arises, which itself will push the prices to equilibrium. If the forward points are mentioned simply as 5/8, then a doubt arises as to whether it is at premium, and hence has to be added or at discount and hence to be deducted. The spot market always has the lowest bid- ask spread and the spread will steadily widen as the duration lengthens.

This is because the uncertainty and the liquidity concerns increase as we go forward in time. If we add 5/8 to the left and right side, the spread will widen and hence fits into the argument.

Hence, a quote such as 5/8 or 43/45 with increasing numbers from left to right means the foreign currency is at premium. This looks like a workaround to calculate but the reader can visualize the logic.

Forward points are equivalent to pips in the spot market which we discussed earlier. They are quoted to an accuracy of 1/100th of one point e.g., if EUR/USD rates for spot and forward are 1.1323 & 1.1328, then the forward point is 5 because one pip or point is worth 0.0001 in EUR/USD.

5.8   Broken period forward rate

Interbank exchange rates are wholesale rates which are applicable to transaction among banks and in the interbank market. They are for large standard amounts with standardized due dates i.e., end of January, end of February and so on. However, in customer transactions, the amounts are not only smaller & for odd amounts, but the due date could be also a non-standardized one. There could be an export bill for euro 12,345.67 getting realized on 10th January or 23rd February and so on. Thus, the forward rate that is available in the interbank market [in the form of forward points for February, for March and so on] cannot be applied as such for customer transactions. The broken period concept becomes relevant in such situations.

On 1st January, if the spot rate for US Dollar is ₹ 62 and if the forward margin for two months i.e., at the end of February is 10 paise [premium], then the forward rate can be calculated as ₹ 62.10 per USD and any customer transaction exchange rate can be calculated using this as the base rate. Thus, if the bank wishes to keep a margin of say 3 paise, it will quote a rate of ₹ 62.13 for an importer and quote a rate of ₹ 62.07 for an exporter. However, this logic is valid only for a bill to be realized [for an exporter] or a bill to be paid [for an importer] on 28th February because the underlying forward rate was for two months on 1st January i.e., the date of 28th February. However, in customer transactions, the event [of converting FC into INR or vice versa] does not always happen on the exact standard dates. Thus, if the bill is getting paid or is to be retired on 23rd February, then the forward points are to be calculated for such odd number of days starting from 1st January. It will be

presumed [though there is no logical answer, in practice, it turns out to be adequately accurate], that the forward points 'grow' uniformly throughout and arithmetically proportionate manner for the applicable date is arrived at e.g. in the above instance, on 1st January, the premium for a customer transaction expected to happen on 23rd February is calculated as =10*53/59 = 8.98 paise [53 & 59 are broken & full periods] and hence the exchange rate will be 62.0898. As market convention, this will be rounded off to 62.09. The merchant forward rate for a customer transaction expected to happen on 23rd February will be this margin loaded onto spot rate. Thus, if the margin is 3 paise, the rate for an exporter will be 62.06 & for an importer, the rate will be 62.12. This logic will be applied even while calculating exchange rate for a third currency though the calculation will be a bit lengthier.

5.9 Merchant Rates

It is always interesting to know who 'fixes' the exchange rates as quoted to customers and to realize that nobody fixes but the market decides the exchange rate based on demand and supply and other relevant factors. RBI often clarifies that it does not fix the exchange rates, though in the same breath, RBI also clarifies that it monitors the 'volatility' of Indian rupee exchange rate. In other words, RBI does not control the exchange rates, but it controls the volatile movement of INR exchange rate by intervention i.e. by deliberately altering the demand and supply of the foreign currency say USD. It does it by either buying USD from the interbank market or pumping in USD into the market. This wholesale interbank market rate is the basis for banks' exchange rates quoted to customers.

In foreign exchange market, banks consider customers as 'merchants' for historical reasons. It may look ridiculous to call an NRI who has remitted dollars to India as a merchant but exchange rates applied to all types of customers including that for converting inward remittance in USD to INR are called merchant rates as against the rates quoted to each other by banks in the interbank market, which are called interbank rates. This term is important because there are guidelines issued by FEDAI [Foreign Exchange Dealers Association of India] to banks on these merchant rates as there is customer service element involved in these.

Till 1998, FEDAI prescribed what 'margins' are to be loaded by banks onto the ongoing interbank exchange rate for quoting to customers i.e., to arrive at the merchant rates. This was because, most customer affecting costs like interest rates were then controlled by regulators.

As a part of liberalization, banks got the freedom to quote their own rates. Since then, banks decide themselves what should be the margin depending on the bank's 'position'. The only rule that is still existing in the FEDAI rule book is rule 5A.8 which states that "Settlement of all merchant transactions shall be effected on the principle of rounding off the Rupee amounts to the nearest whole Rupee i.e., without paise". This means if an exporter or an individual has received USD 1234 and if the

applicable exchange rate is 61.32, then the amount to be credited to customer's account is ₹ 75669 and not ₹ 75668.88, less charges if any. This rule will be similarly applicable for import or outward remittance transactions also. This rule is more a matter of common sense and does not have any meaningful impact on customer transactions. In fact, in some of the banking software, amount is always rounded off.

After the discontinuation of gold standard in 1971 by USA, the foreign exchange market was in turmoil. Initially, RBI had kept sterling as the intervention currency pegging the rupee exchange rate for historical reasons and due to political legacy. Effective 1975, rupee was delinked from sterling and was linked to a basket of currencies. It should be noted that the concept of RBI/FEDAI advising the fixed exchange rate was discontinued long ago. The sterling schedule was abolished from the beginning of 1984. FEDAI issued detailed guidelines to banks on how to calculate exchange rates under the new freedom, the minimum & maximum profit margin and the maximum spread between the buying and selling rates. All these are now redundant now. There were arguments for and against giving freedom to banks for loading margins by banks themselves on the ongoing interbank rate. However, the liberalization wave overruled the skeptics.

The International Division of any bank calculates the merchant rates for a variety of transactions like import bill, export bill, inward & outward remittance etc. and advises the same in the morning with standard spread loaded to all branches. It is called card rate. For a walk-in customer, for transactions of small value [what is small varies with the bank], this is applied.

However, for regular customers and for transactions of high value, always a better rate is sought from the dealing room. Card rates advised in the margin are generally not changed unless there is too much volatility.

6. EXCHANGE RATE FORECASTING

The foreign exchange market has changed dramatically over the past few years. The amounts traded each day in the foreign exchange market are now huge. In this increasingly challenging and competitive market, investors and traders need tools to select and analyze the right data from the vast amounts of data available to them to help them make good decisions. 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.

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. Speculators may find the models useful for predicting day-to-day movements. However, since the models typically focus on the near future and rarely provide point or range estimates, they are of limited use to MNCs.

(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.

In general, fundamental forecasting is limited by:

❖   the uncertain timing of the impact of the factors,

❖   the need to forecast factors that have an immediate impact on exchange rates,

❖   the omission of factors that are not easily quantifiable and

❖   changes in the sensitivity of currency movements to each factor over time.

(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.

7.   EXCHANGE RATE DETERMINATION

The major factors that affect the foreign exchange of any country are inflation rate and interest rate. The impact of these factors has been discussed in forthcoming paragraphs under the headings Purchasing Power Parity (PPP) and Interest Rate Parity (IRP) respectively. The other factors that affect foreign exchange rate are as follows:

(a)   Deficit/Surplus on Capital/Current Account: - A country's Deficit/Surplus on both Capital and Current Account plays a big role in determination of its exchange rate. While deficit in Current Account leads to depreciation of currency, the surplus results in appreciation of home currency.

In case of Capital Account if net inflow is positive then home currency is appreciated and if it is negative then home currency depreciates because of oversupply.

(b)   Trade Barriers: - Generally with the increase in trade barriers or quota restrictions for import of goods from any country the value of own currency appreciates in the long run. For example, if

India puts some restriction on import from China for any goods, then demand for Indian goods will be increased and will be sold for higher price.

(c)   Intervention by Central Bank: - Sometimes to regulate the prices of foreign exchange the Central Bank of or Monetary Authorities of country intervenes by selling or buying foreign exchange in/from the Market.

(d)   Government Controls: - Government Controls such as restrictions on FDI, FPI or repatriation of Foreign Exchange also affects the foreign exchange rates.

(e)   Expectations (Band Wagon Effect): - Sometimes speculations by the speculators on any currency can have a substantial impact on exchange rate. When a dominant speculator in Foreign Exchange market expects a fall in value of any currency and he starts taking short position in the same currency, other speculators may also follow the same path. This will ultimately result in fall in the value of same currency.

8.   EXCHANGE RATE THEORIES

There are three theories of exchange rate determination- Interest rate parity, Purchasing power parity and International Fisher effect.

8.1   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 not higher than what would be generated by a domestic investment.

The Covered Interest Rate Parity equation is given by:

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

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 that the investment of one rupee yield same return in the domestic as well as in the foreign market.

The Uncovered Interest Rate Parity equation is given by:

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

Where,

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

Thus, it can be said that Covered Interest Arbitrage has an advantage as there is an incentive to invest in the higher-interest currency to the point where the discount of that currency in the forward market is less than the interest differentials. If the discount on the forward market of the currency with the higher interest rate becomes larger than the interest differential, then it pays to invest in the lower-interest currency and take advantage of the excessive forward premium on this currency.

8.2   Purchasing Power Parity (PPP)

Why is a dollar worth ₹ 48.80, JPY 122.18, etc. at some point of time? One possible answer is that these exchange rates reflect the relative purchasing powers of the currencies, i.e., the basket of goods that can be purchased with a dollar in the US will cost ₹ 48.80 in India and ¥ 122.18 in Japan.

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

The ABSOLUTE FORM, also called the 'Law of One Price' suggests that "prices of similar products of two different countries should be equal when measured in a common currency". If a discrepancy in prices as measured by a common currency exists, the demand should shift so that these prices should converge.

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

In Equilibrium Form:

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

Where,

S(₹/$) = 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.

α = Sectoral price and sectoral shares constant.

For example, A cricket bat sells for ₹ 1000 in India. The transportation cost of one bat from Ludhiana to New York costs ₹ 100 and the import duty levied by the US on cricket bats is ₹ 200 per bat. Then the sectoral constant for adjustment would be 1000/1300 = 0.7692.

It becomes extremely messy if one were to deal with millions of products and millions of constants. One way to overcome this is to use a weighted basket of goods in the two countries represented by an index such as Consumer Price Index. However, even this could break down because the basket of goods consumed in a country like Finland would vary with the consumption pattern in a country such as Malaysia making the aggregation an extremely complicated exercise.

The RELATIVE FORM of the Purchasing Power Parity tries to overcome the problems of market imperfections and consumption patterns between different countries. A simple explanation of the Relative Purchase Power Parity is given below:

Assume the current exchange rate between INR and USD is ₹ 50 / $1. The inflation rates are 12% in India and 4% in the US. Therefore, a basket of goods in India, let us say costing now ₹ 50 will cost one year hence ₹ 50 x 1.12 = ₹ 56.00.A similar basket of goods in the US will cost USD 1.04 one year from now. If PPP holds, the exchange rate between USD and INR, one year hence, would be ₹ 56.00 = $1.04. This means, the exchange rate would be ₹ 53.8462 / $1, one year from now. This can also be worked backwards to say what should have been the exchange rate one year before, taking into account the inflation rates during last year and the current spot rate.

Expected spot rate = Current Spot Rate x expected difference in inflation rates

$$E(S_1) = S_0 \times \frac{(1 + I_d)}{(1 + I_f)}$$

Where,

E(S_1) is the expected Spot rate in time period 1

S_0 is the current spot rate (Direct Quote)

I_d is the inflation in the domestic country (home country)

I_f is the inflation in the foreign country

According to Relative PPP, any differential exchange rate to the one propounded by the theory is the 'real appreciation' or 'real depreciation' of one currency over the other. For example, if the exchange rate between INR and USD one year ago was ₹ 45.00. If the rates of inflation in India and USA during the last one year were 10% and 2% respectively, the spot exchange rate between the two currencies today should be

$$S_0 = 45.00 \times (1+10\%)/(1+2\%) = ₹\ 48.53$$

However, if the actual exchange rate today is ₹ 50,00, then the real appreciation of the USD against INR is ₹ 1.47, which is 1.47/45.00 = 3.27% and this appreciation of the USD against INR is explained by factors other than inflation.

PPP is more closely approximated in the long run than in the short run, and when disturbances are purely monetary in character.

8.3   International Fisher Effect (IFE)

International Fisher Effect theory uses interest rate rather than inflation rate differentials to explain why exchange rates change over time but it is closely related to the Purchasing Power Parity (PPP) theory because interest rates are often highly correlated with inflation rates.

According to the International Fisher Effect, 'nominal risk-free interest rates contain a real rate of return and anticipated inflation'. This means that 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 theory suggests that foreign currencies with relatively high interest rates will depreciate because the high nominal interest rates reflect expected inflation. The nominal interest rate would also incorporate the default risk of an investment.

The IFE equation can be given by:

$$r_D - P_D = r_F - \Delta P_F$$

        or

$$P_D - P_F = \Delta S = r_D - r_F$$

The above equation states that if there are no barriers to capital flows the investment will flow in such a manner that the real rate of return on investment will equalize. In fact, the equation represents the interaction between real sector, monetary sector and foreign exchange market.

If the IFE holds, then a strategy of borrowing in one country and investing the funds in another country should not provide a positive return on average. The reason is that exchange rates should adjust to offset interest rate differentials on the average. As we know that purchasing power has not held over certain periods and since the International Fisher Effect is based on Purchasing Power Parity (PPP). It does not consistently hold either because there are factors other than inflation that affect exchange rates, the exchange rates do not adjust in accordance with the inflation differential.

8.4 Comparison of PPP, IRP and IFE Theories

All the above theories relate to the determination of exchange rates. Yet, they differ in their implications.

The theory of IRP focuses on why the forward rate differs from the spot rate and on the degree of difference that should exist. This relates to a specific point of time.

Conversely, PPP theory and IFE theory focuses on how a currency's spot rate will change over time. While PPP theory suggests that the spot rate will change in accordance with inflation differentials, IFE theory suggests that it will change in accordance with interest rate differentials. PPP is nevertheless related to IFE because inflation differentials influence the nominal interest rate differentials between two countries.

Theory	Key Variables	Basis	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. As a result, covered interest arbitrage will provide a return that is no higher than a domestic return.
Purchasing Power Parity (PPP)	Percentage change in spot exchange rate.	Inflation rate differential.	The spot rate of one currency w.r.t. another will change in reaction to the differential in inflation rates between two countries. Consequently, the purchasing power for consumers when purchasing goods in their

			own country will be similar to their purchasing power when importing goods from foreign country.
International Fisher Effect (IFE)	Percentage change in spot exchange rate	Interest rate differential	The spot rate of one currency w.r.t. another will change in accordance with the differential in interest rates between the two countries. Consequently, the return on uncovered foreign money market securities will on average be no higher than the return on domestic money market securities from the perspective of investors in the home country.

9.   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. For example, a Japanese exporter sells automobiles to a US dealer for dollars, and a US manufacturer sells machine tools to Japanese company for yen. Ultimately, however, the US company will be interested in receiving dollars, whereas the Japanese exporter will want yen because it would be inconvenient for the individual buyers and sellers of foreign exchange to seek out one another, a foreign exchange market has developed to act as an intermediary.

Transfer of purchasing power is necessary because international trade and capital transactions usually involve parties living in countries with different national currencies. Each party wants to trade and deal in his own currency but since the trade can be invoiced only in a single currency, the parties mutually agree on a currency beforehand. The currency agreed could also be any convenient third country currency such as the US dollar. For, if an Indian exporter sells machinery to a UK importer, the exporter could invoice in pound, rupees or any other convenient currency like the US dollar.

But why do individuals, firms and banks want to exchange one national currency for another? The demand for foreign currencies arises when tourists visit another country and need to exchange their national currency for the currency of the country they are visiting or when a domestic firm wants to

import from other nations or when an individual wants to invest abroad and so on. On the other hand, a nation's supply of foreign currencies arises from foreign tourist expenditures in the nation, from export earnings, from receiving foreign investments, and so on. For example, suppose a US firm exporting to the UK is paid in pounds sterling (the UK currency). The US exporter will exchange the pounds for dollars at a commercial bank. The commercial bank will then sell these pounds for dollars to a US resident who is going to visit the UK or to a United States firm that wants to import from the UK and pay in pounds, or to a US investor who wants to invest in the UK and needs the pounds to make the investment.

Thus, a nation's commercial banks operate as clearing houses for the foreign exchange demanded and supplied in the course of foreign transactions by the nation's residents. Hence, four levels of transactor or participants can be identified in foreign exchange markets. At the first level, are tourists, importers, exporters, investors, etc. These are the immediate users and suppliers of foreign currencies. At the next or second level are the commercial banks which act as clearing houses between users and earners of foreign exchange. At the third level are foreign exchange brokers through whom the nation's commercial banks even out their foreign exchange inflows and outflows among themselves. Finally, at the fourth and highest level is the nation's central bank which acts as the lender or buyer of last resort when the nation's total foreign exchange earnings and expenditures are unequal. The central bank then either draws down its foreign exchange reserves or adds to them.

Market Participants

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

(i)   **Non-bank Entities**: Many multinational companies exchange currencies to meet their import or export commitments or hedge their transactions against fluctuations in exchange rate. Even at the individual level, there is an exchange of currency as per the needs of the individual.

(ii)   **Banks**: Banks also exchange currencies as per the requirements of their clients.

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

(iv)   **Arbitrageurs**: This category includes those investors who make profit from price differential existing in two markets by simultaneously operating in two different markets.

(v)   **Governments**: The governments participate in the foreign exchange market through the central banks. They constantly monitor the market and help in stabilizing the exchange rates.

10. FOREIGN EXCHANGE EXPOSURE

"An Exposure can be defined as a Contracted, Projected or Contingent Cash Flow whose magnitude is not certain at the moment. The magnitude depends on the value of variables such as Foreign Exchange rates and Interest rates."

Accordingly Foreign Exchange exposure refers to those parts of a company's business that would be affected if exchange rate changes. Foreign exchange exposures arise from many different activities.

For example, travellers going to visit another country have the risk that if that country's currency appreciates against their own their trip will be more expensive.

An exporter who sells his product in foreign currency has the risk that if the value of that foreign currency falls then the revenues in the exporter's home currency will be lower.

An importer who buys goods priced in foreign currency has the risk that the foreign currency will appreciate thereby making the local currency cost greater than expected.

Fund Managers and companies who own foreign assets are exposed to fall in the currencies where they own the assets. This is because if they were to sell those assets their exchange rate would have a negative effect on the home currency value.

Other foreign exchange exposures are less obvious and relate to the exporting and importing in ones local currency but where exchange rate movements are affecting the negotiated price.

The foreign exchange exposure may be classified under three broad categories:

Moment in time when exchange rate changes

Translation exposure

Accounting-based changes in consolidated financial statements caused by a change in exchange rates

Operating exposure

Change in expected cash flows arising because of an unexpected change in exchange rates

Transaction exposure

Impact of setting outstanding obligations entered into before change in exchange rates but to be settled after the change in exchange rates

Time ⟶

10.1 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 changes. Thus, it deals with cash flows that result from existing contractual obligations.

Example: If an Indian exporter has a receivable of $100,000 due in six months hence and if the dollar depreciates relative, to the rupee a cash loss occurs. Conversely, if the dollar appreciates relative to the rupee, a cash gain occurs.

The above example illustrates that whenever a firm has foreign currency denominated receivables or payables, it is subject to transaction exposure and their settlements will affect the firm's cash flow position.

It measures the changes in the value of outstanding financial obligation incurred prior to a change in exchange rates but not due to be settled until after the exchange rates change.

Thus, it deals with the changes in the cashflow which arise from existing contractual obligation.

In fact, the transaction exposures are the most common ones amongst all the exposures. Let's take an example of a company which exports to US and the export receivables are also denominated in USD. While doing budgeting the company had assumed rate of ₹ 62 per USD. By the time the exchange inward remittance arrives USD/INR could move down to ₹ 57 leading to wiping off of commercial profit for exporter. Such transaction exposures arise whenever a business has foreign currency denominated receipts or payments. The risk is an adverse movement of the exchange rate from the time the transaction is budgeted till the time the exposure is extinguished by sale or purchase of the foreign currency against the domestic currency.

10.2 Translation Exposure

It refers to gains or losses caused by the translation of foreign currency assets and liabilities into the currency of the parent company for consolidation purposes.

Translation exposure, also called as accounting exposure, is the potential for accounting derived changes in owner's equity to occur because of the need to "translate" foreign currency financial statements of foreign subsidiaries into a single reporting currency to prepare worldwide consolidated financial statements.

Translation exposures arise due to the need to "translate" foreign currency assets and liabilities into the home currency for the purpose of finalizing the accounts for any given period. A typical example of translation exposure is the treatment of foreign currency loans.

Consider that a company has taken a medium term loan to finance the import of capital goods worth dollars 1 million. When the import materialized, the exchange rate was, say, USD/INRR-55. The imported fixed asset was, therefore, capitalized in the books of the company at ₹ 550 lacs through the following accounting entry:

Debit fixed assets   ₹ 550 lacs

Credit dollar loan   ₹ 550 lacs

In the ordinary course assuming no change in the exchange rate, the company would have provided depreciation on the asset valued at ₹ 550 lacs, for finalizing its account for the year in which the asset was purchased.

However, what happens if at the time of finalization of the accounts the exchange rate has moved to say USD/INR-58. Now the dollar loan will have to be "translated" at ₹ 58, involving a "translation loss" of a ₹ 30 lacs. It shall have to be capitalized by increasing the book value of the asset, thus making the figure ₹ 580 lacs and consequently higher depreciation will have to be provided, thus reducing the net profit.

It will be readily seen that both transaction and translation exposures affect the bottom line of a company. The effect could be positive as well if the movement is favourable – i.e., in the cited examples, in case the USD would have appreciated and the USD would have depreciated against the rupee.

An important observation is that the translation exposure, of course, becomes a transaction exposure at some stage: the dollar loan has to be repaid by undertaking the transaction of purchasing dollars.

10.3 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. The essence of economic exposure is that exchange rate changes significantly alter the cost of a firm's inputs and the prices of its outputs and thereby influence its competitive position substantially.

Effects of Local Currency Fluctuations on Company's Economic Exposure (Cash inflow)

Variables influencing the inflow of cash in Local currency	Revaluation impact	Devaluation impact
Local sale, relative to foreign competition in local currency	Decrease	Increase
Company's export in local currency	Decrease	Increase
Company's export in foreign currency	Decrease	Increase
Interest payments from foreign investments	Decrease	Increase

Effects of Local Currency Fluctuations on Company's Economic Exposure (Cash outflow)

Variables influencing the outflow of cash in local currency	Revaluation impact	Devaluation impact
Company's import of material the same denoted in local currency	Remain the same	Remain the same
Company's import of material denoted in foreign currency	Decrease	Increase
Interest on foreign debt	Decrease	Increase

Foreign exchange risk management is a critical component of any business that deals with international transactions. It involves the identification, assessment, and mitigation of risks associated with fluctuations in foreign currency exchange rates. The importance of foreign exchange risk management cannot be overstated, and here are some reasons why:

(i)   *Protection against volatility:* Exchange rates are highly volatile and can change rapidly, which can result in significant losses for a business. Foreign exchange risk management helps to protect against this volatility by allowing businesses to lock in exchange rates in advance, providing greater stability and certainty in financial planning.

(ii)   *Cost reduction:* Effective foreign exchange risk management can help businesses reduce costs associated with foreign transactions. By minimizing currency exchange rate losses and reducing the need for hedging, businesses can save significant amounts of money in the long run.

(iii) *Competitive advantage:* Companies that effectively manage their foreign exchange risks can gain a competitive advantage over their competitors. They can offer more competitive prices and more attractive payment terms, which can help to attract and retain customers.

(iv)   *Improved cash flow:* Foreign exchange risk management can also help businesses to improve their cash flow by providing greater visibility and predictability in their international transactions. This can help businesses to better manage their cash flow and ensure that they have sufficient funds to meet their obligations.

(v)   *Compliance with regulations:* Many countries have regulations in place that require businesses to manage their foreign exchange risks. Failure to comply with these regulations can result in significant fines and penalties. Effective foreign exchange risk management can help businesses to stay in compliance with these regulations and avoid potential legal issues.

In summary, foreign exchange risk management is critical for businesses that engage in international transactions. It helps to protect against volatility, reduce costs, gain a competitive advantage, improve cash flow, and ensure compliance with regulations. By managing foreign exchange risks effectively, businesses can achieve greater financial stability and success in the global marketplace.

11. HEDGING CURRENCY RISK

Though there are a range of hedging instruments that can be used to reduce risk but often Exporters use Natural Hedging Strategy to mitigate transaction exposure risk by availing different Short Term Foreign currency loans i.e. Pre-Shipment Credit in Foreign Currency (PCFC)/ Foreign Currency Non-Resident Account (FCNR B) Loans because of following two major benefits:

1.   PCFC is available to exporters for exporting their goods in Foreign Currencies. This product is available at cheaper rate compared to other Domestic Currency rates.

2.   Secondly by availing PCFC, one can hedge foreign currency transaction risk against exports receivables by settling exports collection against PCFC loans outstanding.

Broadly other techniques can be divided into:

(A)   Internal Techniques: These techniques explicitly do not involve transaction costs and can be used to completely or partially offset the exposure. These techniques can be further classified as follows:

(i)   Invoicing in Domestic Currency: Companies engaged in exporting and importing, whether of goods or services, are concerned with decisions relating to the currency in which goods and services are invoiced. Trading in a foreign currency gives rise to transaction exposure. Although trading purely in a company's home currency has the advantage of simplicity, it fails to take account of the fact that the currency in which goods are invoiced has become an essential aspect of the overall marketing package given to the customer. Sellers will usually wish to sell in their own currency or the currency in which they incur cost. This avoids foreign exchange exposure but buyers' preferences may be for other currencies. Many markets, such as oil or aluminum, in effect require that sales be made in the same currency as that quoted by major competitors, which may not be the seller's own currency. In a buyer's market, sellers tend increasingly to invoice in the buyer's ideal currency. The closer the seller can approximate the buyer's aims, the greater chance he or she has to make the sale.

Should the seller elect to invoice in foreign currency, perhaps because the prospective customer prefers it that way or because sellers tend to follow market leader, then the seller should choose

only a major currency in which there is an active forward market for maturities at least as long as the payment period. Currencies, which are of limited convertibility, chronically weak, or with only a limited forward market, should not be considered.

The seller's ideal currency is either his own, or one which is stable relative to it but often the seller is forced to choose the market leader's currency. Whatever the chosen currency, it should certainly be one with a deep forward market. 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.

(ii)   Leading and Lagging: Leading and Lagging refer to adjustments at the time of payments in foreign currencies. Leading is the payment before due date while lagging is delaying payment post the due date. These techniques are aimed at taking advantage of expected devaluation and/or revaluation of relevant currencies. Lead and lag payments are of special importance in the event that forward contracts remain inconclusive. For example, Subsidiary b in B country owes money to subsidiary a in country A with payment due in three months' time and with the debt denominated in US dollar. On the other side, country B's currency is expected to devalue within three months against US dollar, vis-à-vis country A's currency. Under these circumstances, if company b leads -pays early - it will have to part with less of country B's currency to buy US dollars to make payment to company A. Therefore, lead is attractive for the company. When we take reverse the example-revaluation expectation- it could be attractive for lagging.

(iii)   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. The simplest scheme is known as bilateral netting and involves pairs of companies. Each pair of associates nets out their own individual positions with each other and cash flows are reduced by the lower of each company's purchases from or sales to its netting partner. Bilateral netting involves no attempt to bring in the net positions of other group companies.

Netting basically reduces the number of inter-company payments and receipts which pass over the foreign exchanges. Fairly straightforward to operate, the main practical problem in bilateral netting is usually the decision about which currency to use for settlement.

Netting reduces banking costs and increases central control of inter-company settlements. The reduced number and amount of payments yield savings in terms of buy/sell spreads in the spot and forward markets and reduced bank charges.

(iv) Matching: Although netting and matching are terms which are frequently used interchangeably, there are distinctions. Netting is a term applied to potential flows within a group of companies whereas matching can be applied to both intra-group and to third-party balancing.

Matching is a mechanism whereby a company matches its foreign currency inflows with its foreign currency outflows in respect of amount and 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.

The prerequisite for a matching operation is a two-way cash flow in the same foreign currency within a group of companies; this gives rise to a potential for natural matching. This should be distinguished from parallel matching, in which the matching is achieved with receipt and payment in different currencies but these currencies are expected to move closely together, near enough in parallel.

Both Netting and Matching presuppose that there are enabling Exchange Control regulations. For example, an MNC subsidiary in India cannot net its receivable(s) and payable(s) from/to its associated entities. Receivables have to be received separately and payables have to be paid separately.

(v) Price Variation: Price variation involves increasing selling prices to counter the adverse effects of exchange rate change. This tactic raises the question as to why the company has not already raised prices if it is able to do so. In some countries, price increases are the only legally available tactic of exposure management.

Let us now concentrate on price variation in inter-company trade. Transfer pricing is the term used to refer to the pricing of goods and services, which changes hands within a group of companies. As an exposure management technique, transfer price variation refers to the arbitrary pricing of inter - company sales of goods and services at a higher or lower price than the fair price, arm's length price. This fair price will be the market price if there is an existing market or, if there is not, the price which would be charged to a third-party customer. Taxation authorities, customs and excise departments and exchange control regulations in most countries require that the arm's length pricing should be used.

(vi) Asset and Liability Management: This technique can be used to manage balance sheet, income statement or cash flow exposures. Concentration on cash flow exposure makes economic sense but emphasis on pure translation exposure is misplaced. Hence, our focus here is on asset liability management as a cash flow exposure management technique.

In essence, 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. In 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.

(B) *External Techniques:* Under this category range of various financial products are used which can be categorized as follows:

(i) **Money Market Hedging:** At its simplest, a money market hedge is an agreement to exchange a certain amount of one currency for a fixed amount of another currency, at a particular date. For example, suppose a business owner in India expects to receive 1 Million USD in six months. This Owner could create an agreement now (today) to exchange 1 Million USD for INR at roughly the current exchange rate. Thus, if the USD dropped in value by the time the business owner got the payment, he would still be able to exchange the payment for the original quantity of U.S. dollars specified.

Advantages and Disadvantages of Money Market Hedge: Following are the advantages and disadvantages of this technique of hedging.

Advantages

(a)   Fixes the future rate, thus eliminating downside risk exposure.

(b)   Flexibility with regard to the amount to be covered.

(c)   Money market hedges may be feasible as a way of hedging for currencies where forward contracts are not available.

Disadvantages include:

(a)   More complicated to organize than a forward contract.

(b)   Fixes the future rate - no opportunity to benefit from favourable movements in exchange rates.

(ii) **Derivative Instruments:** 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. Today, derivatives transactions cover a broad range of underlying - interest rates, exchange rates, commodities, equities and other indices.

In addition to privately negotiated, global transactions, derivatives also include standardized futures and options on futures that are actively traded on organized exchanges and securities such as call warrants.

The term derivative is also used to refer to a wide variety of other instruments. These have payoff characteristics, which reflect the fact that they include derivatives products as part of their make-up.

Transaction risk can also be hedged using a range of financial derivatives products which include: Forwards, futures, options, swaps, etc. These instruments are discussed in detailed manner in following pages.

12. 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. There are markets for a multitude of underlying. Among these are the traditional agricultural or physical commodities, currencies (foreign exchange forwards) and interest rates (forward rate agreements - FRAs). The volume of trade in forward contracts is massive.

Companies importing goods are also exposed to foreign currency risk. To mitigate this, they can use forward contracts for all their liabilities. When foreign Currency is depreciating, one can book a long-term forward contract which will be used in future when foreign currency is appreciating.

12.1 Forward Rate – Premium and Discount

The change in value in a forward contract is broadly equal to the change in value in the underlying. Forwards differ from options in that options carry a different payoff profile. Forward contracts are unique to every trade. They are customized to meet the specific requirements of each end-user. The characteristics of each transaction include the particular business, financial or risk-management targets of the counterparties. Forwards are not standardized. The terms in relation to contract size, delivery grade, location, delivery date and credit period are always negotiated.

In a forward contract, the buyer of the contract draws its value at maturity from its delivery terms or a cash settlement. On maturity, if the price of the underlying is higher than the contract price the buyer makes a profit. If the price is lower, the buyer suffers a loss. The gain to the buyer is loss to the seller.

❖ *Forwards Rates:* The forward rate is different from the spot rate. Depending upon whether the forward rate is greater than the spot rate, given the currency in consideration, the forward may either be at a 'discount' or at a 'premium'. Forward premiums and discounts are usually expressed as an annual percentage of the difference between the spot and the forward rates.

❖ *Premium:* When a currency is costlier in forward or say, for a future value date, it is said to be at a premium. In the case of direct method of quotation, the premium is added to both the selling and buying rates.

❖   *Discount:* If the currency is cheaper in forward or for a future value date, it is said to be at a discount. In case of direct quotation, the discount is deducted from both the selling and buying rate. The following example explains how to calculate Premium / Discount both under Indirect/Direct quotes.

To calculate the Premium or Discount of a currency vis-à-vis another, we need to find out how much each unit of the first currency can buy units of the second currency. For instance, if the Spot rate between INR and USD is ₹ 55 to a dollar and the six months forward rate is ₹ 60 to a dollar, it is clear the USD is strengthening against the Rupee and hence is at a premium which also means that Rupee is at discount.

The premium of USD against INR is ₹ 5 for six months in absolute terms. However, forward premium is always expressed as an annual percentage. Therefore, this premium is calculated as

[(Forward Rate – Spot rate) / (Spot rate)] x (12/6)

= (60 – 55)/(55) x 12/6 = 18.18%

Rupee is at discount and to calculate the discount, we need to find out how many dollars each Rupee can buy today and six months from now. Therefore, the Spot rate of USD in terms of INR today is USD 1/55 = $ 0.01818 and six months from now is USD 1/60 = $ 0.01667. The discount is calculated as:

[(Forward Rate – Spot rate) / (Spot rate)] x (12/6)

= (0.01667 – 0.01818) / 0.01818 x 12/6

= – 0.00151 / 0.01818 x 12/6 = – 16.61%

The minus sign implies that the Rupee is at discount.

Another important point to be noted in the above example, is that the forward premiums do not equal forward discount always. In the aforesaid example, for instance, the rupee is trading at a discount of 16.67% while the dollar is trading at a premium of 18.18%.

12.2 Fate of Forward Contracts

Whenever any forward contract is entered, normally it meets any of the following three fates.

(A)   Delivery under the Contract

(B)   Cancellation of the Contract

(C)   Extension of the Contract

Further above of fates of forward contract can further classified into following sub-categories.

(A)   Delivery under the Contract

    (i)   Delivery on Due Date

    (ii)   Early Delivery

    (iii)   Late Delivery

(B)   Cancellation of the Contract

    (i)   Cancellation on Due Date

    (ii)   Early Cancellation

    (iii)   Late Cancellation

(C)   Extension of the Contract

    (i)   Extension on Due Date

    (ii)   Early Extension

    (iii)   Late Extension

Let us discuss each of above executions one by one.

Delivery on Due Date

This situation does not pose any problem as rate applied for the transaction would be rate originally agreed upon. Exchange shall take place at this rate irrespective of the spot rate prevailing.

Illustration 3

On 1st June 2015 the bank enters into a forward contract for 2 months for selling US$ 1,00,000 at ₹ 65.5000. On 31st July 2015 the spot rate was ₹ 65.7500/65.2500. Calculate the amount to be debited in the customer's account.

Solution

The bank will apply rate originally agreed upon i.e., ₹ 65.5000 and will debit the account of the customer with ₹ 65,50,000.

Early Delivery

The bank may accept the request of customer of delivery before due date of forward contract provided the customer is ready to bear the loss if any that may accrue to the bank as a result of this. In addition to some prescribed fixed charges bank may also charge additional charges comprising of:

(a) *Swap Difference*: This difference can be loss/ gain to the bank. This arises on account of offsetting its position earlier created by early delivery as bank normally covers itself against the position taken in the original forward contract.

(b) *Interest on Outlay of Funds*: It might be possible early delivery request of a customer may result in outlay of funds. In such bank shall charge from the customer at a rate not less than prime lending rate for the period of early delivery to the original due date. However, if there is an inflow of funds the bank at its discretion may pass on interest to the customer at the rate applicable to term deposits for the same period.

Illustration 4

On 1 October 2015 Mr. X an exporter enters into a forward contract with a BNP Bank to sell US$ 1,00,000 on 31 December 2015 at ₹ 65.40/$. However, due to the request of the importer, Mr. X received amount on 28 November 2015. Mr. X requested the bank the take delivery of the remittance on 30 November 2015 i.e., before due date. The inter-banking rates on 28 November 2015 was as follows:

Spot	₹ 65.22/65.27
One Month Premium	10/15

If bank agrees to take early delivery then what will be net inflow to Mr. X assuming that the prevailing prime lending rate is 18%.

Solution

Bank will buy from customer at the agreed rate of ₹ 65.40. In addition to the same if bank will charge/ pay swap difference and interest on outlay funds.

(a)   Swap Difference

Bank Sells at Spot Rate on 28 November 2015	₹ 65.22
Bank Buys at Forward Rate of 31 December 2015 (65.27 + 0.15)	₹ 65.42
Swap Loss per US$	₹ 00.20
Swap loss for US$ 1,00,000	₹ 20,000

(b)   Interest on Outlay Funds

On 28th November Bank sells at	₹ 65.22
It buys from customer at	₹ 65.40

	Outlay of Funds per US$	₹ 00.18
	Interest on Outlay fund for US$ 1,00,000 for 31 days	₹ 275.00
	(US$100000 x 00.18 x 31/365 x 18%)	
(c)	Charges for early delivery	
	Swap loss	₹ 20,000.00
	Interest on Outlay fund for US$ 1,00,000 for 31 days	₹ 275.00
		₹ 20,275.00
(d)	Net Inflow to Mr. X	
	Amount received on sale (₹ 65.40 x 1,00,000)	₹ 65,40,000
	Less: Charges for early delivery payable to bank	(₹ 20,275)
		₹ 65,19,725

Late Delivery

In case of late delivery, current rate prevailing on such date of delivery shall be applied. However, before this delivery (execution) takes place the provisions of Automatic Cancellation (discussed later on) shall be applied.

Cancellation on Due Date

In case of cancellation on due date in addition to flat charges (if any) the difference between contracted rate and the cancellation rate (reverse action of original contract) is charged from/ paid to the customer.

Illustration 5

On 15th January 2015 you as a banker booked a forward contract for US$ 250000 for your import customer deliverable on 15th March 2015 at ₹ 65.3450. On due date customer request you to cancel the contract. On this date quotation for US$ in the inter-bank market is as follows:

Spot	₹ 65.2900/2975 per US$
Spot/ April	3000/ 3100
Spot/ May	6000/ 6100

Assuming that the flat charges for the cancellation is ₹ 100 and exchange margin is 0.10%, then determine the cancellation charges payable by the customer.

Solution

Bank will sell to customer at the agreed rate of ₹ 65.3450.

Since this is sale contract by the bank the contract shall be cancelled at ready buying rate on the date of cancellation as follows:

Spot Buying Rate on 15 March 2015	₹ 65.2900
Less: Exchange Margin	₹ 0.0653
	₹ 65.2247

Rounded to ₹ 65.2250

Dollars sold to customer at	₹ 65.3450
Dollars bought from customer	₹ 65.2250
Net amount payable by the customer per US$	₹ 0.1200
Amount payable by the customer	
Flat Charges	₹ 100.00
Cancellation Charges (₹ 0.12 x 250000)	₹ 30,000.00
	₹ 30,100.00

Early Cancellation

If a forward is required to be cancelled earlier than the due date of forward contract same shall be cancelled at opposite rate of original contract of the date that synchronizes with the date of original forward contract.

Illustration 6

You as a banker has entered into a 3 month's forward contract with your customer to purchase AUD 1,00,000 at the rate of ₹ 47.2500. However, after 2 months your customer comes to you and requests cancellation of the contract. On this date quotation for AUD in the market is as follows:

Spot	₹ 47.3000/3500 per AUD
1 month forward	₹ 47.4500/5200 per AUD

Determine the cancellation charges payable by the customer.

Solution

The contract shall be cancelled at the 1 month forward sale rate of ₹ 47.5200 as follows:

AUD bought from customer under original forward contract at	₹ 47.2500
On cancellation it is sold to him at	₹ 47.5200
Net amount payable by customer per AUD	₹ 00.2700

Thus, total cancellation charges payable by the customer ₹ 27,000

Late Cancellation

In case of late cancellation of Forward Contract, the provisions of Automatic Cancellation (discussed later on) shall be applied.

Extension on Due Date

It might also be possible that an exporter is not able to export goods on the due date. Similarly, it might also be possible that an importer is not able to pay on due date. In both of these situations an extension of contract for selling and buying contract is warranted. Accordingly, if earlier contract is extended first, it shall be cancelled and rebooked for the new delivery period. In case extension is on due date it shall be cancelled at spot rate as like cancellation on due date (discussed earlier) and new contract shall be rebooked at the forward rate for the new delivery period.

Illustration 7

Suppose you are a banker and one of your export customers has booked a US$ 1,00,000 forward sale contract for 2 months with you at the rate of ₹ 62.5200 and simultaneously you covered yourself in the interbank market at ₹ 62.5900. However, on due date, after 2 months your customer comes to you and requests for cancellation of the contract and also requests for extension of the contract by one month. On this date quotation for US$ in the market was as follows:

Spot	₹ 62.6800/62.7200
1 month forward	₹ 62.6400/62.7400

Determine the extension charges payable by the customer assuming exchange margin of 0.10% on buying as well as selling.

Solution

Cancellation

First the original contract shall be cancelled at Spot Selling Rate as follows:

US$/₹ Spot Selling Rate	₹ 62.7200
Add: Margin @ 0.10%	₹ 0.06272
	₹ 62.78272

Rounded off	₹ 62.7825
Bank buys US$ under original contract at	₹ 62.5200
Bank Sells at Spot Rate	₹ 62.7825
	₹ 0.2625

Thus, total cancellation charges payable by the customer for US$ 1,00,000 is ₹ 26,250.

Rebooking

Forward US$/₹ Buying Rate	₹ 62.6400
Less: Margin @ 0.10%	₹ 0.06264
Net amount payable by customer per US$	₹ 62.57736
Rounded off	₹ 62.5775

Extension before Due Date

In case any request to extend the contract is received before due date of maturity of forward contract, first the original contract would be cancelled at the relevant forward rate as in case of cancellation of contract before due date and shall be rebooked at the current forward rate of the forward period.

Illustration 8

Suppose you as a banker entered into a forward purchase contract for US$ 50,000 on 5th March with an export customer for 3 months at the rate of ₹ 59.6000. On the same day you also covered yourself in the market at ₹ 60.6025. However, on 5th May your customer comes to you and requests extension of the contract to 5thJuly. On this date (5th May) quotation for US$ in the market is as follows:

Spot	₹ 59.1300/1400 per US$
Spot/ 5th June	₹ 59.2300/2425 per US$
Spot/ 5thJuly	₹ 59.6300/6425 per US$

Assuming a margin 0.10% on buying and selling, determine the extension charges payable by the customer and the new rate quoted to the customer.

Note: Rates to be rounded off to 4 decimals in multiples of 0.0025.

Solution

(a)   Cancellation of Original Contract

The forward purchase contract shall be cancelled at the for the forward sale rate for delivery June.

Interbank forward selling rate	₹ 59.2425
Add: Exchange Margin	₹ 0.0592
Net amount payable by customer per US$	₹ 59.3017

Rounded off, the rate applicable is ₹ 59.3025

Buying US$ under original contract at original rate	₹ 59.6000
Selling rate to cancel the contract	₹ 59.3025
Difference per US$	₹ 00.2975

Exchange difference for US$ 50,000 payable to the customer is ₹ 14,875.

(b)   Rate for booking new contract

The forward contract shall be rebooked with the delivery 15th July as follows:

Forward buying rate (5th July)	₹ 59.6300
Less: Exchange Margin	₹ 0.0596
	₹ 59.5704

Rounded off to ₹ 59.5700

Late Extension

In case of late extension current rate prevailing on such date of delivery shall be applied. However, before this delivery the provisions of Automatic Cancellation (discussed later on) shall be applied.

Automatic Cancellation

As per FEDAI Rule 6, a forward contract which remains overdue without any instructions from the customers on or before due date shall stand automatically cancelled within 3 working days after the maturity date. Though customer is liable to pay the exchange difference arising there from but not entitled for the profit resulting from this cancellation.

For late delivery and extension after due date as mentioned above the contract shall be treated as fresh contract and appropriate rates prevailing on such date shall be applicable as mentioned below:

1.   Late Delivery: In this case the relevant spot rate prevailing on the such date shall be applicable.

2.   Extension after Due Date: In this case relevant forward rate for the period desired shall be applicable.

As mentioned earlier in both of above case cancellation charges shall be payable consisting of following:

(i)   *Exchange Difference:* The difference between Spot Rate of offsetting position (cancellation rate) on the date of cancellation of contract after due date or 3 working days (whichever is earlier) and original rate contracted for.

(ii)   *Swap Loss (Difference):* The loss arises on account of offsetting its position at the spot rate on the date of cancellation and taking opposite position of offsetting position at earliest forward rate.

(iii) *Interest on Outlay of Funds:* Interest on the difference between the rate entered by the bank in the interbank market and actual spot rate on the due date of contract of the opposite position multiplied by the amount of foreign currency amount involved. This interest shall be calculated for the period from the due date of maturity of the contract and the actual date of cancellation of the contract or 3 working days whichever is later.

Please note in above in any case there is profit by the bank on any course of action same shall not be passed on the customer as normally passed cancellation and extension on or before due dates.

Illustration 9

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

The exchange rates for dollar in the interbank market on 10th June and 13th June were:

	10th June	13th June
Spot USD 1=	₹ 63.8000/8200	₹ 63.6800/7200
Spot/June	₹ 63.9200/9500	₹ 63.8000/8500
July	₹ 64.0500/0900	₹ 63.9300/9900
August	₹ 64.3000/3500	₹ 64.1800/2500
September	₹ 64.6000/6600	₹ 64.4800/5600

Exchange Margin 0.10% and interest on outlay of funds @ 12%. The importer requested on 14th June for extension of contract with due date on 10th August.

Rates to be rounded off to 4 decimals in multiples of 0.0025.

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

Calculate:

(i)   Cancellation rate

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

(iii) Swap loss

(iv)   Interest on outlay of funds, if any

(v)   New contract rate

(vi)   Total Cost

Solution

(i)   Cancellation Rate:

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

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

Rounded off to ₹ 63.6175

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

Bank sells $2,00,000 @ ₹ 64.4000	₹ 1,28,80,000
Bank buys $2,00,000 @ ₹ 63.6175	₹ 1,27,23,500
Amount payable by customer	₹ 1,56,500

(iii) Swap Loss

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

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

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

(iv)   Interest on Outlay of Funds

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

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

Outlay for $ 2,00,000 is ₹ 96,000

Interest on ₹ 96,000 @ 12% for 3 days   ₹ 96

(v)   New Contract Rate

The contract will be extended at current rate

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

Rounded off to ₹ 64.3150

(vi)   Total Cost

Cancellation Charges	₹ 1,56,500.00
Swap Loss	₹ 30,000.00
Interest	₹ 96.00
	₹ 1,86,596.00

12.3 Non-deliverable Forward Contract

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

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

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

12.4 Rollover of Deliverable Forward Contract

Rollover of Deliverable Forward Contract is a Contract wherein, as an Exporter, you have no Foreign Currency to Deliver at maturity and as an Importer you have no Local Currency to deliver at maturity. As an Exporter or Importer you would like to rollover the contract which effectively means spot cancellation and booking of new contract for later date.

The rationale behind the rollover is:

❖   Non receipt of Foreign Currency from client (export perspective),

❖   Shortage of local currencies (Import perspective) ,

❖   Non-agreement of payment with clients,

❖   Non availability of longer period forward contracts as normally forward contracts are available maximum for one year and to hedge the exposure for the period more than one roll over contract shall be used.

13. FUTURES CONTRACTS

A basic futures contract is very similar to the forward contract in its obligation and payoff profile.

There are some important distinctions between futures and forwards.

❖   The contract terms of futures are standardized. These encompass:

- Quantity and quality of the underlying;

- Time and place of delivery;

- Method of payment.

❖   Being standardized in nature credit risk is greatly reduced by marking the contract to market on a daily basis with daily checking of position.

❖   Futures are smaller in contract size than forwards and swaps, which means that they are available to a wider business market.

A financial futures contract is purchased or sold through a broker. It is a commitment to make or take delivery of a specified financial instrument, or perform a particular service, at predetermined date in the future. The price of the contract is established at the outset.

Distinction between Futures and Forward Contracts

There are major differences between the traditional forward contract and a futures contract. These are tabulated below:

Feature	Forward Contract	Futures Contract
Amount	Flexible	Standard amount
Maturity	Any valid business date agreed to by the two parties	Standard date. Usually, one delivery date such as the second Tuesday of every month
Furthest maturity date	Open	12 months forward
Currencies traded	All currencies	Majors
Cross rates	Available in one contract; Multiple contracts avoided	Usually requires two contracts
Market-place	Global network	Regular markets – futures market and exchanges
Price fluctuations	No daily limit in many currencies	Daily price limit set by exchange
Risk	Depends on counter party	Minimal due to margin requirements
Honouring of contract	By taking and giving delivery	Mostly by a reverse transaction
Cash flow	None until maturity date	Initial margin plus ongoing variation margin because of market to market rate and final payment on maturity date
Trading hours	24 hours a day	4 – 8 hours trading sessions

14. OPTION CONTRACTS

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

- to buy **(call option)**;

- or to sell **(put option**).

The purchaser is called the buyer or holder; the seller is called the writer or grantor. The premium may be expressed as a percentage of the price per unit of the underlying.

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.

During or at the end of the contract period (depending on the type of the option)the holder can do as he pleases. He can buy or sell (as the case may be) the underlying, let the contract expire or sell the option contract itself in the market.

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.

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.

Distinction between Options and Futures

There are certain fundamental differences between a futures and an option contract. Let us look at the main comparative features given below:

	Options	**Futures**
(a)	Only the seller (writer) is obliged to perform	Both the parties are obligated to perform.
(b)	Premium is paid by the buyer to the seller at the inception of the contract	No premium is paid by any party.
(c)	Loss is restricted while there is unlimited gain potential for the option buyer.	There is potential/risk for unlimited gain/loss for the futures buyer.
(d)	An American option contract can be exercised any time during its period by the buyer.	A futures contract has to be honoured by both the parties only on the date specified.

Options Vs Futures: Gain and Losses in Different Circumstances

Price Movement	**Type of Position Held**					
	Call buyer	*Long Futures Position*	*Call Seller*	*Put Buyer*	*Short Futures Position*	*Put Seller*
Price rises	Unlimited gain	Unlimited gain	Unlimited loss	Limited loss	Unlimited loss	Limited gain

| Price falls | Limited loss | Unlimited loss* | Limited gain | Unlimited gain* | Unlimited gain* | Unlimited loss* |
| Price unchanged | Limited loss | No gain or loss | Limited gain | Limited loss | No Gain or loss | Limited gain |

Note: Transaction Costs are ignored.

*Since the price of any commodity or share cannot go below zero, there is technically a 'limit' to the gain/loss when the price falls. For practical purposes, this is largely irrelevant.

15. SWAP CONTRACTS

Swaps are infinitely flexible. In technical terms 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.

A swap transaction commits the participants to exchange cash flows at specified intervals, which are called payment or settlement dates. Cash flows are either fixed or calculated for specific dates by multiplying the quantity of the underlying by specified reference rates or prices.

The vast majority of swaps are classified into the following groups:

❖   Interest rate;

❖   Currency;

❖   Commodity;

❖   Equity.

The notional principal (i.e. the face value of a security) on above swap, except currency swaps, is used to calculate the payment streams but are not actually exchanged. Interim payments are usually netted - the difference is paid by one party to the other.

Like forwards, the main users of swaps are large multinational banks or corporations. Swaps create credit exposures and are individually designed to meet the risk-management objectives of the participants.

15.1 Interest Rate Swaps

Interest Rate Swap has been covered in detail in the Chapter 12 of this Study Material. Please refer the same from there.

15.2 Currency Swaps

It involves an exchange of liabilities between currencies. A currency swap can consist of three stages:

❖ A spot exchange of principal - this forms part of the swap agreement as a similar effect can be obtained by using the spot foreign exchange market.

❖ Continuing exchange of interest payments during the term of the swap - this represents a series of forward foreign exchange contracts during the term of the swap contract. The contract is typically fixed at the same exchange rate as the spot rate used at the outset of the swap.

❖ Re-exchange of principal on maturity.

A currency swap has the following benefits:

❖ Treasurers can hedge currency risk.

❖ It can provide considerable cost savings. A strong borrower in the Japanese Yen market may be interested in borrowing in the American USD markets where his credit rating may not be as good as it is in Tokyo. Such a borrower could get a better US dollar rate by raising funds first in the Tokyo market and then swapping Yen for US dollars.

❖ The swap market permits funds to be accessed in currencies, which may otherwise command a high premium.

❖ It offers diversification of borrowings.

A more complex version of a currency swap is a currency coupon swap, which swaps a fixed-or-floating rate interest payment in one currency for a floating rate payment in another. These are also known as *Circus Swaps.*

In a currency swap the principal sum is usually exchanged:

❖ At the start;

❖ At the end;

❖ At a combination of both; or

❖ Neither.

Many swaps are linked to the issue of a Eurobond. An issuer offers a bond in a currency and instrument where it has the greatest competitive advantage. It then asks the underwriter of the bond to provide it with a swap to convert funds into the required type.

15.3 Commodity Swaps

It is a kind of series of Future Contracts involving settlement on the basis of notional amount over multiple dates at predetermined specified reference prices or related commodities indices. Although this swap strategy can be used for any type of commodity but is primarily used in hedging oil price risks.

15.4 Equity Swaps

An equity swap is an arrangement in which total return on equity or equity index in the form of dividend and capital is exchanged with either a fixed or floating rate of interest.

16. POPULAR DERIVATIVE PRODUCTS

Some of the popularly used derivative products are as follows:

16.1 Forward Importer

This Product consists of an FX Transaction where the Counterparty will buy the Notional Amount of USD against INR at the forward rate under predefined conditions.

Benefits / Risks:

- If the USD/INR rate on the settlement date of an FX Transaction is greater than Forward Rate, Counterparty (Importer) will buy at a rate better than the market rate. If this occurs, the structure will protect the Counterparty against appreciation in USD against INR.

- If the USD/INR rate on an FX Transaction is less than Forward Rate, Counterparty will buy at a rate worse than the market rate. If this occurs, the Counterparty will incur a loss, which could be potentially unlimited.

Example

Notional Amount: USD 500,000.00 – Strike Rate – ₹ 80.00/USD

₹/USD rate on Settlement Date	Settlement Conditions for FX	Profit and Loss (in ₹)
75.00	Counterparty buys USD Notional Amount against INR @ 80.00	25,00,000.00 (Loss)
78.50	Counterparty buys USD Notional Amount against INR @ 80.00	7,50,000.00 (Loss)
82.50	Counterparty buys USD Notional Amount against INR @ 80.00	12,50,000.00 (Gain)

16.2 Forward Exporter

This Product consists of an FX Transaction where the Counterparty will sell the Notional Amount of USD against INR at the forward rate under predefined conditions.

Benefits / Risks:

- If the USD/INR rate on the settlement date of an FX Transaction is less than forward rate, Counterparty will sell at a rate better than the market rate. If this occurs, the structure will protect the Counterparty against depreciation in USD against INR.

- If the USD/INR rate on an FX Transaction is greater than Forward Rate, Counterparty will sell at a rate worse than the market rate. If this occurs, the Counterparty will incur a loss, which could be potentially unlimited.

Example

Notional Amount : USD 500,000.00 – Strike Rate – ₹ 80.00/USD

₹/USD rate on Settlement Date	Settlement Conditions for FX	Profit and Loss (in ₹)
75.00	Counterparty sells USD Notional Amount against INR @ 80.00	25,00,000.00 (Gain)
78.50	Counterparty sells USD Notional Amount against INR @ 80.00	7,50,000.00 (Gain)
82.50	Counterparty sells USD Notional Amount against INR @ 80.00	12,50,000.00 (Loss)

16.3 FX Call Option

This Product consists of an FX Transaction where the Counterparty (generally Importer) has a right to buy the Notional Amount of USD against INR at the relevant Strike Rate(s) under predefined conditions. The Counterparty will pay the premium to bank.

Benefits / Risks:

- If the Expiry Reference Rate is greater than or equal to the Strike Rate, the Counterparty has the right to buy Notional Amount at the Strike Rate.

- If the Expiry Reference Rate is less than the Strike Rate, there is neither right nor obligation on the Counterparty to buy the Notional Amount. The Counterparty will be able to buy at the prevailing market rate, thus retaining participation in any INR appreciation without any limitation.

Example

Notional Amount: USD 500,000.00 – Strike Rate – ₹ 78.00/USD

Expiry Reference Rate	Settlement Conditions for FX	Profit and Loss (in ₹)
64.0080	No Settlement	-
71.1200	No Settlement	-
78.2320	Counterparty Buys USD Notional Amount against INR @ 78.00	1,16,000.00 (Gain)

16.4 FX Put Option

This Product consists of an FX Transaction where the Counterparty (generally exporter) has a right to sell the Notional Amount of USD against INR at the relevant Strike Rate(s) under predefined conditions. The Counterparty will pay the Premium to bank.

Benefits / Risks:

- If the Expiry Reference Rate is less than or equal to the Strike Rate, the Counterparty has the right to sell Notional Amount at the Strike Rate.

- If the Expiry Reference Rate is greater than the Strike Rate, there is neither right nor obligation on the Counterparty to sell the Notional Amount. The Counterparty will be able to sell at the prevailing market rate, thus retaining participation in any USD appreciation without any limitation.

Example

Notional Amount: USD 500,000.00 – Strike Rate – ₹ 78.00/USD

Reference Rate	Settlement Conditions for FX	Profit and Loss (in ₹)
75.00	Counterparty Sells USD Notional Amount against INR @ 78.00	15,00,000.00 (Gain)
79.00	No Settlement	-

16.5 IRS USD Floating to Fixed

In this swap transaction one party pays periodic amounts in respect of each calculation period in a currency based on a fixed rate, and the other party pays periodic amounts in the same currency based on a floating rate that is reset periodically. Such periodic amounts calculations are based on predetermined notional amount(s) in that same currency. Notional amount(s) may be constant throughout the term of the transaction, or amortizing, accreting, or otherwise variable over the term.

- The Counterparty receives floating USD cashflows from bank and pays fixed USD cashflows, thereby, transforming its floating USD exposure into a fixed rate USD exposure via this swap structure.

- If the floating USD cashflows of the Counterparty is lower than fixed USD cashflows on sustained basis, then Counterparty would end up having net negative cashflows.

- If the floating USD cashflows of the Counterparty is higher than fixed USD cashflows on sustained basis, then Counterparty would end up having net positive cashflows.

Example

Fixed Rate:　　　　USD 1.50% per annum, payable semi-annually

Notional Amount:　　USD 10,00,000.00

Floating Rate Fixing	Counterparty Receives (USD)	Counterparty Pays (USD)	Gain/ (Loss) in USD
0.0000%	-	7,500.00	(7,500.00)
0.1500%	750.00	7,500.00	(6,750.00)
2.0000%	10,000.00	7,500.00	2,500.00

17. STRATEGIES FOR EXPOSURE MANAGEMENT

A company's attitude towards risk, financial strength, nature of business, vulnerability to adverse movements, etc. shapes its exposure management strategies. There can be no single strategy which is appropriate to all businesses. Four separate strategy options are feasible for exposure management.
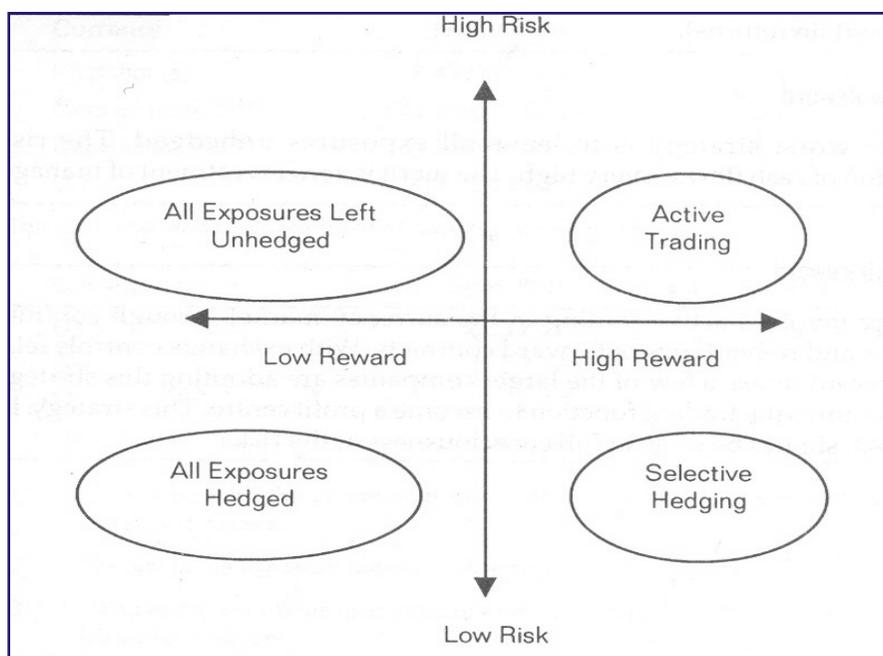
Exposure Management Strategies

17.1 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. The merits of this approach are that yields and costs of the transaction are known and there is little risk of cash flow destabilization. Again, this option doesn't require any investment of managerial time or effort. The negative side is that automatic hedging at whatever rates are available is hardly likely to result into optimum costs. At least some management seems to prefer this strategy on the grounds that an active management of exposures is not really their business. In the floating rate era, currencies outside their home countries, in terms of their exchange rate, have assumed the characteristics of commodities. And business whose costs depend significantly on commodity prices can hardly afford not to take views on the price of the commodity. Hence this does not seem to be an optimum strategy.

17.2 Low Risk: Reasonable Reward

This strategy requires selective hedging of exposures whenever forward rates are attractive but keeping exposures open whenever they are not. Successful pursuit of this strategy requires quantification of expectations about the future and the rewards would depend upon the accuracy of the prediction. This option is similar to an investment strategy of a combination of bonds and equities with the proportion of the two components depending on the attractiveness of prices. In foreign exchange exposure terms, hedged positions are similar to bonds (known costs or yields) and unhedged ones to equities (uncertain returns).

17.3 High Risk: Low Reward

Perhaps the worst strategy is to leave all exposures unhedged. The risk of destabilization of cash flows is very high. The merit is zero investment of managerial time or effort.

17.4 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. In effect, this requires the trading function to become a profit centre. This strategy, if it has to be adopted, should be done in full consciousness of the risks.

18. CONCLUSION

Thus, on account of increased globalization of financial markets, risk management has gained more importance. The benefits of the increased flow of capital between nations include a better international allocation of capital and greater opportunities to diversify risk. However, globalization of investment has meant new risks from exchange rates, political actions and increased interdependence on financial conditions of different countries.

All these factors- increase in exchange rate risk, growth in international trade, globalization of financial markets, increase in the volatility of exchange rates and growth of multinational and transnational corporations- combine to make it imperative for today's financial managers to study the factors behind the risks of international trade and investment, and the methods of reducing these risks.

TEST YOUR KNOWLEDGE

Theoretical Questions

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

2. What do you mean by Nostro, Vostro and Loro Accounts?

Practical Questions

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

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

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

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

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

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

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

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

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

3 months' swap points   160   186

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

Assume spot date as April 5, 2016.

Assume 1 swap point = 0.0001,

You are required to:

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

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

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

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

The current spot rates are:

INR/US $ =   ₹ 62.22

JPY/US$ =   JPY 102.34

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

Forward rates for August 2014 are

INR/US $ =   ₹ 66.50

JPY/US$ =   JPY 110.35

Required:

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

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

INR/US $=   ₹ 66.25

JPY/US$ =   JPY 110.85

Is the decision to take forward cover justified?

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

| US$ 1 | = | H.K.$ 7.5880 | 7.5920 |

Local inter bank market rates for US$ were

| Spot US$ 1 | = | ₹ 42.70 | 42.85 |

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

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

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

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

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

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

The Bank wishes to retain an exchange margin of 0.125%

Required:

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

(Note: Calculate the rate in multiples of 0.0001)

10. 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?

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

	Spot	2-months forward
₹/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?

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

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

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

   You are required to evaluate the following options:

   (i)   Pay the supplier in 60 days, or

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

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

    USD/INR   48.30 in Mumbai

    GBP/INR   77.52 in London

    GBP/USD   1.6231 in New York

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

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

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

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

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

15. 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?

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

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

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

Calculate the rate to be quoted to the importer by assuming an exchange margin of 5 paisa.

17. A company operating in Japan has today affected 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.

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

19. 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.

20.   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?

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

(i)   Pay immediately without any interest charges.

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

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

Spot rate (₹ /$) : 48.35 /48.36

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

The importer seeks your advice. Give your advice.

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

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

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

Which one of the following options would be better?

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

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

23.   A company is considering hedging its foreign exchange risk. It has made a purchase on 1st July, 2016 for which it has to make a payment of US$ 60,000 on December 31, 2016. The present exchange rate is 1 US $ = ₹ 65. It can purchase forward 1 $ at ₹ 64. The company

will have to make an upfront premium @ 2% of the forward amount purchased. The cost of funds to the company is 12% per annum.

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

(i) ₹ 68 per US $.

(ii) ₹ 62 per US $.

(iii) ₹ 70 per US $.

(iv) ₹ 65 per US $.

24. 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

Advise AKC Ltd. by calculating average contribution to sales ratio whether it should hedge its foreign currency risk or not.

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

Market information as at January 1, 2015 is:

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

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

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

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

(i) Using forward contract

(ii) Using currency futures

(iii) Not hedging the currency risk

26. 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.

27. 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?

28. An Indian exporting firm, Rohit and Bros., would be covering 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?

29. 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.

30. 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.

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

32. 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.

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

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

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

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

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

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

You are required to recommend cheaper hedging alternative for XYZ LTD.

34. ABC Technologic is expecting to receive a sum of US$ 4,00,000 after 3 months. The company decided to go for future contract to hedge against the risk. The standard size of future contract available in the market is $1000. As on date spot and futures $ contract are quoting at ₹ 44.00 & ₹ 45.00 respectively. Suppose after 3 months the company closes out its position futures are quoting at ₹ 44.50 and spot rate is also quoting at ₹ 44.50. You are required to calculate effective realization for the company while selling the receivable. Also calculate how company has been benefitted by using the future option.

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

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

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

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

    The rates are as follows:

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

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

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

Spot	1 Month Forward	3 Months Forward
0.9284-0.9288	0.9501	0.9556

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

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

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

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

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

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

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

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

Following data is available

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

You are required to

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

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

38.   Columbus Surgicals Inc. is based in US, has recently imported surgical raw materials from the UK and has been invoiced for £ 480,000, payable in 3 months. It has also exported surgical goods to India and France.

The Indian customer has been invoiced for £ 138,000, payable in 3 months, and the French customer has been invoiced for € 590,000, payable in 4 months.

Current spot and forward rates are as follows:

£ / US$

Spot:	0.9830 – 0.9850
Three months forward:	0.9520 – 0.9545

US$ / €

Spot:	1.8890 – 1.8920
Four months forward:	1.9510 – 1.9540

Current money market rates are as follows:

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

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

39. 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

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

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

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

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

The company has 3 choices:

(i)   Forward cover

(ii)   Money market cover, and

(iii)   Currency option

Which of the alternatives is preferable by the company?

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

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

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

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

Following data is available:

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

Required:

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

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

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

Additional information:

Present exchange rate	₹ 100 = 340 yen
180 day's forward rate	₹ 100 = 345 yen

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

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

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

The market rates for Rupee and Dollar are as under:

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

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

(A) To cover payables in the forward market and

(B) To lag the receivables by one month and cover the risk only for the net amount. No interest for delaying the receivables is earned.

Evaluate both the options if the cost of Rupee Funds is 12%. Which option is preferable?

44.   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?

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

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

Spot	USD 1 = Sw. Fcs.	1.5076/1.5120
One month forward		1.5150/ 1.5160
Two months forward		1.5250 / 1.5270
Three months forward		1.5415/ 1.5445

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

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

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

46.   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?

47. You have following quotes from Bank A and Bank B:

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

Calculate :

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

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

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

| ₹/Euro | 51.50/55 |
| ₹/S$ | 27.20/25 |

After six months the exchange rates turn out as follows:

| ₹/Euro | 52.00/05 |
| ₹/S$ | 27.70/75 |

(A) You are required to calculate loss/gain due to transaction exposure.

(B)　Based on the following additional information calculate the loss/gain due to transaction and operating exposure if the contracted price of air conditioners is ₹ 25,000 :

　　(i)　the current exchange rate changes to

　　　　₹/Euro　　　　　　　51.75/80

　　　　₹/S$　　　　　　　　27.10/15

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

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

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

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

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

London on New York

Spot	1.5350/90
1 month	15/18
2 months	30/35
3 months	80/85

London on Frankfurt

Spot	1.8260/90
1 month	60/55
2 months	95/90
3 months	145/140

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

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

    You are required to:

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

    (b) Assuming that Indian Government offers a swap at spot rate which is 1US$ = ₹ 50 in one year, then should the company should opt for this option or should it just do nothing. The spot rate after one year is expected to be 1US$ = ₹ 54. Further you may also assume that the Drilldip can also take a US$ loan at 8% p.a.

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

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

    What steps would you take, if you are required to maintain a credit Balance of Swiss Francs 30,000 in the Nostro A/c and keep as overbought position on Swiss Francs 10,000?

ANSWERS/ SOLUTIONS

Answers to Theoretical Questions

1. Please refer paragraph 10.

2. Please refer paragraph 4.

Answers to the Practical Questions

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

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

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

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

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

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

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

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

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

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

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

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

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

3. To purchase Rupee, XYZ LTD Bank shall first sell £ and purchase $ and then sell $ to purchase Rupee. Accordingly, rate (£/₹)$_{ask}$ shall be used.

   The available rates are as follows:

   ($/£)$_{bid}$ = $1.5260

   ($/£)$_{ask}$ = $1.5270

   (₹/$)$_{bid}$ = ₹ 61.3625

$(₹/\$)_{ask}$ = ₹ 61.3700

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

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

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

= £ 0.01068 or £ 0.0107

Thus, amount of £ to be credited

= ₹ 25,000,000 x £ 0.0107

= £ 267,500

4. Forward Rate = $\dfrac{2.50\,(1+0.075)}{(1+0.060)}$ = Can$ 2.535/£

(i) If spot rate decline by 2%

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

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

(ii) If spot rate gains by 4%

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

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

(iii) If spot rate remains unchanged

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

5. **(i)** Swap Points for 2 months and 15 days

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

(ii) Foreign Exchange Rates for 20th June 2016

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

(iii) Annual Rate of Premium

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

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

₹/$ x $/¥ = ₹/¥

62.22/102.34 = 0.6080

Spot rate on date of export 1¥ = ₹ 0.6080

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

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

(i)   **Calculation of expected loss without hedging**

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

Hedging of loss under Forward Cover

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

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

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

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

The decision to take forward cover is still justified.

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

Rupee – Dollar selling rate	= ₹ 42.85
Dollar – Hong Kong Dollar	= HK $ 7.5880
Rupee – Hong Kong cross rate	= ₹ 42.85 / 7.5880
	= ₹ 5.6471

Profit / Loss to the Bank

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

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

    Cover at London:

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

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

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

The rupee cost will be	= ₹ 65,07,88
Profit (₹ 65,15,000 - ₹ 65,07,881)	= ₹ 7,119

    Cover at New York:

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

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

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

The rupee cost will be	= ₹ 65,10,176.
Profit (₹ 65,15,000 - ₹ 65,10,176)	= ₹ 4,824

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

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

    To consider sell rate for the bank:

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

On February 4, 2013 the rates are

US $	=	₹ 45.97
Pound 1	=	US$ 1.7775
Pound 1	=	SGD 3.1380
Therefore, SGD 1	=	$\dfrac{₹\ 45.97 * 1.7775}{SGD\ 3.1380}$
SGD 1	=	₹ 26.0394
Add: Exchange margin (0.125%)		₹ 0.0325
		₹ 26.0719

Hence, loss to the importer

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

10. **(i)** Net exposure of each foreign currency in Rupees

	Inflow (Millions)	Outflow (Millions)	Net Inflow (Millions)	Spread	Net Exposure (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) In Japanese Yen, the net exposure is payable, and the forward rate is quoted at a discount, effectively offsetting the position. Likewise, in the remaining currencies, the net exposures are in receivables, and the related currencies are at a premium, offsetting the positions in their respective currencies.

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

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

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

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

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

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

Opportunity gain

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

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

Proceeds if we can encash by forward rate :

$ 69000 × ₹47.00   32,43,000

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

12.   (i)   Pay the supplier in 60 days

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

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

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

Alternative 1 is better as it entails lower cash outflow.

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

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

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

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

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

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

(ii) Calculation of the forward rate:

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

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

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

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

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

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

or F_1 = ₹57.13

(iii) Rate of premium:

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

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

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

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

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

16.

USD/ ₹ on 3rd September	49.3800
Swap Point for October	0.1300
	49.5100
USD/ SGD on 3rd September	1.7058
Swap Point for 2nd month Forward	0.0096
	1.7154
SGD/ ₹ (49.5100/ 1.7154)	28.8621
Add: Exchange Margin	0.0500
	28.9121

Thus, Cross Rate for SGD/ ₹ of 30th October shall be ₹ 28.9121.

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

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

Anticipated decline in Exchange rate = 10%.

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

	₹ *(in lakhs)*
Present cost of 108 lakhs yen	30.00
Cost after 3 months: 108 lakhs yen/ 3.24 yen	33.33
Expected exchange loss	3.33
If the expected exchange rate risk is hedged by a Forward contract:	
Present cost	30.00
Cost after 3 months if forward contract is taken 108 lakhs yen/ 3.3 yen	32.73
Expected loss	2.73

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

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

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

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

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

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

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

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

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

19. (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:

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

20.

Buy £ 62500 × 1.2806	= $ 80037.50
Sell £ 62500 × 1.2816	= $ 80100.00
Profit	$ 62.50

Alternatively, if the market comes back together before December 15, the dealer could unwind his position (by simultaneously buying £ 62,500 forward and selling a futures contract. Both for delivery on December 15) and earn the same profit of $ 62.5.

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

	₹
Amount required to purchase $130000[$130000 X ₹48.36]	6286800
Add: Overdraft Interest for 3 months @15% p.a.	235755
	6522555

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

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

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

₹ 6427249 (US$ 131625 X ₹ 48.83)

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

22. (i) Pay the supplier in 60 days

If the payment is made to supplier in 60 days the applicable forward rate for 1 USD	₹ 63.15
Payment Due	USD 1 crore
Outflow in Rupees (USD 1 crore × ₹ 63.15)	₹ 63.15 crore
Add: Interest on loan for 30 days@9.5% p.a.	₹ 0.50 crore
Total Outflow in ₹	₹ 63.65 crore

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

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

Alternative 1 is better as it entails lower cash outflow.

23.

	(₹)
Present Exchange Rate ₹65 = 1 US$	
If company purchases US$ 60,000 forward premium is	
60000 × 64 × 2%	76,800
Interest on ₹76,800 for 6 months at 12%	4,608
Total hedging cost	81,408
If exchange rate is ₹68	
Then gain (₹68 – ₹64) for US$ 60,000	2,40,000
Less: Hedging cost	81,408
Net gain	1,58,592
If US$ = ₹62	
Then loss (₹64 – ₹62) for US$ 60,000	1,20,000
Add: Hedging Cost	81,408
Total Loss	2,01,408
If US$ = ₹70	
Then Gain (₹70 – ₹64) for US$ 60,000	3,60,000
Less: Hedging Cost	81,408
Total Gain	2,78,592
If US$ = ₹65	
Then Gain (₹ 65 – ₹ 64) for US$ 60,000	60,000
Less: Hedging Cost	81,408
Net Loss	21,408

24. If foreign exchange risk is hedged

				Total (₹)
Sum due	Yen 78,00,000	US$1,02,300	Euro 95,920	
Unit input price	Yen 650	US$10.23	Euro 11.99	
Unit sold	12000	10000	8000	
Variable cost per unit	₹ 225/-	₹ 395/-	₹ 510/-	
Variable cost	₹ 27,00,000	₹ 39,50,000	₹ 40,80,000	₹ 1,07,30,000
Three months forward rate for selling	2.427	0.0216	0.0178	
Rupee value of receipts	₹32,13,844	₹ 47,36,111	₹ 53,88,764	₹ 1,33,38,719
Contribution	₹5,13,844	₹ 7,86,111	₹ 13,08,764	₹ 26,08,719
Average contribution to sale ratio				19.56%
If risk is not hedged				
Rupee value of receipt	₹31,72,021	₹ 47,44,898	₹ 53,58,659	₹ 1,32,75,578
Total contribution				₹ 25,45,578
Average contribution to sale ratio				19.17%

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

25. Receipts using a forward contract = $10,000,000/0.016129   =   ₹   620,001,240

Receipts using currency futures

The number of contracts needed is ($10,000,000/0.016118)/24,816,975 = 25

Initial margin payable is 25 contracts x ₹ 22,500   =   ₹   5,62,500

On April 1,2015 Futures Contracts close at 0.016134

Receipts = US$10,000,000/0.016136   =   ₹   619,732,276

Variation Margin =

[(0.016134 – 0.016118) x 25 x 24,816,975]/0.016136

OR (0.000016x 25 x 24,816,975)/.016136 = 9926.79/0.016136   =   ₹   615,195

Less: Interest Cost – ₹ 5,62,500x 0.07 x 3/12	=	₹	9,844
Net Receipts		₹	620,337,627

Receipts under different methods of hedging

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

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

26.

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

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

= 3.36%

Interest rate differential   = 12% - 8% = 4%

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

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

1.   Borrow US$ 83,312 for 6 months

Amount to be repaid after 6 months

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

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

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

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

Converting the same at the forward rate

= ₹42,40,000/ ₹48.8190= US$ 86,851.43

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

₹10,103 i.e., ($206.95 x ₹48.8190)

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

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

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

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

The following operations are carried out:

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

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

   = (1000/0.665) = 1503.76

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

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

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

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

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

   Net arbitrage gain = 1025.15 – 1022.50 = Can$ 2.65

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

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

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

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

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

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

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

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

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

29. **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.

30.

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

31. As per interest rate parity

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

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

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

$$= £0.7570 \times 1.0099 = £0.7645$$

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

32. **(i)** The contract is to be cancelled on 30-10-2010 at the spot buying rate of US\$ 1

	= ₹ 41.5000
Less: Margin Money 0.075%	= ₹ <u>0.0311</u>
	= ₹ <u>41.4689</u> or ₹ 41.47
US\$ 20,000 @ ₹ 41.47	= ₹ 8,29,400
US\$ 20,000 @ ₹ 42.32	= ₹ <u>8,46,400</u>
The difference in favour of the Bank/Cost to the importer ₹	<u>17,000</u>

(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

33. (i) Forward Cover

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

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

(ii) Option Cover

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

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

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

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

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

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

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

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

35. Option - I

$20 x 5000 = $ 1,00,000

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

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

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

Option - II

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

Option I should be preferred as it has lower outflow.

36.　*Forward Market Cover*

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

July	-	1010000 X 0.9501 = US $ 959601
Sept.	-	705000 X 0.9556 = US $ 673698

Option Contracts

July Payment	= 1010000/ 50,000 = 20.20
September Payment	= 705000/ 50,000 = 14.10

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

	July		Sept.	
	Can $	**US $**	**Can $**	**US $**
Covered by Contracts	1000000	940000	700000	665000
Balance bought at spot rate	10000	9501	5000	4778
Option Costs:				
Can $ 50000 x 20 x 0.0102		10200	---	
Can $ 50000 x 14 x 0.0164	---			11480
Total cost in US $ of using Option Contract		959701		681258

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

37. **(i)** **Receipt under three proposals**

   (a) Proposal of Mr. Peter

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

   (b) Proposal of Mr. Wilson

   Forward Rate = € 1.1970-0.0055 = 1.1915

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

   (c) Proposal of Ms. Karen

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

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

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

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

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

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

After 6 months

Amount Received	€ 28,00,000
Less: Loss on Future Contracts	€ 16,188
	€ 27,83,812

Sterling Receipts

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

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

38. **£ Exposure**

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

(i) Forward market hedge

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

£ 342,000 / 0.9520 = US$ 359,244

(ii) Money market hedge

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

For payment of £ 342,000 in 3 months (@2.5% interest) amount required to be deposited now (£ 342,000 ÷ 1.025)	= £　333,658
With spot rate of 0.9830 the US$ loan needed will be	= US$ 339,429
Loan repayable after 3 months (@3.25% interest) will be	= US$ 350,460

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

€ Receipt

Amount to be hedged	= € 590,000

(i) Forward market hedge

Sell 4 months' forward contract accordingly, amount receivable after 4 months will be (€ 590,000 x1.9510)	= US$ 1,151,090

(ii) Money market hedge

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

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

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

Deposit amount will increase over 4 months
(@3.83% interest) will be   = US$ 1,098,639

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

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

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

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

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

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

(c) **Call option:**

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

* ($1.97 + $0.04)

(d) **No hedge option:**

Expected Future spot rate	Dollar needed Xi	Prob. Pi	Pi xi
1.91	5,73,000	0.25	1,43,250

1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

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.

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

Spot rate

GBP = $\dfrac{1}{USD1.5617}$ to $\dfrac{1}{USD1.5673}$

USD = GBP 0.64033 - GBP 0.63804

6 months' forward rate

GBP = $\dfrac{1}{USD1.5455}$ to $\dfrac{1}{USD1.5609}$

USD = GBP 0.64704 - GBP 0.64066

Payoff in 3 alternatives

i.   **Forward Cover**

   Amount payable   USD 3,64,897

   Forward rate   GBP 0.64704

   Payable in GBP   GBP 2,36,103

ii. **Money market Cover**

   Amount payable   USD 3,64,897

   PV @ 4.5% for 6 months i.e. $\dfrac{1}{1.0225} = 0.9779951$ 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   GBP 2,36,510

iii.   **Currency options**

Amount payable	USD 3,64,897
Unit in Options contract	GBP 12,500
Value in USD at strike rate of 1.70 (GBP 12,500 x 1.70)	USD 21,250
Number of contracts USD 3,64,897/ USD 21,250	17.17
Exposure covered USD 21,250 x 17	USD 3,61,250
Exposure to be covered by Forward (USD 3,64,897 – USD 3,61,250)	USD 3,647
Options premium 17 x GBP 12,500 x 0.096	USD 20,400
Premium in GBP (USD 20,400 x 0.64033)	GBP 13,063
Total payment in currency option	
Payment under option (17 x 12,500)	GBP 2,12,500
Premium payable	GBP 13,063
Payment for forward cover (USD 3,647 x 0.64704)	GBP 2,360
	GBP 2,27,923

Thus total payment in:

(i)   Forward Cover   2,36,103 GBP

(ii)   Money Market   2,36,510 GBP

(iii) Currency Option   2,27,923 GBP

The company should take currency option for hedging the risk.

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

41.   (i)   **Receipt under three proposals**

(a)   Invoicing in Sterling

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

(b)   Use of Forward Contract

Forward Rate $= €1.1770 + 0.0060 = 1.1830$

Using Forward Market hedge Sterling receipt would be $\dfrac{€\,4\,\text{million}}{1.1830}$

= £ 3381234

(c) Use of Future Contract

The equivalent sterling of the order placed based on future price (€1.1760)

= $\dfrac{€\,4.00\,\text{million}}{1.1760}$ = £ 3401360

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

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

Buy Future at   €1.1760

Sell Future at   €1.1785
                      ─────────
                      €0.0025
                      ─────────

Total profit on Future Contracts = $54 \times £62,500 \times €0.0025$ = €8438

After 6 months

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

Sterling Receipts

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

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

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

Cost of equipment	₹ in lakhs
3400 lakh yen at ₹100 = 340 yen	1,000.00
Add: Interest at 4.5% I Quarter	45.00
Add: Interest at 4.5% II Quarter (on ₹1045 lakhs)	47.03
Total outflow in Rupees	1,092.03

Alternatively, interest may also be calculated on compounded basis, i.e., ₹1000 × [1.045]²	₹1092.03

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

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

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

43. **(A)** To cover payable and receivable in forward Market

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

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

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

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

Note: 1. In the question it has not been clearly mentioned that whether quotes given for 2 and 3 months (in points terms) are premium points or direct quotes. Although above solution is based on the assumption that these are direct quotes, but students can also consider them as premium points and solve the question accordingly.

2. Alternatively, students can also consider the interest element on the Profit earned due cancellation of Forward Contract.

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

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

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

Loss to the Customer:

Exchange difference (Loss)   ₹ 2,700

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

45. First the contract will be cancelled at TT Selling Rate

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

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

(Sw. Fcs. 1,00,000 x ₹ 0.5475)

46. The amount of EURO bought by selling US$

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

To acquire EURO 5,000 from the market @

(a)   USD 1 = EURO 1.4400 &

(b)   USD1 = INR 31.4500

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

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

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

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

To acquire EURO 5,000 from market @

US $ 1 = EURO 1.4400

US $ 1 = INR 31.45

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

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

47. **(i)**   To Buy 1 Million GBP Spot against CHF

1.   First to Buy USD against CHF at the cheaper rate i.e. from Bank A. 1 USD = CHF 1.4655

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

By applying chain rule Buying rate would be

1 GBP = 1.7650 * 1.4655 CHF

1 GBP = CHF 2.5866

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

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

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

GBP / USD 3 months swap points are at discount

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

USD / CHF 3 months swap points are at premium

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

Hence

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

Spot rate   GBP 1 = CHF 2.5850 / 2.5881

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

48. **(i)**   **Profit at current exchange rates**

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

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

Profit after change in exchange rates

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

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

LOSS DUE TO TRANSACTION EXPOSURE

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

(ii) **Profit based on new exchange rates**

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

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

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

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

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

Decline in profit due to transaction exposure

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

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

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

Change in Price due to change in Exch. Rate

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

Price elasticity of demand = 1.5

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

Size of increased order = 2400 ×1.0072 = 2417 units

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

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

Therefore, decrease in profit due to operating exposure

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

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

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

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

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

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

49. **(i)** **If investment is made at London**

Convert US$ 5,00,000 at Spot Rate (5,00,000/1.5390)	= £ 3,24,886
Add: £ Interest for 3 months on £ 324,886 @ 5%	= £ 4,061
	= £ 3,28,947

Less: Amount Invested	$ 5,00,000	
Interest accrued thereon	$ 5,000	
	= $ 5,05,000	

Equivalent amount of £ required to pay the above sum ($ 5,05,000/1.5430*)	= £ 3,27,285
Arbitrage Profit	= £ 1,662

(ii) **If investment is made at New York**

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

(iii) **If investment is made at Frankfurt**

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

Arbitrage Profit   = £   2,047

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

* Due to conservative outlook.

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

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

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

(b)   **With the swap**

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

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

Without the swap

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

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

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

51. **Exchange Position:**

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

Cash Position (Nostro A/c)

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

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

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

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