# Foreign Exchange Exposure and Risk Management

## Learning Objectives

After going through the chapter student shall be able to understand

- Foreign Exchange Market and its participants
- Nostro, Vostro and Loro Accounts
- Exchange Rate Determination
- Exchange Rate Quotation
- Exchange Rate Forecasting
- Exchange Rate Theories
  1. Interest Rate Parity (IRP)
  2. Purchasing Power Parity (PPP)
  3. International Fisher Effect (IFE)
  4. Comparison of PPP, IRP and IFE Theories
- Risk Management
- Risk Considerations
- Foreign Exchange Exposure
- Types of Exposures
  1. Transaction Exposure
  2. Translation Exposure
  3. Economic Exposure
- Techniques for Managing Exposure
  1. Derivatives
  2. Money Market Hedge
  3. Netting
  4. Matching
12.2 Strategic Financial Management

<table>
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<th>(5) Leading and Lagging</th>
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<td>(6) Price Variation</td>
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<td>(7) Invoicing in Foreign Currency</td>
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<td>(8) Asset and Liability Management</td>
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<td>(9) Arbitrage</td>
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- Strategies for Exposure Management
  - (1) Low Risk: Low Reward
  - (2) Low Risk: Reasonable Reward
  - (3) High Risk: Low Reward
  - (4) High Risk: High Reward

- Hedging Currency Risk

### 1. Introduction

Coupled with globalisation 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 organisations 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 globalise 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 multinational organisations 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 optimise the utilisation of financial resources at his command.

However, the problems to be faced by him in the perspective of financial management of the multinational organisations are slightly more complex than those of domestic organisations. 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 organisation from the vagaries of international financial transactions.

2. 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 U.S. dealer for dollars, and a U.S. manufacturer sells machine tools to Japanese company for yen. Ultimately, however, the U.S. 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.
12.4 Strategic Financial Management

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.

3. 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.

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 local currency account maintained by a foreign bank/branch. It is also called “your account with us”. For example, Indian rupee account maintained by a bank in Switzerland with a bank in India. The Loro account is an account wherein a bank remits funds in foreign currency to another bank for credit to an account of a third bank.
4.1 **Exchange Position:** It is referred to total of purchases or sale of commitment 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 sale by 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 effecting Cash position will affect Exchange Position not vice versa.

**Illustration 1**

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

<table>
<thead>
<tr>
<th>Particulars</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD purchased</td>
<td>12,500</td>
</tr>
<tr>
<td>Purchased a Bill on London</td>
<td>40,000</td>
</tr>
<tr>
<td>Sold forward TT</td>
<td>30,000</td>
</tr>
<tr>
<td>Forward purchase contract cancelled</td>
<td>15,000</td>
</tr>
<tr>
<td>Remitted by TT</td>
<td>37,500</td>
</tr>
<tr>
<td>Draft on London cancelled</td>
<td>15,000</td>
</tr>
</tbody>
</table>

What steps you would take, if you are required to maintain a credit Balance of £15,000 in the Nostro A/c and keep as overbought position on £7,500?

**Solution**

**Exchange Position:**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Purchase £</th>
<th>Sale £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Balance Overbought</td>
<td>35,000</td>
<td>—</td>
</tr>
<tr>
<td>DD Purchased</td>
<td>12,500</td>
<td>—</td>
</tr>
<tr>
<td>Purchased a Bill on London</td>
<td>40,000</td>
<td>—</td>
</tr>
<tr>
<td>Sold forward TT</td>
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<tr>
<td>Forward purchase contract cancelled</td>
<td>—</td>
<td>15,000</td>
</tr>
<tr>
<td>TT Remittance</td>
<td>—</td>
<td>37,500</td>
</tr>
<tr>
<td>Draft on London cancelled</td>
<td>15,000</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>102,500</td>
<td>82,500</td>
</tr>
<tr>
<td>Closing Balance Overbought</td>
<td>—</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>102,500</td>
<td>102,500</td>
</tr>
</tbody>
</table>
12.6 Strategic Financial Management

### Cash Position (Nostro A/c)

<table>
<thead>
<tr>
<th></th>
<th>Credit £</th>
<th>Debit £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Balance (credit)</td>
<td>65,000</td>
<td>—</td>
</tr>
<tr>
<td>TT Remittance</td>
<td></td>
<td>37,500</td>
</tr>
<tr>
<td></td>
<td>65,000</td>
<td>37,500</td>
</tr>
<tr>
<td>Closing Balance (credit)</td>
<td></td>
<td>27,500</td>
</tr>
<tr>
<td></td>
<td>65,000</td>
<td>65,000</td>
</tr>
</tbody>
</table>

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 Determination

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 rupee that one dollar will buy. If a dollar will buy 100 rupee, the exchange rate would be expressed as Rs 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/Rs (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 2

*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**

US$ 0.0217/₹1 reads "0.0217 US dollar per rupee." This means that for one Indian rupee one can buy 0.0217 US dollar.

In this method, known as the European terms, the rate is quoted in terms of the number of units of the foreign currency for one unit of the domestic currency. This is called an indirect quote.

The alternative method, called the American terms, expresses the home currency price of one unit of
the foreign currency. This is called a direct quote.

This means the exchange rate between the US dollar and rupee can be expressed as:

\[ \text{₹ 46.08} / \text{US$ reads } ^\prime \text{₹ 46.08 per US dollar} ^\prime \]

Hence, a relationship between US dollar and rupee can be expressed in two different ways which have the same meaning:

- 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 rate 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!

6. Exchange Rate Quotation

6.1 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.

6.2 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

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

<table>
<thead>
<tr>
<th></th>
<th>USD</th>
<th>CNY</th>
<th>JPY</th>
<th>HKD</th>
<th>INR</th>
<th>KRW</th>
<th>SGD</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD</td>
<td></td>
<td>0.1583</td>
<td>0.0128</td>
<td>0.129</td>
<td>0.0184</td>
<td>0.0009</td>
<td>0.8197</td>
<td>1.3089</td>
</tr>
<tr>
<td>CNY</td>
<td>6.3162</td>
<td></td>
<td>0.0809</td>
<td>0.8147</td>
<td>0.1161</td>
<td>0.0057</td>
<td>5.177</td>
<td>8.2667</td>
</tr>
<tr>
<td>JPY</td>
<td>78.08</td>
<td>12.362</td>
<td></td>
<td>10.072</td>
<td>1.435</td>
<td>0.0701</td>
<td>64</td>
<td>102.17</td>
</tr>
<tr>
<td>HKD</td>
<td>7.7526</td>
<td>1.2274</td>
<td>0.0993</td>
<td></td>
<td>0.143</td>
<td>0.0069</td>
<td>6.3546</td>
<td>10.148</td>
</tr>
<tr>
<td>INR</td>
<td>54.405</td>
<td>8.613</td>
<td>0.6955</td>
<td>7.005</td>
<td></td>
<td>0.0488</td>
<td>44.505</td>
<td>71.067</td>
</tr>
<tr>
<td>KRW</td>
<td>1,114.65</td>
<td>176.5476</td>
<td>142.965</td>
<td>143.9908</td>
<td>20.4965</td>
<td>914.8582</td>
<td>1,459.05</td>
<td></td>
</tr>
<tr>
<td>SGD</td>
<td>1.2202</td>
<td>0.1932</td>
<td>0.0156</td>
<td>0.1574</td>
<td>0.0224</td>
<td>0.0011</td>
<td></td>
<td>1.5961</td>
</tr>
<tr>
<td>EUR</td>
<td>0.7642</td>
<td>0.121</td>
<td>0.0098</td>
<td>0.0986</td>
<td>0.014</td>
<td>0.0007</td>
<td>0.6263</td>
<td></td>
</tr>
</tbody>
</table>

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.

6.3 Bid, Offer and Spread: A foreign exchange quotes are two-way quotes, expressed as a ‘bid’ and an offer’ (or ask) price. Bid is the price at which the dealer is willing to buy another currency. 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.
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”.

### 6.4 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.

Broadly, it can be stated that the exchange rates expressed by any currency pair that does not involve the U.S. dollar are called cross rates. This means that the exchange rate of the currency pair of Canadian dollar and British pound will be called a cross rate irrespective of the country in which it is being quoted as it does not have U.S. dollar as one of the currencies.

### 7. 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.

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 no higher than what would be generated by a domestic investment.

The Covered Interest Rate Parity equation is given by:

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

Where,

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

The Uncovered Interest Rate Parity equation is given by:

\[r + r_D = \frac{S_F}{S}(1 + r_F)\]

Where,

\(S_F = \text{Expected future spot rate when the receipts denominated in foreign currency is converted into domestic currency.}\)
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 in 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 embeds 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,

- \( S(\text{₹}/\$) \) = spot rate
- \( P_D \) = is the price level in India, the domestic market.
- \( P_F \) = is the price level in the foreign market, the US in this case.
- \( \alpha \) = 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

\[ S_0 = 45.00 \times \frac{(1+10%)/(1+2%)} = ₹ 48.53 \]

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 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:

$$r_0 - P_0 = r_F - \Delta P_F$$

or

$$P_0 - P_F = \Delta S = r_0 - r_F$$

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 in 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.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Key Variables</th>
<th>Basis</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Rate Parity (IRP)</td>
<td>Forward rate premium (or discount)</td>
<td>Interest rate differential</td>
<td>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.</td>
</tr>
</tbody>
</table>
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. Risk Management

Whether it is investing, driving, or just walking down the street, everyone exposes himself or herself to risk. A person’s personality and lifestyle play a big deal on how much risk he can comfortably take on. If an investor invests in stocks and has trouble sleeping at nights because of his investments, then probably he is taking on too much risk. A ‘risk’ is anything that can lead to results that deviate from the requirements. Risk has two parameters – there must be an uncertainty about the outcome and the ‘outcome’ has to matter in terms of a ‘utility’. According to Tom Gilb, risk can be defined as “An abstract concept expressing the possibility of unwanted outcomes”. Deciding what amount of risk an investor can take on while allowing him to get rest at night is his most important decision.

Risk Management is, “any activity which identifies risks, and takes action to remove or control ‘negative results’ (deviations from the requirements).” Effective risk management strategies have become increasingly necessary due to the dynamic nature of the business environment. Globalization is resulting in new markets, new competitors, and new products. Technological advances are dramatically accelerating the pace of business and the volatility of financial markets. A new relationship between the public and private sectors is contributing to restructured markets and greater deregulation.

Volatility in financial markets was a natural outcome of changes in the flow of funds worldwide.
following the first oil crisis in the 1970s, the collapse of the fixed foreign exchange rate system, monetarist practices adopted by many central banks, the advancement of communications and technology, and the acceptance of deregulation of financial systems around the world during the 1980s.

Unpredictable changes in interest rates, yield curve structures, exchange rates, and commodity prices, exacerbated by the explosion in international expansion, have made the financial environment riskier today than it ever was in the past. For this reason, boards of directors, shareholders, and executive and tactical management need to be seriously concerned that corporate risk management activities be adequately assessed, prioritized, driven by strategy, controlled, and reported.

Organizations around the globe are therefore overwhelmingly focused on the most fundamental of financial principles: risks = returns. Executives are undertaking major initiatives to manage the risk side of this equation, and, in doing so, are examining global treasury alternatives and employing comprehensive and integrated risk management strategies.

Each organization faces a unique set of parameters with respect to, for example, industry sector, product mix, organizational goals, business culture, and risk tolerances. Consequently, an organization must tailor its risk management framework to meet its particular needs.

Organizations are now concerned with the problems faced by any firm whose performance is affected by the international environment. Indeed, even companies that operate only domestically but compete with firms producing abroad and selling in their local market are affected by international developments. For example, Indian clothing or appliance manufacturers with no overseas sales will find Indian sales and profit margins affected by exchange rates, which influence the prices of imported clothing and appliances. Similarly, bond investors holding their own government’s bonds, denominated in their own currency, and spending all their money at home are affected by changes in exchange rates if exchange rates prompt changes in interest rates. Specifically, if governments increase interest rates to defend their currencies when they fall in value on the foreign exchange markets, holders of domestic bonds will find their assets falling in value along with their currencies: bond prices fall when interest rates increase. It is difficult to think of any firm or individual that is not affected in some way or other by the international environment. Jobs, bond and stock prices, food prices, government revenues and other important economic variables are all tied to exchange rates and other developments in the global financial environment.

10. Risk Considerations

A multinational organization operates in more than one country. This implies that it functions in different environments. However, the degree of risk is different in different countries. It has been observed that international diversification is often more effective than domestic diversification in reducing company’s risk in relation to its expected return because the economic cycles of different countries do not tend to be completely synchronized. For example, if a company is in a particular line of business, say power and telecom facilities, invests in another unit in the same country, both the existing and the new units are subjected to the same environmental risks and the return from the new plant is likely to be highly co-
related with return from existing plant. This implies that there is no change in the environmental risks and perceptions in the same country both for existing and new units. However, had the management decided to invest the same money in the similar business but in a different country, there would have been change in environmental risk as well as reward perception since both the units now function in different environments. This mechanism probably reduces the risk facing the business and improves chances of rewards.

The political instability and unfavourable Government can seriously endanger the very existence and functioning of the multi-national organizations. It is therefore advisable that before making investment abroad, the organisation should realistically assess the political instability and risk of that country in which investment is proposed to be made. In other words, the company will have to forecast the political instability of the country, which is possible by assessing the degree of stability of the existing government, its attitude towards foreign investment, incentives offered and the quickness in processing foreign investment proposals. If the assessment reveals that political risks is high, the company may decide not to invest even if very high returns are expected to be made and vice-versa.

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

10.1 **Financial Risk** – It is the potential loss or danger due to the uncertainty in movement of foreign exchange rates, interest rates, credit quality, liquidity position, investment price, commodity price, or equity price, as well as the unpredictability of sales price, growth, and financing capabilities. Balance sheet and cash flow hedges as well as derivatives tools mitigate financial risks by reducing uncertainty faced by firms.

However, these strategies and instruments themselves are manifestations of the different types of financial uncertainty in that further risks arise from their use.

10.2 **Business Risk** – On a micro scale, business risk involves the variability in earnings due to variation in the cash inflows and outflows of capital investment projects undertaken. This risk, also known as investment risk, may materialize because of forecasting errors made in market acceptance of products, future technological changes, and changes in costs related to projects.

On an aggregated basis variability in earnings may derive from the degree of efficient diversification that the firm has achieved in its operations and its overall portfolio of assets. The firm can reduce this risk, also referred to as portfolio risk, by seeking out capital projects and merger candidates that have a low or negative correlation with its present operations.

10.3 **Credit Risk (i.e, default risk)** – Government Securities (G-Secs) and Treasury bills have sovereign risk associated with them – i.e. read zero credit risk, whereas securities issued by Corporates suffer from the risk of non-payment or delayed payment of interest and principal as and when they become due.

10.4 **Interest Rate Risk** – Interest rate prevailing in a economy is influenced, inter alia, by the demand for and supply of money and the inflation rates. These parameters keep changing continuously and hence interest rates also fluctuate. An investor’s investment in a financial security suffers from the fluctuating interest rates as price of the security and yield expectations are inversely related. Therefore, when interest rates rise, the value of a portfolio reduces.
10.5 Liquidity Risk – This is the possibility for an investor to experience losses due to the inability to sell or convert assets into cash immediately or in instances where conversion to cash is possible but at a loss. These may be caused by different reasons such as trading in securities with small or few outstanding issues, absence of buyers, limited buy/sell activity or underdeveloped market. Even government securities which are the most liquid of fixed income securities may be subjected to liquidity risk particularly if a sizeable volume is involved. In the equity markets, the liquidity risk is captured by ‘impact cost’ percentage.

10.6 Market/Price Risk - This is the possibility for an investor to experience losses due to changes in market prices of securities. It is the exposure to the uncertain market value of a portfolio due to price fluctuations.

10.7 Reinvestment Risk – This is the risk associated with the possibility of having lower returns or earnings when maturing funds or the interest earnings of funds are reinvested. Investors who redeem and realize their gains run the risk of reinvesting their funds in an alternative investment outlet with lower yields. Similarly, the investor is faced with the risk of not being able to find good or better alternative investment outlets as some of the securities in the fund matures.

10.8 Country Risk – This is the possibility for an investor to experience losses arising from investments in securities issued by/in foreign countries due to changes in forex rates (transaction, translation and economic exposures) or due to expropriation actions by the host governments. All businesses trading overseas and increasingly in domestic markets will have some exposure to exchange rate movements either directly or indirectly. Whilst exposure to exchange rate movements may be an inevitable part of everyday activity, the risk arising from such exposure can be controlled.

<table>
<thead>
<tr>
<th>International Country Risk Guide Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Political</strong></td>
</tr>
<tr>
<td>Risk Factor</td>
</tr>
<tr>
<td>Economic expectations versus reality</td>
</tr>
<tr>
<td>Economic planning failures</td>
</tr>
<tr>
<td>Political leadership</td>
</tr>
<tr>
<td>External conflict</td>
</tr>
<tr>
<td>Government corruption</td>
</tr>
<tr>
<td>Military in politics</td>
</tr>
<tr>
<td>Organized religion in politics</td>
</tr>
<tr>
<td>Law and order tradition</td>
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<tr>
<td>Racial and national tensions</td>
</tr>
<tr>
<td>Political terrorism</td>
</tr>
<tr>
<td>Civil war</td>
</tr>
<tr>
<td>Political party development</td>
</tr>
<tr>
<td>Quality of bureaucracy</td>
</tr>
<tr>
<td><strong>Total Political</strong></td>
</tr>
</tbody>
</table>
11. 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."

In other words, 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.

12. Types of Exposures

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

- **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

12.1 **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.

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

12.3 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)

<table>
<thead>
<tr>
<th>Variables influencing the inflow of cash in Local currency</th>
<th>Revaluation impact</th>
<th>Devaluation impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local sale, relative to foreign competition in local currency</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td>Company’s export in local currency</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td>Company’s export in foreign currency</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td>Interest payments from foreign investments</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Variables influencing the outflow of cash in local currency</th>
<th>Revaluation impact</th>
<th>Devaluation impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company’s import of material denoted in local currency</td>
<td>Remain the same</td>
<td>Remain the same</td>
</tr>
<tr>
<td>Company’s import of material denoted in foreign currency</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td>Interest on foreign debt</td>
<td>Decrease</td>
<td>Increase</td>
</tr>
</tbody>
</table>

13. Techniques for Managing Exposure

The aim of foreign exchange risk management is to stabilize the cash flows and reduce the uncertainty from financial forecasts. To hedge any transaction is to buy certainty to make sure that unexpected exchange rate movements will have no impact on our operations. What determines the price of this certainty?
12.20 Strategic Financial Management

- **Flexibility**  -- Do we want to have perfect coverage?
- **Opportunity** – Do we want the chance to gain on the upside?
- **Efficiency** – How (liquid/transparent /regulated) is the market?

The above graphs show that the value of the firm increases after the risks are hedged.

There are a range of hedging instruments that can be used to reduce risk. Hedging alternatives include: Forwards, futures, options, swaps, etc.

**Example:** Swedish company has got a sales order to an American customer. Delivery time is in three months and price is in US dollar.

- **Open position**
  
  No hedging. If the Swedish Kroner (SEK) increases in value the Swedish company loses.

- **Forward contract**
  
  An exchange rate quoted today for settlement at a future date.

- **Futures contract**
  
  A standardized agreement for settlement at a future date.

- **Money market hedge**
  
  Borrow US dollar today and exchange the proceeds to local currency.

- **Options contract**
  
  A contract giving the Swedish company the right, but not the obligation to sell US dollar at an agreed rate. Provides a hedge and a chance to win.
13.1 Derivatives: A derivatives transaction is a bilateral contract or payment exchange agreement whose value depends on - derives from - the value of an underlying asset, reference rate or index. Today, derivatives transactions cover a broad range of underlyings - 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. While the range of products is diverse it is not complicated. Every derivatives transaction is constructed from two simple building blocks that are fundamental to all derivatives: forwards and options. They include:

- **Forwards**: forwards and swaps, as well as exchange-traded futures.
- **Options**: privately negotiated OTC options (including caps, collars, floors and options on forward and swap contracts), exchange-traded options.

Diverse forms of derivatives are created by using these building blocks in different ways and by applying them to a wide assortment of underlying assets, rates or indices.

(a) **Forwards-Based Derivatives**

There are three divisions of forwards-based derivatives:

- forward contracts;
- swaps;
- futures contracts.

(i) **The Forward Contract**: The simplest form of derivatives is the forward contract. It obliges one party to buy, and the other to sell, a specified quantity of a nominated underlying financial instrument at a specific price, on a specified date in the future. There are markets for a multitude of underlyings. 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.

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 a loss to the seller.
12.22 Strategic Financial Management

- **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 percentages 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:

\[
(\text{Forward Rate} - \text{Spot rate}) / \text{Spot rate} \times (12/6)
\]

\[= (60 - 55) / 55 \times 12/6 = 18.18\%\]

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:

\[
(\text{Forward Rate} - \text{Spot rate}) / \text{Spot rate} \times (12/6)
\]

\[= (0.01667 - 0.01818) / 0.01818 \times 12/6 = -0.00151 / 0.01818 \times 12/6 = -16.61\%\]

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%

- **Forward Rates in India:** Forward rates in India are not determined by interest rate differentials i.e. forward quotations do not have a clear rule but are determined by actual demand/supply conditions for respective currencies, mainly the US dollars. These rates reflect to an extent the actual and expected currency changes, since cancellation and re-booking of forward contracts are introduced in India.

The cost of forward cover will be the agreed forward rate minus the ruling spot rate on the transaction day (opportunity cost).
According to the RBI guidelines, Authorised Dealers (ADs) can enter into contracts for forward purchase and sale of foreign currency with residents (corporate) who have a crystallised exposure to exchange risk in respect of genuine transactions permitted under Exchange Control Regulations. The choice of the currency and tenor are left to the customer. Where the exact amount is not ascertainable owing to the rates/costs being linked to variable factors, contracts may be booked on the basis of a reasonable estimate. However, the maturity of the cover should not exceed the maturity of the underlying transaction.

The greater flexibility provided by the RBI now requires the corporate treasurer to be well acquainted with the mechanism of cancellation and early delivery under a forward contract.

- **Extension of forward contracts:** Extension of a forward contract becomes necessary when the contract is booked for a shorter period as compared to the due date or when the payment to be made is delayed beyond the period covered by the forward contract. An extension of a forward contract involves a swap (simultaneously selling in the spot market and buying in the forward market or vice versa), the cost of which is recovered or paid to the corporation, as the case may be. However, according to the FEDAI rules, if the swap period is for a period of 30 days or less, benefit from the swap will not be passed on the corporation. The extension cost, simply put, is the difference between the spot rate prevailing on the date of the extension and the forward rate for the period up to which the contract is sought to be extended.

For example, suppose an importer had a $100,000 liability to be met today (31/10/2012) for which he had booked a forward contract six months ago for delivery today at 45.45. However, due to delays in delivery of the equipment and installation and commissioning by the supplier, the payment date is extended to March 31, 2013, which is due five months from now. Today’s spot rate is 45.32. The forward premium today on the dollar for 5 months is 0.40.

The earlier booked forward contract needs to be extended for delivery on March 31, 2013. In this case the swap charges will be calculated as follows:

<table>
<thead>
<tr>
<th></th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot rate on 31.10.2012</td>
<td>@ 45.32</td>
</tr>
<tr>
<td>Sell Spot</td>
<td>$ 100,000 @ 45.32</td>
</tr>
<tr>
<td>Buy Forward</td>
<td>$ 100,000 @ 45.72</td>
</tr>
<tr>
<td>Swap Charges</td>
<td>(45.32+0.40)</td>
</tr>
<tr>
<td></td>
<td>45,72,000</td>
</tr>
<tr>
<td></td>
<td>40,000</td>
</tr>
</tbody>
</table>

Thus by paying ₹ 40,000 as swap charges the importer retains his forward rate of ₹ 45.45, at which his liability of $ 1,00,000 will be crystallized.

A further charge, being the cost of rupee funds, if any, laid out in performing the swap may have to be borne by the corporation. As per the FEDAI rules, if there is an outflow of funds from the bank on account of the swap, interest @15% p.a. is charged for the duration of the swap. In case of rupee to the bank, interest rate @12% is paid to the customer.

Continuing the above example, if the spot rate is ₹ 45.32 and the forward rate for 31.03.2012 is ₹45.72 and the contract rate (rate at which the contract which is to be extended was booked) is ₹ 45.45 then the interest cost is calculated as follows:
The total cost of extension of the company would be the sum of the swap charges paid and the interest cost, if any. In the above example, the total cost of extension of the contract for 5 months is ₹ 40,813.

- **Cancellation of forward contract:** In case of cancellation of a contract at the request of the customer, the bank shall recover/pay as the case may be, the difference between the contracted rate and the rate at which the cancellation is effected.

In case there is no instruction from the customer, contracts which have matured, shall on the 15th day from the date of maturity be automatically cancelled. The customer will not be entitled to the exchange difference, if any, in his favour as the contract has been cancelled on account of his default.

Drawing from the example given above, the customer had covered his $1,00,000 exposure by booking a forward contract on 31.10.2012 for a period of five months at ₹ 45.45 for delivery on 31.03.2013. Suppose he can cancel his contract @ ₹ 45.55 on January 1, 2013. In this case as the cancellation rate is in favour of the company, it will receive ₹ 0.10 per $ (₹45.55 – ₹ 45.45) and thereby make a profit of ₹ 10,000.

The customer now has an open position which he can review i.e. consider whether to cover or not to cover again.

- **Early delivery:** Early delivery takes place when payment is made or received before the maturity of the forward contract covering the underlying transaction. Early delivery is exactly the opposite of extension of forward contracts. Hence the same principles that apply to extension would also apply to early delivery.

(ii) **Swaps:** 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 all these, except currency swaps, is used to calculate the payment stream but not 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.

**Interest Rate Swaps:** In an interest rate swap, no exchange of principal takes place but interest payments are made on the notional principal amount. Interest payments can be exchanged between two parties to achieve changes in the calculation of interest on the principal, for example:
- Floating to fixed;
- Fixed to floating;
- LIBOR to prime - based;
- Prime to LIBOR;
- Currency A to currency B.

In an interest rate swap both parties raise finance as they normally would in the markets where they have relative advantage. They then engage in the swap. The arrangement benefits both parties since it exploits one's comparative advantage. Here LIBOR refers to the London Interbank Offered Rate, which is a daily reference rate based on the interest rates at which banks borrow unsecured funds from other banks in the interbank market. This rate is officially fixed once a day by the British Bankers Association but the rate changes throughout the day.

**Currency Swaps:** These involve 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.
12.26 Strategic Financial Management

- 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.

Plain Vanilla Swaps: These are fixed-to-floating interest rate swaps between two parties in which each contracts to make payments to the other on particular dates in the future till a specified termination date.

Basis rate swaps: These are similar to plain vanilla swaps but in a basis rate swap both legs are floating rate but measured against different benchmarks. For example, a US corporate that has a Floating rate bond benchmarked to US 10 year treasury notes could swap the floating interest to LIBOR (which itself is a floating rate). In basis swaps, the initial value of the swap is not equal to Zero.

Asset Swaps: These can be either a plain vanilla or a basis rate swap. Instead of swapping the interest payments on liability, one of the parties to the swap is swapping the interest receipts on an asset.

Mortgage Swaps: A mortgage swap seeks to emulate the economic process of buying a collection of mortgage-backed securities and financing the acquisition with short-term variable-rate debt. It is like an interest rate swap with a long-term forward commitment. Three factors distinguish a mortgage swap from an interest rate swap:
- A reducing principal amount;
- Periodic cash settlements for adjustments to the premium or discount resulting from prepayment;
- Settlement with cash or delivery of securities at a prearranged date.

Amortising Swaps: These are swaps for which the notional principal falls over its term. They are particularly useful for borrowers who have issued redeemable debt. It enables them to match interest rate hedging with the redemption profile of the bonds.

Forward swaps: These are swaps arranged to run from some point in the future. They are similar to FRAs but are longer-term vehicles.

Swaptions: Options on swaps, they give the buyer of the swaption the right but not the obligation to enter into a swap agreement where term, notional principal and interest rates are
predetermined. They are helpful in tenders where the bidder needs to fix costs but does not know who will win the contract.

**Callable swaps:** These are similar to swaptions but here the swap counterparty has the right to end the swap.

**Canape swaps:** These currency swaps have no initial or final exchange of principal. Interest payments in one currency are exchanged for interest payments in another.

**Equity swaps:** Exchange of dividends earned and capital gains on a portfolio, which is based on a stock index against periodic interest payments. An equity portfolio manager may swap the variable gains on his equity portfolio to the fixed returns promised by equity swap dealer.

**Commodity swaps:** One party pays a fixed price for the good (say crude) and the counterparty pays a market rate (variable rate) over the swap period. Commodity swaps are very common in the energy industry.

(iii) **Futures Contracts:** A basic futures contract is very similar to the forward contract in its obligation and payoff profile. The volume of newer financial futures contracts in interest rates, currencies and equity indices now far outstrips the original markets in agricultural commodities.

There are some important distinctions between futures and forwards and swaps.

- The contract terms of futures are standardized. These encompass:
  - Quantity and quality of the underlying;
  - Time and place of delivery;
  - Method of payment.

The only variable is the price. Even the credit risk is standardized; this 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.

Financial futures comprise three principal types:

- Interest Rate Futures;
- Currency Futures;
- Stock Futures – on individual stocks and on stock indices.

*Interest rate futures* centre on specific types of financial instruments, whose prices are dependent on interest rates. *Currency futures* are based on internationally significant currencies. *Stock futures are based on individual stocks and stock index futures* draw on internationally recognized stock exchange indices.

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:

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

(b) **Options:** The second of the two principal building blocks in derivatives is options. These products offer, in exchange for a premium, the right - but not the obligation - to buy or sell the underlying at the strike price during a period or on a specific date. So the owner of the option can choose not to exercise the option and let it expire. A buyer can benefit from favourable movements in the price of the underlying but is not exposed to corresponding losses. This represents the principal difference between forwards and options.

It is summarized neatly by IP Morgan and Arthur Andersen’s *Guide to Corporate Exposure Management* (appearing in *Risk Magazine*): “The advantage of options over swaps and forwards is that options give the buyer the desired protection while allowing him to benefit from a favourable movement in the underlying price.”

Privately negotiated options exist on a multitude of underlyings such as bonds, equities, currencies and commodities, and even swaps. Options can also be structured as securities in warrants or can be embedded in products like convertible bonds, certain commodity- or equity-linked bonds with options.

An option is a contract which has one or 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:

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

**Options Vs Futures: Gain and Losses in Different Circumstances**

<table>
<thead>
<tr>
<th>Price Movement</th>
<th>Type of Position Held</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Call buyer</strong></td>
<td>Long Futures Position</td>
</tr>
<tr>
<td>Price rises</td>
<td>Unlimited gain</td>
</tr>
<tr>
<td></td>
<td>Unlimited gain</td>
</tr>
<tr>
<td></td>
<td>Unlimited loss</td>
</tr>
<tr>
<td></td>
<td>Limited loss</td>
</tr>
<tr>
<td></td>
<td>Unlimited loss*</td>
</tr>
<tr>
<td>Price falls</td>
<td>Limited loss</td>
</tr>
<tr>
<td></td>
<td>Unlimited loss*</td>
</tr>
<tr>
<td></td>
<td>Limited gain</td>
</tr>
<tr>
<td></td>
<td>Unlimited gain*</td>
</tr>
<tr>
<td></td>
<td>Unlimited loss*</td>
</tr>
</tbody>
</table>
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; share are financial instrument cannot go below zero, there is technically a ‘limit’ to the gain/loss when the price falls. For practical purposes, this is largely irrelevant.

As regards to using derivatives as a risk management technique, it can be said that the emergence of the market for derivatives products, forwards, futures and options, can be traced back to the willingness of risk-averse investors to guard themselves against uncertainties arising due to fluctuations in asset prices. Through the use of derivatives, it is possible to transfer price risks by locking-in asset prices. Derivatives generally do not influence the fluctuations in the underlying asset prices but by locking-in asset prices, they minimize the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

- **Commodity Price Exposure:** The purchase of a commodity futures contract will allow a firm to make a future purchase of the input at today’s price, even if the market price on the item has risen substantially in the interim.

- **Security Price Exposure:** The purchase of a financial futures contract will allow a firm to make a future purchase of the security at today’s price, even if the market price on the asset has risen substantially in the interim.

- **Foreign Exchange Exposure:** The purchase of a currency futures or options contract will allow a firm to make a future purchase of the currency at today’s price, even if the market price on the currency has risen substantially in the interim.

**13.2 Money Market Hedge:** A money market hedge involves simultaneous borrowing and lending activities in two different currencies to lock in the home currency value of a future foreign currency cash flow. The simultaneous borrowing and lending activities enable a company to create a home made forward contract.

**13.3 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.
13.4 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.

13.5 Leading and Lagging: Leading and lagging refers to the adjustment of credit terms between companies. It is mostly applied with respect to payments between associate companies within a group. Leading means paying an obligation in advance of the due date. Lagging means delaying payment of an obligation beyond its due date. Leading and lagging are foreign exchange management tactics designed to take advantage of expected devaluations and revaluations of currencies.

13.6 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 to price variation on inter company trade. Transfer pricing is the term used to refer to the pricing of goods and services, which change 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 be used.

13.7 Invoicing in Foreign 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.

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

13.9 Arbitrage: Arbitrage is not a method of hedging foreign exchange risk in a real sense. It is however a method of making profits from foreign exchange transactions. The term arbitrage is used in many areas of finance. It refers to the process of buying and selling of currencies. The sale/purchase of currencies takes place within an unstable market. The prices are affected by the supply and demand of currencies and arbitrage helps in adjusting the market to equilibrium. The process of buying in one market and selling the same in another market is known as arbitrage.

Thus the simple notion in arbitrage is to purchase and sell a currency simultaneously in more than one foreign exchange markets. Arbitrage profits are the result of (i) the difference in exchange rates at two different exchange centres, (ii) the difference, due to interest yield which can be earned at different exchanges. Thus depending upon the nature of deal, arbitrage may be of space and time arbitrage. The space arbitrage is because of separation of two exchange markets due to physical dispersion wherein the rates may vary while on the other hand in the time arbitrage an investor may gain by executing a spot and forward deal to buy and sell a currency.
14. 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

14.1 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 management 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.

14.2 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).

14.3 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.

14.4 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.

15. Hedging Currency Risk

Currency markets are highly speculative and volatile in nature. Any currency can become very
expensive or very cheap in relation to any or all other currencies in a matter of days, hours, or
sometimes, in minutes. This unpredictable nature of the currencies is what attracts an investor
to trade and invest in the currency market.

15.1 Currency Exchange Risk: International investment brings with it two exposures
wrapped into one—the underlying asset and the currency. Already managing the underlying
asset has been discussed earlier. By developing a currency-hedging plan, one can manage
the currency risk separately.

For an international company, exchange rate volatility can work against if payment in a foreign
currency has to be made at a future date. There is no way to guarantee that the price in the
currency market will be the same in the future—it is possible that the price will move against
the company, making the payment cost more. On the other hand, the market can also move in
favour of the company, making the payment cost less in terms of their home currency.
Generally, firms that export goods to other countries benefit when their home currency
depreciates, since their products become cheaper in other countries. Firms that import from
other countries benefit when their currency becomes stronger, since it enables them to
purchase more.

As discussed earlier, there are three ways investors can trade in foreign exchange market
directly or indirectly—the Spot market, Forwards and futures and Options. Let us look at these
transactions again taking currency into accounts.

(a) A Spot Transaction: A spot transaction is a direct exchange of one currency for another.
The spot rate is the current market price, also called the benchmark price. Spot transactions
do not require immediate settlement, or payment "on the spot." The settlement date, or "value
date," is the second business day after the "deal date" (or "trade date") on which the
transaction is agreed to by the two traders, i.e. T+2. The two-day period provides time to
confirm the agreement and arrange the clearing and necessary debiting and crediting of bank
accounts in various international locations. At Spot Transaction where payment has to be
made on the same date is called “Cash Spot” and a Spot Transaction where payment has to be made the next day is called “Tom” (short form for ‘Tomorrow’). The delivery date is called “Settlement Date” or “Value Date” in banking parlance.

(b) Forwards and Futures: A forward transaction is an agreement between two parties whereby one party buys a currency at a particular price by a certain date that is greater than two business days (a spot transaction).

A future contract is a forward contract with fixed currency amounts and maturity dates. They are traded on future exchanges and not through the interbank foreign exchange market.

(c) Options: A currency option is similar to a futures contract in that it involves a fixed currency transaction at some future date in time. However the buyer of the option is only purchasing the right but not the obligation to purchase a fixed amount of currency at a fixed price by a certain date in future. The price is known as the premium and is lost if the buyer does not exercise the option.

Example: Currency Risk

Let's take a hypothetical example of Bubbles Blue, a U.S. company, imports wine from France. Bubbles Blue has to pay EUR 5,000,000 on January 2. Presently i.e. on September 4, the exchange rate is 1.19 USD/EUR.

Situation: Payment due on January 2: EUR 50,00,000.

Now, on January 2, $S_{Jan 2} \uparrow$ or $\downarrow$ 1.19 USD/EUR.

At $S_{Sep 4}$, Bubbles Blue total payment would be:

$EUR 5,000,000 \times 1.19 \text{USD/EUR} = \text{USD 5,950,000}$

On January 2 we have two potential scenarios:

- If the $S_{Jan 2} \downarrow$ (USD appreciates) $\Rightarrow$ BUBBLES BLUE will pay less USD.
- If the $S_{Jan 2} \uparrow$ (USD depreciates) $\Rightarrow$ BUBBLES BLUE will pay more USD.

The second scenario introduces Currency Risk.

Currency risk arises because the value of the a currency fluctuates due to the market forces of supply and demand.

In general, an importer paying for goods or services in a foreign currency would consider an appreciating rupee favourable, but would seek protection against a depreciating rupee, because of the potential for an increased cost in the final price of the goods or services. Similarly, an exporter receiving foreign currency as payment for goods or services would consider a depreciating rupee favourable, but would seek protection against an appreciating rupee because of the potential for loss incurred as a result of a drop in the value of the final payment received.

The primary goal of currency risk management is to protect the economic value of a business from the negative impact of exchange fluctuations, at the lowest possible cost. Because exchange rate volatility also provides opportunity for gains, a secondary goal is to strike a balance between risk and return.
15.2 Techniques of Hedging Currency Risk: Currency Derivatives can reduce the risk in foreign exchange transactions. One can use forward transactions and options to hedge currency risk.

(a) Currency Futures or Forward Contracts: Forward/Futures are agreements that set today the price of the exchange rate in a given future date. The agreement specifies a given quantity.

Illustration 3

ABC has to pay in 90 days AUD 2.5 million to an Australian supplier. It is concerned about a depreciation of the USD against the AUD in the near future. What should it do?

Solution

ABC buys a AUD forward contract of Size = AUD 2.5 million, maturity = 90 days and $F_{t,90} = .70 \text{ USD/AUD}$

It knows that in 90 days, it will pay USD 1.75M (AUD 2.5M*.70 USD/AUD) to the supplier. No uncertainty whatsoever about this amount.

Hedging Note:

Underlying position: Short AUD 2.5 M.

Hedging position: Long 90 days futures for AUD 2.5 M.

Illustration 4

A U.S. investor has British Pound (BP) 1 million invested in British gilts. He is uncertain about future value of USD/BP in December.

Solution

Sell British Pound December futures.

Take a hypothetical situation to understand the hedging technique: It is September 12.

- Underlying position: British bonds worth BP 10,00,000.
  - $F_{Sep \text{ 12},Dec} = 1.55 \text{ USD/BP}$
  - Futures contract size: BP 62,500.
  - $S_{Sep \text{ 12}} = 1.60 \text{ USD/BP}$
  - Number of contracts = ?

Hedging position: The investor sells

- BP 1,00,00,000 / (62,500 BP/contract) = 16 contracts.

(Note: the Standard size of a pound sterling contract in the US exchanges such as CBOT or PBOT is 62,500)

The U.S. investor knows that in Dec, if she decides to sell her British gilts, she will receive exactly USD 1.55M. No uncertainty whatsoever about this amount.
Hedging Note:
Underlying position: Long BP 1 million.
Hedging position: Short futures for BP 1 million.

(b) Currency Options: A currency option in its simplest form provides the buyer of the option with the right but not the obligation to buy or sell one currency amount at a specified exchange rate on a specified date. It insures the buyer against unfavourable changes in exchange rates. The buyer pays only for the right to exercise the option on expiry.

16. 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.

Illustration 5

A company operating in a country having the dollar as its unit of currency has today invoiced sales to an Indian company, the payment being due three months from the date of invoice. The invoice amount is $ 7,500 and at today’s spot rate of $0.025 per ₹1, is equivalent to ₹ 3,00,000.

It is anticipated that the exchange rate will decline by 10% over the three months period and in order to protect the dollar proceeds, the importer proposes to take appropriate action through foreign exchange market. The three months forward rate is quoted as $0.0244 per ₹1.

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

Solution

Calculation of the expected loss due to foreign exchange rate fluctuation

Present Cost

US $7,500 @ today spot rate of US $0.025 per Re. 1 = ₹ 3,00,000

Cost after 3 months

US $7,500 @ expected spot rate of US $0.0225 per Re. 1 = ₹ 3,33,333

(Refer to working note)

Expected loss = ₹ 33,333

Forward cover is available today at 1 Re. = US $0.0244 for 3 months

If we take forward cover now for payment after 3 months net amount to be paid is (US $ 7,500/0.0244) = ₹ 3,07,377
Hence, by forward contract the company can cover ₹25,956 (₹33,333 – ₹7,377) i.e. about 78% of the expected loss.

**Working Note:**

*Expected spot rate after 3 months*

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

Present rate - 10% of the present rate.

\[
= \text{US } \$ 0.025 - 10\% \text{ of US } \$ 0.025
\]

\[
= \text{US } \$ 0.0225
\]

Alternatively, the expected rate may also be calculated as follows:

\[
= \text{US } \$ 0.025 \times \frac{90}{100} = \text{US } \$ 0.0225
\]

**Illustration 6**

Beta Ltd. is planning to import a multi-purpose machine from Japan at a cost of 7,200 lakhs yen. The company can avail loans at 15% interest per annum with quarterly rests with which it can import the machine. However, there is an offer from Tokyo branch of an India based bank extending credit of 180 days at 2% per annum against opening of an irrevocable letter of credit.

**Other Information**

Present exchange rate

\[
\text{¥ 100} = 360 \text{ yen}
\]

180 days' forward rate

\[
\text{¥ 100} = 365 \text{ yen}
\]

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

Advise whether the offer from the foreign branch should be accepted?

**Solution**

**Option I (To finance the purchase by availing loan at 15% per annum):**

Cost of machine ₹ in lakhs

7,200 lakhs yen as ¥100 = 360 yen

Add : Interest at 3.75 I Quarter

\[
\text{Add : Interest at } 3.75 \text{ II Quarter (on ₹ 2,075 lakhs)}
\]

Total outflow in rupees 2152.81

Alternatively, interest may also be calculated on compounded basis, i.e.

\[
\text{₹ 2,000} \times (1.0375)^2 = \text{₹ 2,152.81 lakhs}
\]

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

Cost of letter of credit ₹ in lakhs

at 1% on 7,200 lakhs yen as ¥100 = 360 yen = 20.00

Add : Interest I Quarter

\[
\text{Interest IInd Quarter (A)}
\]

= 0.75

= 0.78

= 21.53
Payment at the end of 180 days:
Cost 7200 lakhs yen
Interest at 2% p.a. [7200×2/100×180/365] 71.01 lakhs yen
Conversion at ₹ 100 =365 yen [7271.01/365×100] (B) = ₹ 1,992.05
Total Cost : A + B = 2013.58 lakhs

Advise: Option No.2 is cheaper. Hence, the offer can be accepted.

Illustration 7
The following spot rates are observed in the foreign currency market.

<table>
<thead>
<tr>
<th>Currency</th>
<th>Foreign currency per U.S.$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Britain pound</td>
<td>0.62</td>
</tr>
<tr>
<td>Netherlands Guilder</td>
<td>1.90</td>
</tr>
<tr>
<td>Sweden Kroner</td>
<td>6.40</td>
</tr>
<tr>
<td>Switzerland Franc</td>
<td>1.50</td>
</tr>
<tr>
<td>Italy Lira</td>
<td>1,300.00</td>
</tr>
<tr>
<td>Japan Yen</td>
<td>140.00</td>
</tr>
</tbody>
</table>

On the basis of this information, compute to the nearest second decimal the number of:

a. British pounds than can be acquired for $100.
b. Dollars that 50 Dutch guilders (a European Monetary Union legacy currency) will buy.
c. Swedish krona that can be acquired for $40.
d. Dollars that 200 Swiss francs can buy.
e. Italian lira (an EMU legacy currency) that can be acquired for $10.
f. Dollars that 1,000 Japanese yen will buy.

Solution

<table>
<thead>
<tr>
<th>Question Description</th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A British pounds that can be acquired for $100</td>
<td>$100 × .62 = 62 pounds</td>
<td></td>
</tr>
<tr>
<td>B $ that 50 Dutch guilders will buy</td>
<td>50/1.90 = $26.32</td>
<td></td>
</tr>
<tr>
<td>C Swedish Kroner that can be acquired for $40</td>
<td>$40 × 6.40 = 256 krona</td>
<td></td>
</tr>
<tr>
<td>D Dollars that 200 Swiss francs can buy</td>
<td>200 / 1.50 = $133.33</td>
<td></td>
</tr>
<tr>
<td>E Italian Lira that can be acquired for $10</td>
<td>$10 × 1,300 = 13,000 lira</td>
<td></td>
</tr>
<tr>
<td>F Dollars that 1000 Japanese yen will buy</td>
<td>1,000 /140 = $7.14</td>
<td></td>
</tr>
</tbody>
</table>

Spot Rates and Forward Rates and Currency Appreciation

Illustration 8
Suppose that 1 French franc could be purchased in the foreign exchange market for 20 US cents on Jan 2, 2012. If the franc appreciated 10 percent the next day against the dollar, how many francs would a dollar buy on Jan 3, 2012?
Solution
1 franc = 0.2 US$. Currency appreciation of francs is 10% Therefore 1 franc = 0.2 × 1.1 = .22SU$
Therefore 1 US$ = 1/.22 = 4.5455 French francs

Illustration 9
Fleur du lac, a French co., had shipped on Jan 2, 2012 goods to an American importer under a letter of credit arrangement, which calls for payment at the end of 90 days. The invoice is for $ 124,000. On the date of shipment the exchange rate was 5.70 French francs to the $ if the French franc were to strengthen by 5% by the end of 90 days what would be the transactions gain or loss in French francs? If it were to weaken by 5%, what would happen? (Note: may calculate in francs per $)

Solution
The French franc strengthening by 5 percent means an exchange rate of 5.70 × .95 = 5.415 French francs to the dollar. The French franc weakening by 5 percent means an exchange rate of 5.70 × 1.05 = 5.985 French francs to the dollar.

<table>
<thead>
<tr>
<th></th>
<th>French franc strengthens</th>
<th>French franc weakens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before: $124,000 × 5.70</td>
<td>FF 706,800</td>
<td></td>
</tr>
<tr>
<td>After: 124,000 × 5.415</td>
<td>FF 671,460</td>
<td></td>
</tr>
<tr>
<td>Transaction loss</td>
<td>-FF 35,340</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before: $124,000 × 5.70</td>
<td>FF 706,800</td>
<td></td>
</tr>
<tr>
<td>After: 124,000 × 5.985</td>
<td>FF 742,140</td>
<td></td>
</tr>
<tr>
<td>Transaction gain</td>
<td>+FF 35,340</td>
<td></td>
</tr>
</tbody>
</table>

Illustration 10
Suppose the exchange rate on Jan 2, 2012 between US dollars and the French franc was FF 5.9 = $1, and on the same day the exchange rate between the dollar and the British pound was 1 Pound = $1.50. What was the exchange rate between francs and pounds?

Solution
1 Pound = 1.5 × 5.9 = 8.85 FF

Illustration 11
Six month T-bills have a nominal rate of 7 percent, while default-free Japanese bonds that mature in 6 months have a nominal rate of 5.5 percent. In the spot exchange market, 1 yen equals $0.009. If interest rate parity holds, what is the 6 month forward exchange rate?

Solution
(1.035 / 1.0275) × .009 = 0.00907

Illustration 12
India Imports co., purchased USD 100,000 worth of machines from a firm in New York, USA. The value of the rupee in terms of the Dollar has been decreasing. The firm in New York offers 2/10, net 90 terms. The spot rate for the USD is ₹ 55; the 90 days forward rate is ₹ 56.

a. Compute the Rupee cost of paying the account within the 10 days.
b. Compute the Rupee cost of buying a forward contract to liquidate the account in 10 days.
c. The differential between part a and part b is the result of the time value of money (the discount for prepayment) and protection from currency value fluctuation. Determine the magnitude of each of these components.

Solution

a) 
\[(98,000) \times (\text{\₹} 55) = \text{\₹} 53,90,000\]

b) 
\[(100,000) \times (\text{\₹} 56) = \text{\₹} 56,00,000\]

Differences = \text{\₹} 56,00,000 – \text{\₹} 53,90,000 = \text{\₹} 2,10,000

c) Time value of money = (100,000 – 98,000) \times (\text{\₹} 56) = \text{\₹} 1,12,000

Protection from devaluation = (98,000) \times (\text{\₹} 56 – \text{\₹} 55) = \text{\₹} 9,80,000

Illustration 13

Following are the rates quoted at Bombay for British pound:

<table>
<thead>
<tr>
<th>BP/₹</th>
<th>52.60/70</th>
<th>Interest Rates</th>
<th>India</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 m Forward</td>
<td>20/70</td>
<td>3 months</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>6 m Forward</td>
<td>50/75</td>
<td>6 months</td>
<td>10%</td>
<td>8%</td>
</tr>
</tbody>
</table>

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

Solution

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Option I (3 mths)</th>
<th>Option II (6 mths)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount borrowed</td>
<td>100000</td>
<td>100000</td>
</tr>
<tr>
<td>Pound obtained by converting at spot rate</td>
<td>100000/52.70 = 1897.53</td>
<td>100000/52.70 = 1897.53</td>
</tr>
<tr>
<td>Invest pound for the period</td>
<td>1.25%</td>
<td>4%</td>
</tr>
<tr>
<td>Amount of pound received at the end</td>
<td>1897.53 \times 1.0125 = 1921.25</td>
<td>1897.53 \times 1.0 = 1973.43</td>
</tr>
<tr>
<td>Convert pounds to ₹ At forward rate</td>
<td>1921.25 \times 52.80 = 101,441</td>
<td>1973.43 \times 53.10 = 104,789</td>
</tr>
<tr>
<td>Amount of Re. Loan to be repaid</td>
<td>100000 \times 1.02 = 102000</td>
<td>100000 \times 1.05 = 105000</td>
</tr>
</tbody>
</table>

As the amount of Re. Received is less than the amount repaid there is no scope for covered interest arbitrage.

Illustration 14

L.B, Inc., is considering a new plant in the Netherlands the plant will cost 26 Million Euros. Incremental cash flows are expected to be 3 Million Euros per year for the first 3 years, 4 Million Euros the next three, 5 Million Euros in year 7 through 9, and 6 Million Euros in years 10 through 19, after which the project will terminate with no residual value. The present exchange rate is 1.90 Euros per $. The required rate of return on repatriated $ is 16%.

a. If the exchange rate stays at 1.90, what is the project’s net present value?
b. If the Euro appreciates to 1.84 for years 1-3, to 1.78 for years 4-6, to 1.72 for years 7-9, and to 1.65 for years 10-19, what happens to the net present value?

Solution

(Student may please note that the exchange rate between Euro and Pound may not reflect the current market situation – what needs to be understood is the application of the exchange rates)

(a) Cash flows (in millions)

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>1-3</th>
<th>4-6</th>
<th>7-9</th>
<th>10-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows (in Euros)</td>
<td>-26.0</td>
<td>3.00</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
</tr>
<tr>
<td>€/$ exchange rate</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
</tr>
<tr>
<td>Cash flows (in $)</td>
<td>-13.68</td>
<td>1.58</td>
<td>2.11</td>
<td>2.63</td>
<td>3.16</td>
</tr>
<tr>
<td>PVF@ 16%</td>
<td>1</td>
<td>2.2459</td>
<td>1.4388</td>
<td>0.9218</td>
<td>1.2709</td>
</tr>
<tr>
<td>PV of Cash flows (in $)</td>
<td>-13.68</td>
<td>3.55</td>
<td>3.03</td>
<td>2.42</td>
<td>4.02</td>
</tr>
</tbody>
</table>

NPV at 16% = -$0.66 million. The project is not acceptable.

(b) Cash flows (in Euros)

<table>
<thead>
<tr>
<th>Years</th>
<th>0</th>
<th>1-3</th>
<th>4-6</th>
<th>7-9</th>
<th>10-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flows (in Euros)</td>
<td>-26.0</td>
<td>3.00</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
</tr>
<tr>
<td>€/$ exchange rate</td>
<td>1.90</td>
<td>1.84</td>
<td>1.78</td>
<td>1.72</td>
<td>1.65</td>
</tr>
<tr>
<td>Cash flows (in $)</td>
<td>-13.68</td>
<td>1.63</td>
<td>2.25</td>
<td>2.91</td>
<td>3.64</td>
</tr>
<tr>
<td>PVF@ 16%</td>
<td>1</td>
<td>2.2459</td>
<td>1.4388</td>
<td>0.9218</td>
<td>1.2709</td>
</tr>
<tr>
<td>PV of Cash Flows (in $)</td>
<td>-13.68</td>
<td>3.66</td>
<td>3.23</td>
<td>2.68</td>
<td>4.62</td>
</tr>
</tbody>
</table>

NPV at 16% = $0.51 million. With the Euro appreciating relative to the dollar, cash flows are greater. The project is now acceptable, but not by a wide margin.

Illustration 15

A Company's international transfer of funds amounts to about $2 million monthly. Presently the average transfer time is ten days. It has been proposed that the transfer of funds be turned over to one of the larger international banks, which can reduce the transfer time to an average of two days. A charge of one-half of 1 percent of the volume of transfer has been proposed for this service. In view of the fact that the firm's opportunity cost of funds is 12 percent, should this offer be accepted?

Solution

$2,000,000 per month = $24,000,000 per year.

Time saved = 10-2 = 8 days funds are freed for other uses.

Investing $24,000,000 at 12% for 8 days: Yield = $24,000,000 x (0.12) x (8/360) = $64,000

% yield = 64,000/24,000,000 = 0.00267 or 0.267%

Since the firm saves less than 0.3% and the proposed charges is 0.5%, the services would not produce commensurate savings. However, the new transfer time would shorten the exposure of the funds to various risks by an average of 8 days. The firm must decide whether or not this reduction in risk is worth the difference between the proposed fee and the savings due to the shorter transfer time, 0.5% - 0.267% = 0.233%.
Summary

1. Introduction
Coupled with globalisation 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.

2. 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. 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.

3. Market Participants
The participants in the foreign exchange market can be categorized as follows:
(i) Non-bank Entities
(ii) Banks
(iii) Speculators
(iv) Arbitrageurs
(v) Governments

4. Nostro, Vostro and Loro Accounts
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”.

Vostro account is the local currency account maintained by a foreign bank/branch. It is also called “your account with us”.

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

5. Exchange Rate Determination
An exchange rate is, simply, the price of one nation’s currency in terms of another currency, often termed the reference currency. Equivalently, the dollar/rupee exchange rate is the number of dollars one rupee will buy.

(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.
European terms- The rate is quoted in terms of the number of units of the foreign currency for one unit of the domestic currency. This is called an indirect quote.

American terms- The alternative method, called the, expresses the home currency price of one unit of the foreign currency. This is called a direct quote.

(b) The Forward Market: A forward exchange rate 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.

6. Exchange Rate Quotation

(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.

(2) Direct and Indirect Quote: A foreign exchange quotation can be either a direct quotation and or an indirect quotation, depending upon the home currency of the person concerned.

A direct quote is the home currency price of one unit foreign currency. An indirect quote is the foreign currency price of one unit of the home currency. Direct and indirect quotes are reciprocals of each other, which can be mathematically expressed as follows.

Direct quote = 1/indirect quote and vice versa

(3) Bid, Offer and Spread: A foreign exchange quotes are two-way quotes, expressed as a ‘bid’ and an offer’ (or ask) 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. 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.

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

(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.

7. 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
(b) Fundamental Forecasting
(c) Market-Based Forecasting
(d) Mixed Forecasting
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)

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.

The Covered Interest Rate Parity equation is given by:

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

Where,

\((1 + r_D)\) = Amount that an investor would get after a unit period by investing a rupee in the domestic market at \(r_D\) rate of interest and \(\frac{F}{S}(1 + r_F)\) 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:

\[
r + r_D = \frac{S_1}{S}(1 + r_F)
\]

Where,

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

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

(1) 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.

In Equilibrium Form:

\[
S = \alpha \frac{P_D}{P_F}
\]

Where,

\(S (\text{₹ } /\$)\) = spot rate
\(P_D\) = is the price level in India, the domestic market.
\(P_F\) = is the price level in the foreign market, the US in this case.
\(\alpha\) = Sectoral price and sectoral shares constant.

The above equation implies that as the price level in India rises, Rupee depreciates against $, because for each dollar an increased number of dollars are to be paid.
12.46 Strategic Financial Management

(2) Relative Form: An alternative version of the absolute form that accounts for the possibility of market imperfections such as transportation costs, tariffs, and quotas embeds the sectoral constant. For Relative Form of the Purchase Power Parity, Equation is given by:

$$E(S_t) = S_0 \times \frac{(1 + l_0)}{(1 + l_d)}$$

i.e. in equilibrium the rate of change in exchange equals inflation rate differential.

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

8.4 Comparison of PPP, IRP and IFE Theories

<table>
<thead>
<tr>
<th>Theory</th>
<th>Key Variables</th>
<th>Basis</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Rate Parity (IRP) return</td>
<td>Forward rate premium (or discount)</td>
<td>Interest rate differential</td>
<td>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.</td>
</tr>
<tr>
<td>Purchasing Parity (PPP)</td>
<td>Percentage change in spot exchange rate</td>
<td>Inflation rate differential</td>
<td>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.</td>
</tr>
<tr>
<td>International Fisher Effect (IFE)</td>
<td>Percentage change in spot exchange rate</td>
<td>Interest rate differential</td>
<td>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.</td>
</tr>
</tbody>
</table>
9. **Risk Management**

Risk Management is, "any activity which identifies risks, and takes action to remove or control 'negative results' (deviations from the requirements)."

10. **Risk Considerations**

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

1. Financial Risk
2. Business Risk
3. Credit Risk (i.e. default risk)
4. Interest Rate Risk
5. Liquidity Risk
6. Market/Price Risk
7. Reinvestment Risk
8. Country Risk

11. **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."

12. **Types of Exposures**

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

12.1 **Transaction Exposure**: It deals with cash flows that result from existing contractual obligations.

12.2 **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 accounting purposes.

12.3 **Economic Exposure**: It refers to the extent to which the economic value of a company can decline due to changes in exchange rate.

13. **Techniques for Managing Exposure**

There are a range of hedging instruments that can be used to reduce risk. Hedging alternatives include: Forwards, futures, options, swaps, etc.

13.1 **Derivatives**: A derivatives transaction is a bilateral contract or payment exchange agreement whose value depends on - derives from - the value of an underlying asset, reference rate or index.

They include:

(a) **Forwards-Based Derivatives**: There are three divisions of forwards-based derivatives:
(i) The Forward Contract: The simplest form of derivatives is the forward contract. It obliges one party to buy, and the other to sell, a specified quantity of a nominated underlying financial instrument at a specific price, on a specified date in the future.

- **Extension of forward contracts:** The extension cost, simply put, is the difference between the spot rate prevailing on the date of the extension and the forward rate for the period upto which the contract is sought to be extended.

- **Cancellation of forward contract:** In case of cancellation of a contract at the request of the customer, the bank shall recover/pay as the case may be, the difference between the contracted rate and the rate at which the cancellation is effected.

In case there is no instruction from the customer, contracts which have matured, shall on the 15th day from the date of maturity be automatically cancelled. The customer will not be entitled to the exchange difference, if any, in his favour as the contract has been cancelled on account of his default.

- **Early delivery:** Early delivery is exactly the opposite of extension of forward contracts. Hence the same principles that apply to extension would also apply to early delivery.

(ii) Swaps: 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. The vast majority of swaps are classified into the following groups:

- **Interest Rate Swaps**
  In an interest rate swap, no exchange of principal takes place but interest payments are made on the notional principal amount. Interest payments can be exchanged between two parties to achieve changes in the calculation of interest on the principal.

- **Currency Swaps**
  These involve an exchange of liabilities between currencies. A currency swap can consist of three stages:
  - A spot exchange of principal
  - Continuing exchange of interest payments during the term of the swap
  - Re-exchange of principal on maturity.
  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 fora floating rate payment in another. These are also known as **Circus Swaps**.

- **Plain Vanilla Swaps**
  These are fixed-to-floating interest rate swaps between two parties in which each contracts to make payments to the other on particular dates in the future till a specified termination date.

- **Basis rate swaps**
  These are similar to plain vanilla swaps but in a basis rate swap both legs are floating rate but measured against different benchmarks.
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- **Asset swaps**
  These can be either a plain vanilla or a basis rate swap. Instead of swapping the interest payments on liability, one of the parties to the swap is swapping the interest receipts on an asset.

- **Mortgage swaps**
  A mortgage swap seeks to emulate the economic process of buying a collection of mortgage-backed securities and financing the acquisition with short-term variable-rate debt. It is like an interest rate swap with a long-term forward commitment.

- **Amortising swaps**
  These are swaps for which the notional principal falls over its term. They are particularly useful for borrowers who have issued redeemable debt. It enables them to match interest rate hedging with the redemption profile of the bonds.

- **Forward swaps**
  These are swaps arranged to run from some point in the future. They are similar to FRAs but are longer-term vehicles.

- **Swaptions**
  Options on swaps, they give the buyer of the swaption the right but not the obligation to enter into a swap agreement where term, notional principal and interest rates are predetermined. They are helpful in tenders where the bidder needs to fix costs but does not know who will win the contract.

- **Callable swaps**
  These are similar to swaptions but here the swap counterparty has the right to end the swap.

- **Canape swaps**
  These currency swaps have no initial or final exchange of principal. Interest payments in one currency are exchanged for interest payments in another.

**Equity Swaps**: Exchange of dividends earned and capital gains on a portfolio, which is based on a stock index against periodic interest payments. A equity portfolio manager may swap the variable gains on his equity portfolio to the fixed returns promised by equity swap dealer.

**Commodity Swaps**: One party pays a fixed price for the good (say crude) and the counterparty pays a market rate (variable rate) over the swap period. Commodity swaps are very common in the energy industry.

(iii) **Futures Contracts**: 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; | Usually requires two contracts
 | Multiple contracts avoided | |
**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

(b) **Options:** These products offer, in exchange for a premium, the right - but not the obligation - to buy or sell the underlying at the strike price during a period or on a specific date. An option is a contract which has one or 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.

**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:

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

As regards to using derivatives as a risk management technique, it can be said that the emergence of the market for derivatives products, forwards, futures and options, can be traced back to the willingness of risk-averse investors to guard themselves against uncertainties arising due to fluctuations in asset prices.

13.2 Money Market Hedge: A money market hedge involves simultaneous borrowing and lending activities in two different currencies to lock in the home currency value of a future foreign currency cash flow. The simultaneous borrowing and lending activities enable a company to create a homemade forward contract.

13.3 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.

13.4 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.

13.5 Leading and Lagging: Leading means paying an obligation in advance of the due date. Lagging means delaying payment of an obligation beyond its due date. Leading and lagging are foreign exchange management tactics designed to take advantage of expected devaluations and revaluations of currencies.

13.6 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.

13.7 Invoicing In Foreign 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.
13.8 **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.

13.9 **Arbitrage:** It refers to the process of buying and selling of currencies. The sale/purchase of currencies takes place within an unstable market. The prices are affected by the supply and demand of currencies and arbitrage helps in adjusting the market to equilibrium. The process of buying in one market and selling the same in another market is known as arbitrage.

14. **Strategies for Exposure Management**

There can be no single strategy which is appropriate to all businesses. Four separate strategy options are feasible for exposure management.

1. Low Risk: Low Reward
2. Low Risk: Reasonable Reward
3. High Risk: Low Reward
4. High Risk: High Reward