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**402.0 Objectives**

The present chapter deals with the foreign exchange market, operations and related theories. In particular, it

* Explains the activities of the foreign exchange market.
* Describes the theories in explaining the exchange rate behavior.

**402.1 Concept**

One of the major international financial functions is the exchange of currencies. Currencies are bought and sold in foreign exchange market that is spread around the globe. It is the market which provides the facility of converting the currency of one country into that of another country. The foreign exchange market (also referred to as forex market) is mostly an over-the-counter (OTC) market. There is no centralized meeting point or physical market place where parties meet for transacting business. The forex market is structurally a computerized communications network embracing all the major financial centres of the globe, where sellers and buyers of any national currency can quickly and efficiently carry out any desired currency exchange.

The foreign exchange market has certain features which are unique and distinctive. Some of these features are:

(i) Over-the-counter market: The foreign exchange market is an over-the-counter market. It does not denote particular place or floor where dealers assemble and transact foreign currencies. Rather, it consists of trading desks at major agencies dealing in foreign exchange throughout the world that are connected by telephone, telex, etc. That is why transactions are based normally on oral followed by written communication. It may, however, be mentioned that although the market is global, the market features in each country are influenced by local regulatory framework. In the UK or USA, the market relies more on the communication network; while in Frankfurt, Paris and some other European countries, physical meeting of participants at bourses is also customary.

(ii) Operates round the clock: Since foreign exchange dealers are spread all over the globe, the time of transaction differs from one place to another depending upon the longitude of the place. If a dealer in India transacts at 10 A.M., it will be just 4.30 A.M. in London. In order to accommodate dealers from different countries, the foreign exchange market has to function round-the-clock.

(iii) Strong, stable and convertible currencies: The currencies transacted in the foreign exchange market are normally the strong, stable and convertible currencies which are in great demand because of their strength, stability and convertibility.

In the foreign exchange market, there is a spot market as well as a forward market. In the spot market, deals are arranged for immediate delivery. Here settlement takes place on the second working day after the date of transaction.

In the forward market, the purchase or sale of a foreign currency is arranged today at an agreed exchange rate but with delivery scheduled to take place sometime in the future, usually 1, 3, 6 or 12 months from the date of transaction.

There are two methods for quoting the exchange rate between currencies, namely, direct method and the indirect method.

Direct Method- It expresses the number of unitsof the home currency required to buy one unit of a foreign currency. For example, US$1= Rs.71.45. This means that Rs.71.45 is needed to buy one US dollar.

Indirect Method- It expresses the number of unitsof a foreign currency that can be bought with one unit of the home currency. For example, Re 1= US 0.0140$.

Normally, two rates are quoted for foreign exchange transactions, namely, the buying rate **(Bid rate)** and the selling rate (**Offer rate**). The offer rate would be higher than the bid rate. The difference between the offer rate and bid rate is termed as **bid-offer spread** and it is one of the sources of profit for the forex dealers. In case of the direct method of quotation, the first rate quoted would be the buying rate (or bid rate) and the second rate quoted would be the selling rate (or offer rate). The two-rates for dollar-rupee exchange may be: US $ 1= Rs. 73.35-73.66.

By buying US dollar at Rs.73.35 and selling the same at Rs.73.66, the dealer makes a profit of Re 0.31or 31paisaper dollar traded. The exchange rate of US $ 1= 73.505 is the middle quote which is halfway between the sell and the buy price.

The spread percentage is calculated using the following formula:

( ) × 100

Here, the spread percentage is

() × 100 =

The size of the spread depends on a number of factors such as the demand and supply of the foreign currency, the volume of trade in the currency and the type of the customers.

**402.2 Forex market activities:** The foreign exchange market facilitates buying and selling of currencies of different countries. Individuals, business firms, banks, monetary authorities, investment management firm, etc. engage in buying and selling of foreign currencies for different purposes. Based on the purpose of transactions, the forex dealings may be classified as business transactions, arbitrage deals, hedging activities and speculative deals.

**Business Transactions:** Importers need foreign currencies to make payments for their imports, while exporters possess foreign currencies received as export proceeds. Importers need to buy foreign currencies, while exporters need to sell foreign currencies. These are genuine business transactions in foreign currencies, carried out with the purpose of either acquiring foreign currencies or disposing them of. Such business transactions in foreign currencies are also carried out by transactional service providers, borrowers, lenders or investors.

**Hedging:** The exchange rates between currencies are constantly fluctuating under the floating exchange rate system presently followed by most of the countries of the world. Parties who are committed to making payments in the future in some foreign currency would suffer a loss if the value of the foreign currency appreciates in the meantime. On the contrary, parties who are expecting to receive some foreign currency in the future would suffer a loss if the value of the foreign currency depreciates in the near future. The parties who are thus exposed to risk on account of fluctuations in the exchange rates would like to hedge their risk. Derivative instruments such as currency forwards, futures, options and swaps may be used for hedging the risk in foreign exchange dealings. Thus, several transactions in the forex market are carried out for hedging risk.

**Arbitrage:** Fluctuations in the exchange rates sometimes provide opportunities for making riskless profits. The forex market is a global market with important financial centres where there is concentration of transactions. The transactions are normally carried out through various communication channels. A pair of currencies constitutes a product in the forex market and this product is traded globally, that is, in all the important financial centres. However, the exchange rates for a pair of currencies may vary slightly between different centres. When such variations exceeds the transaction cost of buying and selling the pair of currencies in two markets, there arises an opportunity for making riskless profit by buying in the centre offering lower rates and selling in the centre offering higher rates. This type of transaction is known as arbitrage and the parties engaging in such transactions are known as arbitrageurs. Eventually, the arbitrage dealings will bring about parity between exchange rates in different centres. Thus, transactions in the forex market may be carried out for seeking arbitrage profits.

**Speculation:**  The fluctuations in the exchange rates of different currencies offer sufficient opportunities for seeking speculative gains. Speculation is basically making short-term profit from difference in rates or prices of assets. A speculator buys an asset in anticipation of increase in the price of the asset in near future. Alternatively, he may engage in short selling (selling without owning the asset) an asset when he anticipates a fall in the price of the asset in the near future. Speculative activities always involve some risk, as the anticipation of the speculator may not always materialize. Foreign currencies constitute an ideal asset class for speculative activities as the values of foreign currencies fluctuate constantly. Large volumes of transactions in the forex market are examples of speculative deals.

**402.3.0 Introduction**: There are some theories that try to explain how exchange rates between the currencies are determined and also identify the variables that influence exchange rate fluctuations. The following five theories explain different aspects of exchange rate behavior:

(i) The Purchasing Power Parity (PPP) Theory;

(ii) The Fisher Effect (FF) Theory;

(iii) The International Fisher Effect (IFE) Theory; and

(iv) The Interest Rate Parity (IRP) Theory.

These theories are useful in explaining the exchange rate behavior under the floating exchange rate system. They make the following three assumptions:

**(a) Law of one price**: It assumes that the prices of identical tradable goods and financial assets would be within transaction cost of equality all over the world.

**(b) Free role of arbitrageurs**: Arbitrageurs are free to take advantage of any disparity in prices anywhere in the world.

(c) **Unrestricted movements of goods or financial assets**: There are no restrictions for movements of goods and financial assets across countries.

**402.3.1 Purchasing Power Parity**

The Purchasing Power Parity theory was put forward by Gustav Cassel, a Swedish economist, through his article “Abnormal Deviations in International Exchange”, published in Economic Journal, December 1918. The theory states that the rate of exchange between any two currencies is determined by their purchasing power. The PPP theory is based on three assumptions. These three assumptions are:

(i) Law of one price;

(ii) Free role of arbitrageurs; and

(iii) Unrestricted movements of goods or financial assets.

The purchasing power of a currency is equivalent to the amount of goods and services that can be purchased with one unit of that currency. It is fair and equitable that the exchange rate between two currencies be determined in such a way that the rate provides the same purchasing power for both the currencies. The purchasing power parity theory has two versions: an absolute version and a relative version. The absolute version of the theory states that the exchange rate between the currencies of two countries would be equals the ratio of the price levels of the two countries, measured by the respective consumer price indices. Thus,

e0 = Ph / Pf

where, e0 = current exchange rate

Ph = price level in the home country

Pf = price level in the foreign country

For example, if the consumer price indices in India and the USA are 2856 and 136, respectively, the dollar-rupee exchange rate would be

e0 = Ph / Pf  = 2856/136 = 21

i.e., 1 US $ = Rs.21.

The absolute version of the theory tries to explain how the exchange rates between two currencies are determined. However, this version of the theory will hold good only if the same commodities are included in the same proportion in the basket of goods being used for the calculation of price indices in both the domestic and foreign countries.

The relative version of the theory, on the other hand, attempts to explain why or how the exchange rates between currencies change or fluctuate over the long run. According to the relative version of the theory, one of the factors leading to change in exchange rates between currencies is inflation in the respective countries. As long as the inflation rates in the two countries remain equal, the exchange rates between the currencies would not be affected. When a difference or deviation arises in the inflation levels of the two countries, the exchange rate would be adjusted to reflect the inflation rate differential between the countries.

The relationship between the change in the exchange rate and the inflation rate differential is expressed as

Where, = expected exchange rate at time period t

= current exchange rate

= expected domestic inflation rate at time period t

= expected foreign country inflation rate at time period t

From the above equation, the future expected exchange rate can be estimated as

= [ ] t

The PPP theory holds that any change in the equilibrium between the price levels of two countries due to different rates of inflation between the countries trends to produce an equal but opposite movement in the spot exchange rate between the currencies of the two countries over the long run. Accordingly, a country with higher inflation will experience depreciation in the value of its currency and vice-versa.

**402.3.2 Fisher effect:** The Fisher effect deals with the phenomenon of varying interest rates in different countries. Assuming that there is an international mobility of funds or facility for free flow of funds across nations, the interest rates in different countries would be the same. Or else, arbitrage in the form of international capital flows will began and continue till parity is established between the interest rates across countries. We see that interest rates differ from one country to another. What causes such interest rates variations across countries? Irwin Fisher, an American economist, tried to explain this phenomenon. His theory is known as the Fisher effect.

Fisher makes a distinction between the two rates of interest, namely, the real interest rate and the nominal interest rate. The real interest rate is the rate of interest required by the investor as reward for waiting. When there is inflation, the value of interest would erode. The interest rate, therefore, needs to be adjusted upwards to compensate for the erosion in value on account of inflation. Such adjusted interest rate is known as the nominal interest rate. In other words, nominal interest rate is the required real rate of return on investment plus the expected rate of inflation. Countries experiencing higher inflation rates would have higher nominal interest rates and vice versa. Thus, the varying interest rates in different countries are due to the inflation rate differential between the countries. Mathematically, the Fisher effect can be expressed as

r = a + i + ai

where, r = nominal interest rate

a = required real interest rate

i = expected rate of inflation

For example, if the required real interest rate is 5% and the expected rate of inflation in India is 6.5%, the nominal interest rate can be calculated as

r = 0.05 + 0.065 + (0.05 X 0.065) = 0.11825 = 11.825%.

The Fisher effect explains the interest rate variations across countries as the effect of inflation rate differentials between countries. The interest rate differential between any two countries equals the inflation rate differential between these two countries. Mathematically, it can be expressed as

=

The empirical tests on the Fisher effect have produced mixed results. It is generally seen that the Fisher effect holds true in the case of short-term government securities and very seldom in other cases. The arbitrage process assumed by the Fisher for equating real interest rates across countries may not be effective in all cases. Arbitrage will take place only when the domestic capital market and the foreign capital markets are viewed as homogeneous by investors. But investors usually have a preference for domestic capital market and view the foreign capital market as risky. Thus, arbitrage may not take place even when the real interest rate on the foreign securities is higher. In the absence of arbitrage, the Fisher effect will not hold good.

**402.3.3 International Fisher effect:** The PPP theory (relative version) states that the exchange rate between two currencies changes to reflect the inflation rate differential between the two countries, whereas the Fisher effect states that the inflation rate differential between the countries leads to differential interest rates across countries. According to the Fisher effect theory, the interest rate differential between two countries equals the inflation rate differential between these two countries. On considering these two theories together, it may be concluded that the exchange rate movement equals the interest rate differential between the countries concerned. This proposition is known as the International Fisher effect.

According to this theory, the exchange rate between two currencies would move in an equal but opposite direction to the difference in the interest rates between two countries. A country with higher nominal interest rate would experience depreciation in the value of its currency. An investor would like to invest in assets denominated in the currencies expected to depreciate only when the interest rate on those assets is high enough to compensate the loss on account of depreciation in the currency value. Conversely, investors would be willing to invest in assets denominated in the currencies expected to appreciate even at a lower nominal interest rate provided the loss on account of such lower interest rate is likely to be compensated by the appreciation in the value of the currency.

In effect, what the International Fisher effect theory states is that the anticipated change in the exchange rate between two currencies would equal the inflation rate differential between the two countries which, in turn, would equal the nominal interest rate differential between these two countries.

Mathematically, this relationship can be expressed as:

=

Thus, =

As far as the validity of the theory is concerned, it may be stated that the direction of change in the exchange rate in response to the interest rate changes is generally found to be as predicted by the theory, but the magnitude of change is not so predictable. Sometimes, changes in exchange rates may be more than the difference in interest rates and may include risk premium too.

**402.3.4 Interest Rate Parity:** The Interest Rate Parity (IRP) theory tries to explain how the exchange rate in the forward market is determined. The forward exchange rate may be at a premium or a discount to the spot exchange rate. How is the forward rate differential (i.e., the difference between the forward exchange rate and the spot exchange rate) determined?

The IRP theory postulates that the forward rate differential in the exchange rate of two currencies would be equal the interest rate differential between the two countries. More precisely, the theory holds out that the forward premium or discount for one currency relative to another should be equal to the ratio of nominal interest rates on securities of equal risk (and duration) denominated in the two currencies.

Mathematically, the relationship can be expressed as

or, F = S ( )

where, F= forward exchange rate for a specified future period

S = spot exchange rate

= nominal interest rate on a security with a maturity equal to that of the forward exchange rate and denominated in a foreign currency.

= nominal interest rate on a security with a maturity equal to that of the forward exchange rate and denominated in the domestic currency.

If there is no parity between the forward rate differential and interest rate differential, opportunities for arbitrage will arise. Arbitrageurs will move funds from one country to another for taking advantage of the disparity. In an efficient market, with free flow of capital and negligible transaction cost, continuous arbitrage will soon restore parity between the forward rate differential and interest rate differential. This type of arbitrage is known as covered interest arbitrage.

It is generally agreed that the IRP theory holds good in a real world situation. To a large extent, forward exchange rates are based on interest rate differential. But IRP theory has some limitations also. This theory assumes that arbitrageurs will intervene in the market whenever there is a disparity between forward rate differential and interest rate differential. Bur such intervention by arbitrageurs will be effective only in a market which is free from controls and restrictions. Another limitation of IRP theory arises from the diversity of short-term interest rates in the money market. Another factor which might disturb the parity is the market expectation regarding the future spot rates. Such market expectation has a strong influence on the forward rate.

**402.4 Factors affecting Exchange Rates:** The two variables affecting exchange rate fluctuations are inflation and interest rates. These two variables are affected by other fundamental factors. Hence, we need to understand these fundamental factors which indirectly affect currency fluctuations. Some of the fundamental factors which influence the strengths and weaknesses of currencies are enumerated now.

**(i) Balance of Payments**: This is a statement that records the economic transactions of a country with the outside world. Such transactions generate demand for foreign exchange as well as supply of foreign exchange. The balance of payments may show a surplus or a deficit. Continuous deficit is likely to weaken the currency of the country.

**(ii) Growth in money supply**: One of the factors fuelling inflation in an economy is the growth in money supply without corresponding increase in the supply of goods. Inflation, in turn, will lead to changes in the exchange rates.

**(iii) Business cycle**: The different phases of a business cycle affect economic activities of a country differently. During the boom period, exports of developing countries may expand. On the other hand, in a recession, reduced exports may lead to balance of payments deficits and currency devaluation.

**(iv) Decline in foreign exchange reserves:** A large quantum of foreign exchange reserves adds strength to the home currency. Any depletion in such foreign exchange reserves through continuous deficits in its external account balances will weaken the home currency.

**(v) Political situation**: In the modern world, politics and economics are interrelated. Political situations such as changes in government, law and order situation, terrorism and violence, significantly affect economic activities and economic development. Any setback to the development process is likely to weaken the currency also. It is generally observed that politically unstable countries usually have weak currency.

**Sample questions**

1. Write notes on:

(a) Arbitrage;

(b) Hedging;

(c) Speculation.

2. State the assumptions of the theories in explaining the exchange rate behavior.

3. Explain the absolute and relative versions of the PPP theory.

4. What is the Fisher effect?

5. Explain the International Fisher effect.

6. Distinguish between real interest rate and nominal interest rate.

7. What is covered interest arbitrage?

8. Describe the fundamental factors affecting exchange rate fluctuations.