

Foreign Exchange Risk Management 16

This Module Includes:

- 16.1 Transaction Exposure**
- 16.2 Translation Exposure**
- 16.3 Operating Exposure**

Foreign Exchange Risk Management

SLOB Mapped against the Module

To develop a detail understanding of the sources and impact of risks to which an organisation is exposed to in a dynamic business environment at national and international level and the techniques for managing the same to sustain competitive advantages. (CMLO 3b, 3c)

Module Learning Objectives:

After studying this module, the students will be able to -

- ✦ Learn the techniques for measurement and management of transaction exposure
- ✦ Learn the techniques for measurement and management of translation exposure
- ✦ Learn the techniques for measurement and management of operating exposure

Introduction

Exchange rate risk or exchange rate exposure emanates from fluctuations in the foreign exchange rate. A firm that is engaged in any transactions with foreign entities is subject to this exposure. These transactions include exports, imports, borrowing, lending, portfolio investment and direct investment. Currency rate fluctuations affect the value of assets and liabilities arising out of these transactions and consequently revenues and costs are also subject to this risk.

Exchange rate fluctuations can affect not only firms which are directly engaged in international trade. Purely domestic firms may also be subject to this risk. An Indian leather goods manufacturer who sources only domestic materials and sells exclusively in the Indian market with no foreign currency receivables or payables, will certainly be exposed to foreign exchange risk if it competes against imports, say, from Chinese leather goods manufacturer.

This is because as Chinese yuan will depreciate against Indian Rupee, the Rupee price of Chinese goods will come down increasing their sales in India, thus harming the Indian manufacturer.

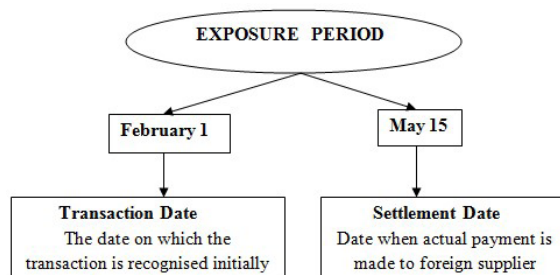
Thus, management of foreign exchange risk must be given utmost priority by firms operating internationally or facing foreign competitors.

In this context, the following sections of the Module discuss about measurement and management of three different types of exchange rate exposure namely Transaction Exposure, Translation Exposure and Economic Exposure.

16.1.1 Transaction Exposure

Meaning: Transaction risk refers to the effect of exchange rate movement associated with the time-gap between the date of the transaction and the date on which the consideration is settled. These generally occur at operational level.

Explanation: When a business entity concludes a purchase or sale of an asset with a customer outside India, a transaction takes place. Transaction risk occurs when there is a time gap between the date of the sale (or purchase) of goods and the date of receipt (or payment) of proceeds.



For example, a transaction takes place on Feb. 1 but the settlement (payment of consideration) takes place on 15th May. While the transaction (and hence the receivable or payable) is recorded on Feb. 1 at the prevailing exchange rate, the actual receipt or payment leading to settlement takes place on and is recorded on May 15, at the exchange rate prevailing on May 15. Since these two rates may not be the same, risk arises. In the above example, the difference in exchange rates between 1st Feb. And 15th May represents transaction risk.

16.1.2 Management of Transaction Exposure

The techniques used for management of transaction exposure can be categorized into two classes: (A) Internal techniques and (B) External techniques. These are explained below:

A. Internal Techniques for Management of Transaction Exposure

The major techniques for Management of Transaction Exposure are:

- Choice of a particular currency for invoicing receivables and payables
- Leading and lagging
- Exposure Netting
- Back-to-back credit swap
- Sharing risk

The above techniques are called internal as the firm does not have to take recourse to any external agency or market to apply these techniques. These techniques are some internal arrangements either between different subsidiaries of the a single MNC or between two transacting but unrelated companies.

a) Choice of a particular currency for invoicing

A very simple way of eliminating the transaction exposure is to invoice all receivables and payables in the domestic currency. Invoice in home currency or foreign currency in respect of an export and whether, to receive invoices home currency or foreign currency in respect of an import would depend on which way the currency is expected to move. The Rule is simple. “In the case of export, you should select that currency (home or foreign) which would lead to higher Rupee realisation. In the case of import you should select the currency (home or foreign) which would lead to a lower Rupee outflow.” The following snapshot should help:

Foreign Currency	Export Invoicing	Import Invoicing
Appreciates	Foreign currency	Home currency
Depreciates	Home currency	Foreign currency

b) Leading and Lagging

A firm will accelerate or delay receipt from or payment to foreign counter parties, depending upon what is beneficial to it in the context of the movement in exchange rate. In case, home currency is expected to depreciate, an importer would like to expedite or lead payments of the payables due. On the other hand, in the same situation, an exporter will be better off by delaying or lagging the receipts in foreign currency.

For example, suppose a firm has payables of US\$1,00,000 due in one month. Anticipating appreciation of rupee against dollar it delays payment to 3 months. If the rates after one month and three months turn out to be ₹ 66 per dollar and ₹ 65.50 per dollar respectively, the firm will save ₹ 50,000 [1,00,000 (66.00 - 65.50)] by delaying payments. Of course, it will have to negotiate with its counter party and as a result, the savings will be less than ₹ 50,000. Let us suppose that the counter party agrees to delay the settlement if it is paid US \$1,00,500 instead of US \$1,00,000. Therefore, the Indian firm will effectively be paying ₹ 6,582,750. Still the firm saves ₹ 17,250 (100000 × 66 - 100500 × 65.50).

c) Exposure Netting

Netting: Netting is a process under which debit balances are netted off against credit balances, so that only the net amounts remain due to be paid in actual currency flows. Very clearly, this is not a tool for managing exchanging risks. The objective here is to save on transaction costs, by netting off inter company balances, before payment is arranged.

- i) **Bilateral Netting:** In this arrangement, only two entities are involved. The lower balances are netted off against higher balances, and the remainder is paid or received.
- ii) **Multi-lateral Netting:** This process is adopted mostly among three or more subsidiaries (or outfits) in the same group (under one control). The procedure is slightly more complex than bilateral netting, but the essential idea is the same. The arrangement is generally coordinated by the Group's treasury operations department, at its Group Headquarters.

d) Back-to-Back Credit Swap

Under this method, two companies, located in two different countries, agree to exchange loans in their respective currencies. Loans are given for a pre-specified fixed period at a pre-specified exchange rate. On maturity, the sums are again re-exchanged. This arrangement can work effectively between MNCs of two different countries, each having subsidiaries in the country of the other. For example, Hitachi (an MNC of Japan) has a subsidiary in USA while Procter & Gamble (an MNC of USA) has a subsidiary in Japan. The subsidiary of Mitsubishi located in USA needs to raise a dollar loan whereas the subsidiary of Microsoft located in Japan needs yen loan. Each parent company can advance loans to the subsidiary of the other in the former's home currency. The loan amount is equivalent in the two currencies. (US dollar and Japanese yen). After the period of loans is over, the sum will again be re-exchanged. Thus, the two companies have been able to manage their exchange risk internally.

e) Sharing Risk

Any two companies from two different countries can practice this technique. The basic principle underlying this technique is that both the parties will share the loss arising out of unfavorable movement of foreign exchange rate. This may be achieved by denominating the transaction partly in each of the domestic currencies of the parties involved. This way, the exposure for both the parties gets reduced.

For example, suppose, a French aircraft manufacturing company has sold aircrafts to a UK company. One way is to invoice the whole sales price of €10 million in euros. In this case the French company will shift the entire exchange risk to the UK Company. Alternatively, the sales can be invoiced as £7 million. This means that the exchange risk is now totally shifted to the French company. The third possibility is that the sales be invoiced as €5 million plus £3.5 million. This arrangement enables both the parties to share the exchange risk.

B. External Techniques for Management of Transaction Exposure

The major external risk management techniques include:

- a) Hedging through Currency Forward Market
- b) Hedging through Money Market
- c) Hedging through Currency Options Market
- d) Hedging through Currency Futures Market

These techniques are called External Techniques simply because the various instruments that are used are external to a business organisation. In order to avail these techniques, the company needs to enter into a contractual agreement with an external agency.

The techniques are discussed below:

a) Hedging through Currency Forward Market

In order to hedge its transaction exposure, a company having a long position in a currency (having a receivable) will sell the currency forward, i.e., go short in the forward market, and a company having a short position in a currency (having a payable) will buy the currency forward, i.e., go long in the forward market.

The idea behind buying or selling a currency in the forward market is to lock the rate at which the foreign currency transaction takes place, and hence, the costs or profits.

For example, if an Indian firm is importing computers from the USA and needs to pay \$1,00,000 after 3 months to the exporter, it can book a 3-month forward contract to buy \$1,00,000. If the 3-month forward rate is ₹ 62.50 per \$, the cost to the Indian firm will be locked at ₹ 62,50,000. Whatever be the actual spot price at the end of three months, the firm needs to pay only the forward rate. Thus, a forward contract eliminates transaction exposure completely.

The cost of a forward hedge can be measured by the opportunity cost, which depends on the expected spot rate at which the currency needs to be bought or sold in the absence of the forward contract. Hence, the cost of a forward hedge is measured as the difference between the forward rate and the expected spot rate for the relevant maturity. In an efficient market, as mentioned earlier, the forward rate is an unbiased predictor of the future spot rate. The process equating these two requires the speculators to be risk-neutral. Hence, when the markets are efficient and the speculators are risk-averse, the cost of hedging through the forward market will be nil.

Consider the following example.

An Indian importer has bought goods worth \$6,00,000 from an American company. The payables are due in three months. The US dollar has a tendency to appreciate. The rates available are as follows:

Spot rate: ₹ 64.00/\$

3-m forward rate: ₹ 65.50/\$

The value of payables on the date of transaction between the Indian and the American company is ₹ 32 million ($\$5,00,000 \times ₹ 64/\$$), but the importer will have to pay more than this amount, if US dollar appreciates during the three months that remain before settlement. To avoid this uncertainty, the importer covers his payables by buying US dollars in forward market. Once he does so, the value of his payable becomes ₹ 32.75 million ($\$5,00,000 \times ₹ 65.50/\$$).

After the import transaction, he waits for 3 months and then he pays ₹ 32.75 million to the foreign exchange dealer to receive \$500,000 which he pays to the American company. By covering in the forward market, he has ensured that he has to pay neither more nor less than ₹ 32.75 million.

Suppose the spot rate on the date of settlement turns out to be ₹ 66.00/\$. It is easy to see that by buying forward, the importer has made a notional gain of ₹ 0.50 per dollar. In other words, his total notional gain is ₹ 2,50,000 ($500,000 \times 0.50$).

Instead of appreciation, if dollar actually depreciates to ₹ 63.80/\$ on the date of settlement. In that case, the importer made a notional loss of ₹ 0.20/\$ ($₹ 64 - ₹ 63.80$) if compared with the spot exchange rate as it was on the date of transaction and a much bigger loss of ₹ 1.70/\$ ($₹ 65.50 - ₹ 63.80$) if compared with the forward rate.

However, as explained in the previous example, notional gains or losses are only post-event exercises. The main purpose of hedging was to reduce uncertainty about the amount in rupees to be paid out for the imports.

That amount is ₹ 32.75 million, neither more nor less, with no uncertainty whatsoever.

b) Hedging through Money Market

Money markets can also be used for hedging foreign currency receivables or payables. Let us say, a firm has a dollar payable after three months. It can borrow in the domestic currency now, convert it at the spot rate into dollars, invest those dollars in the money markets, and use the proceeds to pay the payable after three months. This process locks the exchange rate at which the firm needs to buy dollars. At the same time, it knows its total cost in advance in the form of the principal and interest it needs to repay in the domestic markets.

Consider the following example.

A French exporter has an exposure of £1 million in the form of receivables. The following money market data are given:

3-m interest rate:

Euro: 5.5% p.a.

Pound Sterling: 8% p.a.

Spot exchange rate: €1.4120/£

The process of money market hedge will be as follows:

Step 1: Borrow a sum of pound sterling at 8% p.a. interest for three months such that this sum become £1 million along with the interest after 3 months. Say, the borrowed amount is B. Thus,

$$B(1 + 0.08 \times 3/12) = \text{£1 million}$$

$$B = \text{£1}/1.02 = \text{£0.98039 million}$$

Step 2: Sell this borrowed sum of pound sterling in the spot currency market at the rate of €1.4120/£ to get euros. The amount in euros is going to be $\text{£0.98039} \times \text{€1.4120/£ million} = \text{€1.3843 million}$

Step 3: Place €1.3843 million for 3 months in the money market at the rate of 5.5% p.a. Thus, at the end of 3 months, the amount that the French exporter will have is:

$$\text{€1.3843} \times (1 + 0.055 \times 3/12) \text{ million}$$

$$= \text{€1.4033 million}$$

Step 4: Refund the loan and interest combined that works out to be £1 million as soon as this amount is received from the British company. It is clear that irrespective of the movement of the exchange rate, the exporter will have a definite amount of €1.4033 million. There is no uncertainty about this amount. This has been possible due to hedging in money market.

c) Hedging Through Options

Options can prove to be a useful and flexible tool for hedging transaction and translation exposure. A firm having a foreign currency receivable can buy a put option on the currency, having the same maturity as the receivable. Conversely, a firm having a foreign currency payable can buy a call option on the currency with the same maturity.

Hedging through options has an advantage over hedging through forwards or futures. While the latter fixes the price at which the currency will be bought or sold, options limit the downside loss without limiting the upside potential. That is, since the firm has the right to buy or sell the foreign currency but not the obligation, it can let the option expire by not exercising its right in case the exchange rates move in its favour, thereby making the profits it would not have made had it hedged through forwards or futures, but this advantage does not come free, because of this feature, options generally cost more than the other tools of hedging.

Consider the following example.

A German company has payables of \$10 million due to be paid in one month. The company wants to hedge this exposure by using a call option. The data are as follows:

Spot exchange rate: \$1.20/€

Option strike price: \$1.19/€

Maturity: One month

Option premium: 2.5%

The German company knows that the dollar has tendency to appreciate in near future. So, it buys call option for the underlying dollar amount of \$10 million. For this, it pays the premium upfront, which works out to be:

$$\begin{aligned} & \text{€}0.025 \times 10/1.20 \text{ million} \\ & = \text{€}0.2083 \text{ million} \end{aligned}$$

On the maturity date, different scenarios can be as follows:

Situation 1: Dollar does appreciate against euro and the spot rate on the settlement date is \$1.175/€

The company exercises its call option and buys required amount of dollars at the rate of \$1.19/€. Thus, the total sum paid by the company is

$$\begin{aligned} & \text{€}10/1.19 + \text{Premium already paid} \\ & = \text{€}8.4034 + \text{€}0.2083 \text{ million} \\ & = \text{€}8.6117 \text{ million} \end{aligned}$$

Situation 2: Dollar does appreciate against euro and the spot rate on the settlement date is \$1.19/€

The company is said to be indifferent between exercising and abandoning its call option. In either situation, it will pay €10/1.19 + Premium already paid

$$\begin{aligned} & = \text{€}8.4034 + \text{€}0.2083 \text{ million} \\ & = \text{€}8.6167 \text{ million} \end{aligned}$$

Situation 3: Dollar depreciates against euro and the spot rate on the settlement date is \$1.21/€

The company abandons its call option and buys required amount of dollars directly from the exchange market.

The total outgo in euro works out to be

€10/1.21 + Premium paid on call option

= €8.2645+ €0.2083 million

= €8.4728 million

Thus, the company does not have to pay more than 08.6167 irrespective of the degree of appreciation of dollar, but it benefits from the favorable movement (depreciation) of dollar.

d) Hedging Through Currency Futures

Another way to hedge exposure is through futures. The rule is the same as in the forward market, i.e., go short in futures if you are long in the currency and vice versa. Hence, if an importer needs to pay \$5,50,000 after four months, he can buy dollar futures for the required sum and maturity. Futures can be similarly used for hedging translation exposure. Hedging through futures has an effect similar to hedging through forward contracts, As the gain/loss on the futures contract gets cancelled by the loss/gain on the underlying transaction, the exposure gets almost eliminated. Here it is assumed that basis remains constant. Only a small part of the exposure is left due to the mark-to-market risk on the futures contract. The main difference between hedging through forwards and through futures is that while under a forward contract the whole receipt/payment takes place at the time of maturity of the contract, in case of futures, there has to be an initial payment of margin money, and further payments/receipts during the tenure of the contract on the basis of market movements.

Consider the following example.

An American company expects to receive €6 million in December from its European client. Euro is likely to depreciate against dollar between now and settlement date. The exchange data available now are as follows:

Spot rate: \$1.200/€

December euro futures: \$1.196/€

The American company decides to hedge its exposure in futures market. The standard size of euro futures is €125000. The number of euro futures needed for hedging the exposure is:

$€6000000/€125000 = 48$

The number of euro futures required being an exact number, it is clear that the hedge ratio is 1 and the full amount of €6 million can be hedged.

The American company sells 48 December euro futures by depositing guarantee margin and follows daily movement of futures. It honours margin call whenever required or withdraws excess amount from its margin account.

On 20 December, it decides to close the futures contract by a reverse operation. The rates on 20 December are:

Spot rate: \$1.1925/€

December futures: \$1.1890/€

It is clear that the American company suffered a loss on spot market as the rate has come down from \$1.20/€ to \$1.1925/€. But on the future market, it makes a gain as the futures which was sold at \$1.196 is trading at a lower rate of \$1.1890/€.

The loss on spot market = \$6 million \times (1.200 - 1.1925) = \$0.045 million

The gain on Futures = \$6 million \times (1.196 - 1.189) = \$0.042 million

Thus, a part of the loss suffered on spot market has been compensated by the gain on futures market. The hedge efficiency is 93 per cent (0.042/0.045).

16.2.1 Meaning of Translation Exposure

While transaction exposure arises out of day-to-day activities of the firm, translation exposure arises due to the need to translate the foreign currency values of assets and liabilities into the domestic currency. Translation of the balance sheet items from their value in foreign currency to that in domestic currency is done in order to consolidate the accounts of various subsidiaries. Therefore, translation exposure is also called Consolidation Exposure or Balance Sheet Exposure.

Suppose, an Indian parent company has a subsidiary in the UK. In the beginning of the year, the UK subsidiary has plant and machinery, inventory and cash valued at £400,000, £200,000 and £40,000 respectively. The exchange rate is ₹65 per pound. Therefore, the translated value of these assets is ₹41,600,000. At the end of the year, the assets are \$420,000 (plant and machinery), \$210,000 (inventory) and \$20000 (cash) respectively. At the exchange rate of ₹66 per pound, the translated value becomes ₹42,900,000. Thus, there is a translation “gain” of ₹1,300,000 on asset side of the balance sheet. Similarly, there must have been a translation “loss” on liabilities of the subsidiaries such as, debts-denominated in pounds.

It may be noted in this context that the above gain and loss is only notional and there is no real inflow or outflow of cash as the assets and liabilities are not liquidated in practice.

16.2.2 Translation Rules

There are four methods of foreign currency translation. These are as follows:

- a) **Current/Non-current Method:** The basic principle behind the current/non-current method is that assets and liabilities are translated on the basis of their maturity. Under the current/non-current method, all current assets and current liabilities of foreign affiliates are translated into the parent currency at current exchange rates. All noncurrent assets, non-current liabilities, and owners’ equity are translated at historical exchange rates. Hence, under this method, there will be a translation gain (loss) if the foreign currency (the currency in which the subsidiary keeps its books) appreciates (depreciates) in case the subsidiary has net positive working capital.
- b) **Monetary/Non-monetary Method:** As per this method, all monetary items of balance sheet of a foreign subsidiary are translated at the current exchange rate while all the non-monetary items in the balance sheet, including equity, are translated at the historical exchange rate. The income statement items, under this method, are translated at the average exchange rate for the accounting period.
- c) **Temporal Method:** Under generally accepted accounting principles of historical accounting in the United States, the temporal method produces essentially the same results as the monetary/non-monetary method. The only difference is that under the monetary/non-monetary method, inventory is always translated at the historical rate. Under the temporal method, inventory is usually translated at the historical rate, but it could be translated at the current rate if inventory is carried at market prices or at replacement costs.

- d) Current Rate Method:** The current-rate method is the simplest; all assets and liabilities are translated at the current rate. Existing equity accounts such as common stock and paid-in capital are translated at the historical rate.

16.2.3 Management of Translation Exposure

The risk of translation exposure can be effectively managed by the following strategies:

(a) Balance Sheet Hedge

A balance sheet hedge involves the selection of the currency in which exposed assets and liabilities are denominated so that an exchange rate change would make exposed assets equal to exposed liabilities. In order to do so, a company must maintain the same amount of exposed assets and exposed liabilities in a particular currency. Thus, a devaluation would affect both types of balance sheet accounts equally leading to a situation where gain in one will get offset by loss on the other. When an MNC has several subsidiaries, a variety of funds-adjustment techniques can be used to reduce its translation loss. These techniques require the company to adopt the following two basic strategies:

- i) The company must decrease soft-currency assets and increase soft-currency liabilities.
- ii) The company must increase hard-currency assets and decrease hard-currency liabilities.

Hard currencies are those currencies that are likely to appreciate; soft currencies are those currencies that are likely to depreciate. Thus, if the company thinks that the local currency is likely to depreciate, it should reduce local-currency assets and/or increase local-currency liabilities to generate local-currency cash. In order to reduce translation exposure, these local-currency funds must be converted into hard-currency assets. This conversion can be accomplished, either directly or indirectly, by a variety of funds-adjustment techniques. Direct funds-adjustment techniques include pricing exports in hard currencies and imports in the local currency, investing in hard-currency securities, and replacing hard-currency loans with local-currency loans.

(b) Indirect Funds Adjustment Methods

A variety of indirect funds-adjustment methods can be used to reduce foreign-currency exposure. These are as follows:

- ✦ **Exposure Netting** (Refer to discussion in Module 16.1.2)
- ✦ **Leading and Lagging** (Refer to discussion in Module 16.1.2)
- ✦ **Transfer Pricing:** Transfer prices are prices of goods and services sold between related parties, such as a parent and its subsidiary. Transfer prices are frequently different from arm's length prices (fair market prices) so that they can be used to avoid foreign-currency exposure. For example, an MNC can remove funds from soft-currency countries by charging higher transfer prices on goods sold to its subsidiaries in those countries. For the same reason, an MNC can keep funds at those subsidiaries in hard-currency countries by charging lower prices on goods sold to its subsidiaries in those countries. Governments usually assume that MNCs manipulate their transfer prices to avoid financial problems or to improve financial conditions. Thus, most governments set up policing mechanisms to review the transfer pricing policies of MNCs.

16.3.1 Meaning of Operating Exposure

Operating exposure emanates from those items which have an impact on cash flows but whose values are not contractually defined, as is the case of transaction exposure. Some examples of operating exposure are as follows:

- a) A deal for buying or selling of goods is under negotiation. The price of goods being negotiated may be affected by fluctuations in the exchange rate.
- b) If a part of raw material is imported, the cost of production will increase following a depreciation of the home currency.
- c) Domestic inflation will increase input costs of the firm even if there is no change in the exchange rate. This will adversely affect its competitiveness vis-a-vis the firms of other countries.
- d) Tender submitted for a contract remains an item of operating exposure until the award of contract. Once the contract is awarded, it becomes transaction exposure.
- e) Interest cost on working capital requirements may increase if money supply is tightened following a depreciation of the home currency.

Unfavourable movement in exchange rate will affect future revenues as well as costs and hence operating profits of the firms. Consequently, these effects the long-term prospect and competitiveness of firms. This is why operating exposure is also called **Strategic Exposure**. It influences the long-term business decisions such as production, marketing, sources of supply and location of production facilities etc.

The two cash-flow exposures—operating exposure and transaction exposure—combine to equal a company's economic exposure. In technical terms, economic exposure is the extent to which the value of the firm, as measured by the present value of its expected cash flows, will change when exchange rates change.

16.3.2 Management of Operating Exposure

The risk of economic exposure can be hedged either by operational strategies or currency risk mitigation strategies.

a) **Diversifying Production Facilities and Markets for Products**

Diversifying the production facilities and sales to a number of markets rather than concentrating on one or two markets would mitigate the risk inherent. However, in such cases, the companies have to forego the advantage earned by economies of scale.

b) **Choosing Currency Zones**

Avoidance of inflexible currency zones and locating production and sales in many currency zones with high currency diversification benefit may help to minimize economic exposure.

c) Sourcing Flexibility

Companies may have alternative sources for acquiring key inputs. The substitute sources can be utilized in case the exchange rate fluctuations make the inputs expensive from one region.

d) Flexible Manufacturing

Creation of flexible manufacturing systems that allow rapid product differentiation for acquiring greater control over foreign currency prices and faster introduction of new products in overseas markets may also help firms to manage economic exposure. In addition, development of production systems that can promptly respond to product changes and can be used to tailor products to unique niches in the market place and also reduce the sensitivity of products to foreign currency price changes as well as provide the means to exploit exchange rate changes.

e) Diversifying Financing

A company can have access to capital markets in a number of major regions. This enables the company to gain flexibility in raising capital in the market with the cheapest cost of funds.

f) Making R&D effort for product differentiation

R&D activity aims at strengthening competitive position of a firm against the adverse effect of exchange rate changes. R&D can bring about gains in productivity, reduction in costs and, most importantly, differentiation in products that the firm offers. New or differentiated products have inelastic demand. That is, their demand is not or less sensitive to price variations. Price inelasticity would make the firm immune to economic exposure.

g) Hedging through financial products

Though various ways outlined above will be necessary for effective management of economic exposure, financial products should be used as supplements as far as possible. The firm can use forward, futures or option contracts. These contracts can be rolled over several times, if the situation so demands. Also, the firm can borrow and/or lend foreign currencies on long-term basis.

Additional Illustrations

- On 25th March 2023, a customer requested his bank to remit DG 12,50,000 to Netherlands in payment of import of diamonds under an irrevocable LC. However due to bank strikes, the bank could affect the remittance only on 2nd April 2023. The inter-bank market rates were as follows:

Date	25.03.2023	02.04.2023
Bombay [\$ / ₹100]	2.2873 - 2.2962	2.3063 - 2.3159
London [US\$/Pound]	1.9120 - 1.9135	1.9050 - 1.9070
DG /Pound	4.1125 - 4.1140	4.0120 - 4.0130

The bank wishes to retain an exchange margin of 0.25%. How much does the customer stand to gain or lose due to the delay?

Solution:**1. Determination of Rupee Value of DG 1 on 25.03.2023**

Process: Buy US \$ at Ask Rate at Bombay ⇒ Buy Pound (using US \$) at Ask Rate at London
⇒ Sell Pound at Bid Rate for DG

$$\begin{aligned}
 \text{Therefore, ₹ / DG} &= \text{Ask Rate at Bombay (for Purchase of Dollar)} \times \text{Ask Rate for Pound at London (for Purchase of Pound)} \times \text{Bid Rate for DG (for conversion of Pound into DG)} \\
 &= 100/2.2873 \times 1.9135 \times (1/4.1125) \\
 &= ₹20.34 \text{ per DG}
 \end{aligned}$$

2. Determination of Rupee Value of DG 1 on 02.04.2023

Process: Buy US \$ at Ask Rate at Bombay \Rightarrow Buy Pound (using US \$) at Ask Rate at London
 \Rightarrow Sell Pound at Bid Rate for DG

$$\begin{aligned}
 \text{Therefore, ₹/DG} &= \text{Ask Rate at Bombay (for Purchase of Dollar)} \times \text{Ask Rate for Pound at London (for Purchase of Pound)} \times \text{Bid Rate for DG (for conversion of Pound into DG)} \\
 &= 100/2.3063 \times 1.9070 \times (1/4.0120) \\
 &= ₹20.61 \text{ per DG}
 \end{aligned}$$

3. Loss because of Delay

(a) Loss without considering Banker's Margin (Extra Money payable by the Company)

$$\begin{aligned}
 &= \text{Amount Payable} \times (\text{Exchange Rate on the date of a ctual payment} - \text{Exchange Rate on the date on which payable}) \\
 &= \text{DG } 12,50,000 \times (\text{₹}20.61 - \text{₹}20.34) = \text{₹}3,37,500
 \end{aligned}$$

(b) Banker's Margin on Loss

$$= \text{₹}3,37,500 \times 0.25\% = \text{₹} 844$$

(c) Total Loss to the Company

$$= \text{₹}3,37,500 + \text{₹}844 = \text{₹}3,38,344$$

2. Evaluation of Forward Premium – Encashing Foreign Currency Deposits – The following 2 – way quotes appear in the foreign exchange market –

	Spot Rate	2-Months Forward
₹/ US \$	₹46.00/ ₹46.25	₹47.00/ ₹47.50

Required –

- How many US Dollars should a firm sell to get ₹25 Lakhs after two months?
- How many Rupees is the firm required to pay to obtain US \$2,00,000 in the spot market?
- Assume the firm has US \$ 69,000 current account's earning interest. ROI on Rupee Investment is 10% p.a. should the firm encash the US \$ now, 2 months later?

Solution:**1. (a) US dollars for ₹25 Lakhs in the forward Market**

Action	Sell Foreign Currency in Forward Market
Relevant Rate	Forward Bid Rate = ₹47.00
US \$ Required to get ₹25,00,000	$₹25,00,000 \div ₹47.00 = \text{US } \$ 53,191.49$

(b) Rs. Required to obtain US dollars 2,00,000 in the Spot Market

Action	Buy Foreign Currency in Spot Market
Relevant Rate	Spot Ask Rate = ₹46.25
Rupees Required to obtain US\$2,00,000	$\text{US } \$ 2,00,000 \times ₹46.25 = ₹92,50,000$

(c) Evaluation of Investment in Rupees

Forward Premium (For Bid Rates)

$$= (\text{Forward Rate } ₹47 - \text{Spot Rate } ₹46) / \text{Spot Rate } ₹46 \times 12/2 \times 100 = 13.04\%$$

Observation and conclusion: Annualized Forward Premium for Bid Rates (13.04%) is greater than the Annual Return on Investment in Rupees (10%). Therefore, the firm should not encash its US \$ balance now. It should sell the US \$ in the forward market and encash them two months later.

Alternatively,

Particulars	Encash Now	Encash 2 Months Later
Relevant Rate	Spot Bid Rate = ₹46.00	Forward Bid Rate = ₹47.00
₹ available for US \$ 69,000	₹31,74,000	₹32,43,000
Add: Interest for 2 Months (if converted now)	₹52,900 ($31,74,000 \times 10\% \times 2/12$)	Not Applicable
Amount Available after Two Months	₹32,26,900	₹32,43,000

Conclusion: Encashing two months later yields higher Rupee Return than encashing now and investing in Rupee Deposits. Therefore, the firm should wait for two months to encash under forward market.

3. Ankita Papers Ltd (APL), on 1st July 2023 entered into a 3 Month forward contract for buying GBP 1,00,000 for meeting an import obligation. The relevant rates on various dates are-

Date	Nature of Quote	Quote
01.07.2023	Spot	₹ 81.50 - 81.85
	3-Month Forward	₹ 81.90 - 82.30
01.08.2023	Spot	₹ 82.10- 82.40
	2-Month Forward	₹ 82.25 - 82.60
01.09.2023	Spot	₹ 81.70 - 82.05
	1-Month Forward	₹ 82.00 - 82.30
	2-Month Forward	₹ 82.40 - 82.70
01.10.2023	Spot	₹ 82.50 - 82.75

	1-Month Forward	₹ 82.60 - 82.90
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Explain the further course of action if APL—

(A) Honours the contract on

- ✦ 01.10.2023
- ✦ 01.09.2023; and meets the import obligation on the same date.

(B) Cancels the contract on —

- ✦ 01.08.2023
- ✦ 01.09.2023
- ✦ 01.10.2023; as the import obligation does not materialize.

(C) Rolls over the contract for --

- ✦ 2 Months on 01.09.2023
- ✦ 1 Month on 01.10.2023; as the import obligation gets postponed to 01.11.2023. Also determine the cost/ gain of that action. Ignore transaction costs.

Solution:

A. APL Honours the Contract

On (Date)	Action	Cost/ Gain
01.10.2023	No Further Action	NIL
01.09.2023	<ul style="list-style-type: none"> ✦ Original deal (Buy Contract) should be cancelled. ✦ Sell Forward: Therefore, APL should enter into a 1-Month Forward Contract for sale of GBP 1,00,000 at ₹82.00 (Forward Bid Rate) for reversal of original contract. ✦ Settlement of Difference: Net difference between the original contract and the new contract should be settled i.e., GBP 1,00,000 × (3-Month Buy Rate (Ask Rate) as on 01.07.2023 ₹82.30 Less 1-Month Sell Rate (Bid Rate) as on 01.09.2023 ₹82.00) = ₹30,000 to be paid to the Banker. ✦ Buy Spot: Buy GBP 1,00,000 at Spot Ask Rate of ₹82.05 and settle the import obligation. 	Cost of Settlement ₹30,000.

B. APL Cancels the Contract

On (Date)	Action	Cost/ Gain
01.08.2023	<ul style="list-style-type: none"> ✦ Original deal (Buy Contract) should be cancelled. ✦ Sell Forward: Therefore, APL should enter into a 2-Month Forward Contract for sale of GBP 1,00,000 at ₹82.25 (Forward Bid Rate) for reversal of original contract. ✦ Settlement of Difference: Net difference between the original contract and the new contract should be settled i.e., GBP 1,00,000 × (3-Month Buy Rate (Ask Rate) as on 01.07.2023 ₹82.30 Less 2-Month Sell Rate (Bid Rate) as on 01.08.2023 ₹82.25) 	Cost of Cancellation ₹5,000.

	= ₹5,000 to be paid to the Banker.	
01.09.2023	<ul style="list-style-type: none"> ✦ Original deal (Buy Contract) should be cancelled. ✦ Sell Forward: Therefore, APL should enter into a 1- Month Forward Contract for sale of GBP 1,00,000 at ₹82.00 for reversal of original contract. ✦ Settlement of Difference: Net difference between the original contract and the new contract should be settled i.e. GBP 1,00,000 × (3-Month Buy Rate (Ask Rate) as on 01.07.2023 ₹82.30 Less 1-Month Sell Rate (Buy Rate) as on 01.09.2023 ₹82.00) <p>= ₹30,000 to be paid to the Banker.</p>	Cost of Cancellation ₹30,000.
01.10.2023	<ul style="list-style-type: none"> ✦ Original deal (Buy Contract) should be cancelled. ✦ Sell Spot: Therefore, APL should sell GBP 1,00,000 at the Spot Bid Rate of ₹82.50 for reversal of original contract. ✦ Settlement of Difference: Net difference between the original contract and the spot sale contract should be settled i.e., GBP 1,00,000 × (3-Month Buy Rate-(Ask Rate) as on 01.07.2023 ₹82.30 Less Spot Bid Rate as on 01.10.2023 ₹82.50) <p>= (₹20,000) i.e., ₹20,000 to be received from the Banker.</p>	Gain on Cancellation ₹ 20,000.

C. APL Rolls Over the Contract for a further period of Two Months

On (Date)	Action	Cost / Gain
01.09.2023	<ul style="list-style-type: none"> ✦ Original deal (Buy Contract) should be cancelled. ✦ Sell Forward: Therefore, APL should sell GBP 1,00,000 at the 1-Month Forward Bid Rate of ₹82.00 for reversal of original contract. ✦ Settlement of Difference: Net difference between the original 3-Month Forward Buy Contract and 1-Month Forward Sell Contract should be settled i.e., GBP 1,00,000 × (3-Month Buy Rate (Ask Rate) as on 01.07.2023 ₹82.30 Less 1-Month Sell Rate (Bid Rate) as on 01.09.2023 ₹82.00) = ₹30,000 i.e., ₹30,000 to be paid to the Banker. ✦ Buy Forward: APL should buy GBP 1,00,000 at 2-Month Forward Ask Rate of ₹82.70. 	Cost of Roll Over ₹30,000.
01.10.2023	<ul style="list-style-type: none"> • Original deal (Buy Contract) should be cancelled. • Sell Spot: Therefore. APL should sell GBP 1,00,000 at the Spot Bid Rate of ₹82.50 for reversal of original contract. • Settlement of Difference: Net difference between the original 3-Month Forward Buy Contract and the Spot Bid Rate of ₹82.50 should be settled i.e. GBP 1,00,000 × (3-Month Buy Rate (Ask Rate) as on 01.07.2023 ₹82.30 Less Spot Bid Rate as on 01.10.2023 ₹82.50) = (₹20,000) i.e., ₹20,000 to be received from the Banker. 	Gain on Roll Over ₹20,000.

- **Buy Forward:** APL should buy GBP 1,00,000 at 1-Month Forward Ask Rate of ₹82.90.

4. Sunny Ltd. (SL), have exported goods to UAE for Arab Emirates Dirham (AED) 5,00,000 at a credit period of 90 days. Rupee is appreciating against the AED and SL is exploring alternatives to mitigate loss due to AED Depreciation. From the following information, analyze the possibility of Money Market Hedge —

Foreign Exchange Rates		
	Bid	Ask
Spot	₹11.50	₹ 11.80
3-Month Forward	₹11.20	₹ 11.40

Money Market Rates		
	Deposit	Borrowings
AED	9%	12%
Rupees	8%	10%

Solution:

Facts: SL will sell AED 5,00,000 in 3 Months

Evaluation: Money Market Hedge is possible only if the 3-Month Forward Rate is lower than value of Spot Bid in the next 3 Months (computed by applying AED Borrowing Rate and Rupee Deposit Rate).

Value of Spot Bid

$$\begin{aligned}
 \text{In 3 Month's Time} &= \text{Spot Bid Rate} \times \frac{(1 + \text{Rupee Deposit Rate for 3 Months})}{(1 + \text{AED Borrowing Rate for 3 Months})} \\
 &= 11.50 \times \frac{(1 + 8\% \text{ p.a. for 3 Months})}{(1 + 12\% \text{ p.a. for 3 Months})} \\
 &= ₹11.50 \times (1 + 0.02) \div (1 + 0.03) \\
 &= ₹11.388 \\
 &= ₹11.39
 \end{aligned}$$

Value of Spot Bid ₹11.39 in 3 Month's time > Forward Bid Rate of ₹11.20

⇒ Therefore, there is a possibility for Money Market Hedge

Inference: ⇒ AED 5,00,000 Receivable is an Asset

⇒ Under Money Market Hedge, liability in AED should be created

⇒ SL should borrow AED for 3 Months, which along with interest would amount to AED 5,00,000 in 3 Months.

Action	Date	Activity
Borrow	Now	Borrow an amount of AED at 12% p.a. for 3 Months so that, the total liability including interest for 3 months, is AED 5,00,000. ⇒ AED 5,00,000 ÷ (1 + Interest Rate for 3 Months) ⇒ AED 5,00,000 ÷ (1 + 12% × 3 Months/12 Months) ⇒ AED 5,00,000 ÷ 1.03 = AED 4,85,436.8932 should be borrowed.
Convert	Now	Convert AED 485436.8932 into Rupees at Spot Rate (Bid Rate since AED is sold) ⇒ AED 4,85,436.8932 × ₹11.50 = ₹55,82,524

Invest	Now	Invest ₹55,82,524 in Rupee Deposit for 3 Months at 8% p.a.
Realize	3 Months hence	Realize the maturity value of rupee deposit. Amount received will be - $\Rightarrow ₹55,82,524 \times (1 + \text{Interest Rate for 3 Months})$ $\Rightarrow ₹55,82,524 \times (1 + 8\% \times 3 \text{ Months}/ 12 \text{ Months})$ $\Rightarrow ₹55,82,524 \times (1 + 0.02) = ₹55,82,524 \times 1.02 = ₹56,94,175$
Receive	3 Months hence	Receive the AED 5,00,000 from the customer abroad.
Repay	3 Months hence	Repay the AED Loan using the money received from the customer abroad. Amount Payable = Amount Borrowed AED 4,85,436.8932 $\times (1 + 12\% \text{ p.a. for 3 Months})$ = AED 4,85,436.8932 $\times 1.03$ = AED 5,00,000.

Amount Saved by Utilizing Money Market Hedge

Action: Enter into a 3-Months Forward Sale Contract for sale of AED 5,00,000 at ₹ 11.20. Sell AED 5,00,000 3 Months from now at ₹11.20

Effect: Amount in ₹ in hand in 3 Months = AED 5,00,000 \times ₹ 11.20 = ₹56,00,000

Amount Saved under Money Market Hedge

Under Money Market Hedge is ₹ 56,94,175

Less: Under Forward Contract is ₹ 56,00,000

Amount Saved ₹ 94,175

Conclusion: Hedging risks using Money Market Operations will be advantageous to SL.

- Good Morning Ltd., London will have to make a payment of US \$ 3,64,897 in six month's time. It is currently 1st October. The company is considering the various choices it has in order to hedge its transaction exposure.

Exchange rates:

Spot rate	\$1.5617 – 1.5773
Six-month forward rate	\$1.5455 – 1.5609

	Borrow(%)	Deposit(%)
US	6	4.5
UK	7	5.5

Foreign currency option prices (1 unit is £ 12,500):

Exercise Price	Call option (March)	Put option (March)
\$1.70	\$ 0.037	\$ 0.096

By making the appropriate calculations and ignoring time value of money (in case of Premia) decide which of the following alternative is preferable by the company?

- Forward market;
- Cash (Money) market;

(c) Currency options.

Solution:

Relevant Rule for Conversion: Based on nature of Quote (Direct or indirect)

Nature of Quote	Buying-Foreign Currency (Converting - Home Currency into Foreign Currency)	Selling Foreign Currency (Converting Foreign Currency into Home Currency)
Direct Quote, relevant rate is	Ask Rate	Bid Rate
Indirect Quote, relevant rate is	$1 \div \text{Bid Rate}$	$1 \div \text{Ask Rate}$

(a) Forward Market:

Particulars	Computation	Amount (\$)
Amount Payable	Given	\$ 3,64,897
Amount under Forward Contract	$\$ 3,64,897 \div 1.5455$ (Forward Bid Rate)	£2,36,103

(b) Cash Money Market

1. **Requisite:** Money Market Hedge is possible only in case of difference in rates of interest for borrowing and investing.

2. **Activity Flow:**

Borrow: Borrow Sterling equivalent of money at 7% p.a. for 6 Months for investing.

Convert: Convert the money borrowed in Sterling to US \$ at Spot Rate (**Bid**)

Invest: Invest US \$ so converted in Dollar Deposits at 4.5% p.a. for 6 Months

Realize: Realize the Deposit including Interest and use the proceeds to settle the liability.

3. **Cash Flow:**

Particulars	Amount
Amount Payable After 6 Months	US \$ 3,64,897
Amount to be Invested at 4.5% p.a. for realizing US \$ 3,64,897 = $\text{US } \$ 3,64,897 \div (1 + \text{Interest Rate of } 4.5\% \text{ p.a.} \times 6/12) = \$ 3,64,897 \div 1.0225$	US \$ 3,56,867
Amount be borrowed = Amount to be invested in US \$ 3,56,867 $\div 1.5617$ (Spot Bid Rate)	£2,28,512
Interest payable on money borrowed @ 7% p.a. for 6 Months = $2,28,512 \times 7\% \times 6 \text{ Months} / 12 \text{ Months}$	£ 7,998
Total Amount Payable (Amount Borrowed £ 2,28,512 + Interest £ 7,998)	£2,36,510

(c) Currency Options

Payment is to be made in Pounds after 6 months, hence Put option to sell Pounds is relevant.

Number of Options Contract

\blacktriangleright Value of one Options Contract = Value per unit \times Exercise price
 = £ 12,500 \times 1.70
 = £21,250

\blacktriangleright Number of Contracts to be purchased = Amount payable in 6 month's time \div Value per contract
 = $3,64,897 \div 21,250$

= 17.17 Contracts

Alternative 1:

17 Options Contracts are undertaken and the balance through Forward Contract.

- ✦ Value covered under Options = 17 Contracts × \$ 21,250 per Contract
= \$ 3,61,250
- ✦ Value under Forward Contract = Amount payable after 6 months - Value under Options
= \$ 3,64,897 - \$ 3,61,250
= \$3,647

Cash Flows under Options

Particulars	Amount
Value of Forward Contract in £ = (\$ 3,647 ÷ 1.5455)	£ 2360
Premium Payable [\$0.096 × 17 × 12,500 = \$ 20,400 = \$ 20,400 ÷ 1.5617 (Spot Bid Rate)]	£ 13,063
Value of the 17 Options Contract [17 × 12,500]	£2,12,500
Total Outflow under Options	£ 2,27,923

Alternative 2:

18 Option Contracts are undertaken and the excess Dollars are sold in the Forward Market

- ✦ Value covered under Options = 18 Contracts × \$ 21,250 per Contract
= \$ 3,82,500
- ✦ Value sold under Forward Contract = Amount payable after 6 months - Value under Options
= \$3,64,897 - \$ 3,82,500
= \$17,603

Cash Flows under Options

Particulars	Amount
Value of Forward Contract in £ = (\$ 17,603 ÷ 1.5609)	£ 11,277
Premium Payable [\$0.096 × 18 × 12,500 = \$ 21,600 = \$21,600 ÷ 1.5617 (Spot Bid Rate)]	£ 1,3831
Value of the 18 Options Contract [18 × 12,500]	£ 2,25,000
Total Outflow under Options	£ 2,27,554

Conclusion: The Cash outflow under Options is the lowest and hence it may be undertaken.

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

Currency	Inflow	Outflow	Spot rate	Forward rate
US \$	4,00,00,000	2,00,00,000	48.01	48.82
French Franc (F Fr)	2,00,00,000	80,00,000	7.45	8.12
UK £	3,00,00,000	2,00,00,000	75.57	75.98
Japanese Yen	1,50,00,000	2,50,00,000	3.20	2.40

- (a) Determine the net exposure of each foreign currency in terms of Rupees.
- (b) Are any of the exposure positions off-setting to some extent?

Solution:**1. Computation of Net Exposure**

Particulars	US \$	F Fr	UK £	Japan Yen
Inflow (in Lakhs)	400.00	200.00	300.00	150.00
Less: Outflow	(200.00)	(80.00)	(200.00)	(250.00)
Net Exposure (Foreign Currency Terms)	200.00	120.00	100.00	(100.00)
Spot Exchange Rate	48.01	7.45	75.57	3.20
Net Exposure (in Rupee Terms based on Spot Exchange Rate)	9602 [200 × 48.01]	894 [120 × 7.45]	7557 [100 × 75.57]	(32) [100 × 3.20/10]

Particulars	US \$	F Fr	UK£	Japan Yen
Forward Rate [₹/ FC]	48.82	8.12	75.98	2.40
Less: Spot Exchange Rate [₹/ FC]	48.01	7.45	75.57	3.20
Forward Premium / (Discount)	0.81	0.67	0.41	(0.80)
Net Exposure in Rupee Terms based on extent of uncertainty represented by Premium/ (Discount)	162.0 [200 × 0.81]	80.4 [120 × 0.67]	41.0 [100 × 0.41]	(8.0) [(100) × (0.8)/10]

2. Off Setting Position:

- (a) Net Exposure in all the currencies is offset by better forward rates. In the case of USD, F Fr and UK Pound, the net exposure is receivable, and the forward rates are quoted at a premium for these currencies.
- (b) In case of Japanese Yen, the net exposure is payable, and the forward rate is quoted at a discount. Therefore, a better forward rate is also offsetting the net payable in Japanese Yen.
7. Proactive Ltd. imports some specialty instruments from Japan and exports the finished product to US. The company has a payable of ¥ 500 million and a receivable of \$10 million three months hence. The following exchange rates are available in the market:

	\$/₹	¥/₹
Spot Rate	46.65/85	0.4065/0.4115
3m forward	46.90/15	0.4218/0.4268

The current interest rate scenario is as follows:

Maturity	Rupee (%)	Dollar (%)	Yen (%)
3-m	8.0/9.0	6.00/6.50	0.4/0.5

The company is considering to cover the exposures either through the forward market or through the money market.

You are required to advise the company which alternative should be better for covering both the payables and receivables.

Solution:

Payable of ¥500 million after 3 months:

Covering through forward market:

$$\text{Rupee outflow} = \text{¥ } 500 \text{ million} \times 0.4268 \text{ ¥ per ₹} = \text{₹ } 213.40 \text{ million}$$

Covering through money market:

Borrow rupee, convert into yen spot and invest for 3 months.

$$\text{Yen to be invested} = 500 / (1 + 0.004/4) = \text{¥ } 499.500 \text{ million}$$

$$\text{Rupee amount to be borrowed} = \text{¥ } 499.500 \text{ million} \times 0.4115 \text{ ¥ per ₹} = \text{₹ } 205.5443 \text{ million}$$

$$\text{Rupee amount repayable} = \text{₹ } 205.5443 \times (1 + 0.09/4) = \text{₹ } 210.1690 \text{ million}$$

So, we see outflow through money market is lower than the forward market cover. So, money market cover is preferable.

Receivable of \$10 million after 3 months:

Covering through forward market:

$$\text{Rupee inflow} = \$10 \text{ million} \times \text{₹ } 46.90 \text{ per \$} = \text{₹ } 469 \text{ million}$$

Covering through money market:

Borrow \$, convert into rupee spot and invest for 3 months.

$$\text{\$ amount to be borrowed} = 10 / (1 + 0.08/4) = \$9.80 \text{ million}$$

$$\text{Rupee inflow at spot} = \$9.80 \text{ million} \times \text{₹ } 46.65 \text{ per \$} = \text{₹ } 457.353 \text{ million}$$

$$\text{Rupee inflow after 3 months} = 457.353 (1 + 0.08/4) = \text{₹ } 466.300 \text{ million}$$

So, forward cover is preferable.

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

Spot: CHF 1 = ₹ 27.30/27.35

One month forward: ₹ 27.45/27.52

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

Solution:

Forward contract cancelled at the one month forward sale rate of ₹ 27.52

Francs bought from customer under original forward contract ₹ 27.25

Francs sold to customer on cancellation of forward contract ₹ 27.52

Net amount payable by customer per Franc (27.52 - 27.25) ₹ 0.27

At ₹0.27 per Franc, exchange difference for CHF 10,000 is ₹2,700 is payable by the customer for cancellation of forward contract.

Solved Case Study

In January 1985, Lufthansa purchased twenty 737 jets from Boeing for a total cost of USD 500,000,000 to be paid on delivery of the jets in January 1986. The US dollar had been continuously rising since about mid-1981 and had reached approximately DEM 3.2 by January 1985. This represented a substantial exposure with a potential for a huge cash loss if the dollar continued to rise. Herr Heinz Ruhnau, the Chairman of the airline believed (with many others) that the dollar had peaked and would shortly turn down. One-year forward dollar could be purchased at approximately DEM 3.2. Put options on DEM (call options on USD) at a strike price of DEM 3.2 could be bought for a total premium amounting to about 6% of the contract value or DEM 96 million. What should he have done? Among the choices available to him were:

1. Be very conservative. Cover the whole payable forward.
2. Trust his instincts. Leave it completely unhedged, buy 500 million dollars spot in January 1986.
3. Take a limited risk. Cover partially e.g., buy half forward, leave half open.
4. Buy put options on DEM or call options on USD, go with your instinct but protect yourself on the downside, of course at a cost, viz. the up-front option premium.
5. Buy US dollars now and hold them in a deposit for a year to settle the payable, that is, money market cover.

The case is analyzed as follows:

1. Full forward cover is the most conservative no-risk approach. It would involve a payment of DEM 1.6 billion on delivery of the aircraft.
2. Remaining completely unhedged is the maximum risk alternative. The DEM outlay would be $500 S_T$ million where S_T is the spot USD/DEM rate at the time of settling the payment.
3. Cover 50%, leave the rest open. The DEM outflow on settlement would have been $(800 + 250 S_T)$ million.
4. The put option is a little complicated. If the dollar remains at or above 3.2 DEM, the DEM cost would be 1696 million—1600 million to buy the 500 million dollars at DEM 3.2 per dollar, plus the premium payment of DEM 96 million. (We are ignoring the financing cost of the premium which would have to be paid up-front in January 1995.) If the dollar falls below 3.2, the cost would be $(500S_T + 96)$ million for $S_T < 3.2$. It would have been better than full forward cover if dollar had fallen to 3.008 or lower, and better than 50% forward cover if it had fallen below 2.816.
5. The money market cover would have required that Lufthansa borrow the spot equivalent of USD 500 million in January 1995. Due to some strict covenants in its existing debt, the amount and currency of additional debt it could take on were severely restricted. Also, this option would probably have worked out to be almost equivalent to a forward purchase.

Lufthansa's management ultimately opted for strategy (3), viz. 50% forward cover and rest left open. As it turned out, the dollar had fallen to DEM 2.3 by January 1986. The DEM outflow was thus 1.375 billion. With alternative (2), that is, no hedge at all, it would have been 1.150 billion and with a put option, 1.246 billion. With hindsight, Mr. Ruhnau's handling of the situation could be criticized as to why he did not go with his instinct that the dollar had peaked. But given the magnitude of the exposure and the high degree of uncertainty, such criticism would not be justified.

Exercise

Theoretical Problems

Multiple Choice Questions

- The firm producing and selling in domestic market may face following risk when the economy is opened
 - Transaction risk
 - Translation risk
 - Operating risk
 - Both (a) and (b) above
- Hedging through 'currency of invoicing' results in
 - The exporter covering forex exposure
 - The importer covering forex exposure
 - Both exporter and importer covering forex exposure
 - Either exporter or importer covering forex exposure
- Which of the following is an internal hedging technique?
 - Leading
 - Netting
 - Swap
 - Both (a) and (b) above
- Hedge ratio is the
 - Ratio of futures to a spot position that achieves an objective such as minimizing risk
 - Ratio of spot position to futures position that achieves an objective such as minimizing risk
 - Ratio of spot position to option position that achieves an objective such as minimizing risk
 - Ratio of basis to a spot position that achieves an objective such as minimizing risk
- Which of the following is not an appropriate hedging strategy for a likely devaluation of a currency?
 - Reduce the level of cash.
 - Tighten credit term to decrease account receivables.
 - Reduce borrowing in the currency.
 - Delay account payables.

Answer:

1	2	3	4	5
C	B	D	A	C

State True or False

1. Exposure netting is an external technique of managing transaction exposure.
2. Under Current Non-current method of transaction, all non-current assets are translated under historical exchange rate.
3. Under Monetary/Nonmonetary method, inventory is always translated at the current rate.
4. A balance-sheet hedge involves the selection of the currency in which exposed assets and liabilities are denominated.
5. Under Multilateral Netting more than two members of the MNC group are involved.

Answer:

1	2	3	4	5
False	True	False	True	True

Fill in the Blanks

1. Hedging through forward contracts is an _____ technique of managing transaction exposure.
2. Leading and lagging is an _____ technique of managing transaction exposure.
3. Transfer pricing is an important tool for managing _____ exposure.
4. Economic exposure is the combination of transaction and _____ exposure.
5. Ensuring flexible manufacturing is an example of managing _____ exposure.

Answer:

1	external	2	internal
3	operating	4	operating
5	operating		

Short Essay Type Questions

1. What do you mean by Transaction Exposure?
2. What do you mean by Translation Exposure?
3. What do you mean by Operating Exposure?
4. Name the internal techniques of managing transaction exposures.
5. What is Balance Sheet Hedge?

Essay Type Questions

1. Discuss the internal techniques of management of transaction exposure.
2. Discuss the external techniques of management of transaction exposure.
3. Discuss the various rules of translation.
4. Explain different methods of management of translation exposure.
5. Discuss the methods of managing operating exposure.

Practical Problems

Multiple Choice Questions

- An Indian company's cost of production is ₹20/unit while its export price is \$ 1/ unit. If the \$ appreciates by 10% and the spot rate today is ₹40 per \$, what is the impact of transaction exposure?
 - Increase in profit by ₹4 per unit.
 - Decrease in profit by ₹4 per unit.
 - No change in profit.
 - Insufficient data.
- The foreign exchange market prices for US dollar (\$) against Indian rupees (₹) are quoted as under:

	Buying	Selling
Spot	₹65.30	₹65.50
Three months' forward	₹66.35	₹67.20

Calculate the cost of the forward cover.

- 8.15%
 - 8.17%
 - 8.20%
 - 8.22%
- In September, 2021, X Ltd. assessed the March, 2022 spot rate for pound sterling at the following rates:

\$/Pound	1.30	1.35	1.40	1.45	1.50
Probability	0.15	0.20	0.25	0.20	0.20

What is the expected spot rate for March, 2022?

- \$1.385
- \$1.395
- \$1.405
- \$1.415

Answer:

1	2	3
A	D	C

Comprehensive Numerical Problems

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

$$\text{GBP 1} = \text{OMR } 0.4901 - 0.4941$$

Local inter-bank market rates for GBP were

$$\text{Spot GBP 1} = ₹80.71 - 80.86$$

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

[Answer: Cover rate ₹164.9867 per OMR; Profit to bank ₹7,87,964]

2. HDIL Ltd. is a listed real estate development company in India, with significant operations in the Mumbai Metropolitan Region has an export exposure of HKD 12,00,000 payable August 31, 2021. Hong Kong Dollar (HKD) is not directly quoted against Indian Rupee.

The current spot rates are:

$$\text{GBP/INR } ₹82.05$$

$$\text{GBP/HKD: HKD } 9.93$$

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

Forward rates for August 2021 are

$$\text{GBP/INR: } ₹86.33$$

$$\text{GBP/HKD: HKD } 10.77$$

Required:

- i. Calculate the expected loss, if the hedging is not done. How the position will change, if the firm takes forward cover?
- ii. If the spot rates on August 31, 2021 are:

$$\text{GBP/INR} = ₹82.09$$

$$\text{GBP/HKD} = \text{HKD } 9.99$$

Is the decision to take forward cover justified?

[Answer: (i) Loss without hedging ₹5,67,720; (ii) Loss under Forward cover ₹2,96,400; Forward cover is justifiable; Expected loss on August 31, 2021 ₹54,720]

3. A company is considering hedging its foreign exchange risk. It has made a purchase on 1st. January, 2021 for which it has to make a payment of British Pound GBP 73,500 on September 30, 2021. The present exchange rate is 1 GBP £ = ₹82.3953. It can purchase forward 1 GBP at ₹81.5375. The company will have to make a upfront premium of 2% of the forward amount purchased. The cost of funds to the company is 11% per annum and the rate of corporate tax is 45%. Ignore taxation. Consider the following situations and compute the Profit/Loss the company will make if it hedges its foreign exchange risk:
- If the exchange rate on September 30, 2021 is ₹84.5000 per £.
 - If the exchange rate on September 30, 2021 is ₹83.0000 per £.

[Answer: (i) Net gain ₹87,996; (ii) Total loss ₹2,37,424]

4. An Indian importer has a payable of £100,000. The seller has given the Indian importer the following two options:
- Pay immediately with a cash discount of 1% on the payable,
 - Pay after 3 months with interest at 4% p.a.

The borrowing rate for the importer in Rupees is 12% p.a. The following are the exchange rates as on December 02, 2021.

£/₹ Spot	₹74.76/80
3-month forward	38/40

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

[Answer: Option 1: Outflow ₹76,27,356; Option 2: Outflow ₹75,95,200]

5. An exporter in UK is expecting to receive Euro 1 million after 3 months. He has collected the following information from his banker.

Euro/£Spot	1.5778/80
3 months forward	1.5770/72
3-months interest rates (p.a.)	
Euro	4.5% - 5%
£	6% - 6.5%

Which of the following would you recommend for covering the exposure?

- Forward market
- Money market.

[Answer: Forward market inflow £ 634035; Money market inflow £ 635278.29]

References:

- Apte., P.G., International financial Management (Third Edition); Tata McGraw Hill
- Shapiro & Moles; International Financial Management (Nineth Edition); Wiley
- Kim & Kim; Global Corporate Finance (Sixth Edition); Blackwell

SECTION - E
DIGITAL FINANCE