UNIT 17 FLEXIBLE EXCHANGE RATE SYSTEM

Structure

17.0 OBJECTIVES

After going though this unit, you should be able to:

- explain the basic concepts of international transactions, balance of payments and exchange rate;
- explain how exchange rates are determined;
- explain the concept of flexible exchange rate and its implications; and
- analyse the relationship between flexible exchange rate and trade in goods and capital flows.

17.1 INTRODUCTION

A country is linked to other countries through two broad channels: *trade flows* and *financial flows*. Trade flows pertain to movement of goods and services between countries and thus facilitate exchange of products between countries, commonly known as *exports* and *imports*. When countries produce more than what they can domestically consume, they *export*. Similarly, when countries consume more than what they can produce, they import.

Thus, there would be balancing of production surpluses and deficit when trade takes place between countries.

The implications of the above formulations, (i.e., trade flows) on the components of aggregate demand (AD) would be to include net exports [i.e., exports(X) – imports (M)] such that

$AD = C + I + G + X – M$

where,
C: Consumption
I: Investment
G: Government Expenditure
S: Savings

This would mean that

- if AD > output, then imports rise
- if AD < output, then exports rise

Let us look into financial flows. The international linkages through financial flows shift the assets *between countries*.

That is, if

- domestic I < S $\Longrightarrow$ domestic savings are exported, i.e., foreign investment abroad is financed by domestic savings.
- domestic I > S $\Longrightarrow$ foreign savings are imported, i.e., domestic investment is financed by foreign savings.

Often we come across the term foreign direct investment (FDI) in India. It implies that excess savings in foreign countries is getting invested in India. Recall from Unit 1 of this course that an increase in investment results in an increase in aggregate output. Thus, the transactions in the asset market affect income, interest rate and exchange rate.

17.2 BALANCE OF PAYMENTS

The record of all transactions (trade and financial) of the residents of one country with the rest of the world is *Balance of Payments* (BoP). The direction of money flows determines whether a particular transaction is a *Credit* or *Debit* item. For example, exports of goods is a *credit* item as money flows into the economy. Similarly, *import* of goods is a *debit* item as money flows out of the country. Investment abroad (i.e., export of saving) is a debit item as the transaction results in out flow of money while foreign investment in a country is a credit item.

The BoP has two accounts: Current and Capital accounts. All current/revenue expenditure transactions (such as exports and imports of goods, transfer payments, non-factor payments, etc.) are recorded in current account. The current account balance reflects whether there is a surplus (+) or deficit (–) in this account.

All transactions, (export and import) that influence country's capital assets are recorded in capital account. For example, if a country borrows capital from foreign sector, it would be recorded as credit item and if the country lends capital to the foreign sector, it would be recorded as debit item in capital account. The net surplus (+) or deficit (–) in capital account is recorded in capital account balance. The components of current and capital accounts are presented in table 17.1.

Table 17.1:Composition of Current and Capital Accounts

A) **CURRENT ACCOUNT** 1. Exports and Imports of Merchandise/Goods 2. Exports and Imports of Services (Invisibles) • Non-Factor Services • Investment Income • Private Transfers • Official Grants 3. Current Account Balance (Net of 1+2)	Surplus (+) Exports of goods and services > Imports of goods and services Vice versa for Deficit (–)
B) **CAPITAL ACCOUNT** 1. Direct Investments (Net) 2. Portfolio Investment (Net) 3. External Assistance (Net) 4. Commercial Borrowings (Net) 5. NRI Deposits (Net) 6. Capital account balance (1+2+3+4+5)	Surplus (+) The demand for domestic assets > domestic demand for foreign assets Vice versa for Deficit (–)

BoP equilibrium is achieved when the sum of current account balance and capital account balance is a zero, i.e., surplus in current account is exactly matched by deficit in capital account. If the addition of these two accounts results in a surplus (deficit) then it is indicated as BoP surplus (deficit).

17.3 EXCHANGE RATE

By definition, exchange rate is the price of one currency in terms of another currency, i.e., number of units of domestic currency that can be exchanged for one unit of foreign currency. For example, Rs.45/$.

The demand for foreign currency arises when a country imports goods and services from another country. For example, when an Indian tourist visits the US, there is a need to exchange Rupees for US$. Similarly, when a domestic firm imports (raw material or machinery) from another country or when investments are made abroad foreign exchange is required.

The supply of foreign currencies takes place when a country exports its goods and services. For example, when a foreign tourist visits India (i.e., export of tourism services) foreign currency is exchanged for domestic currency. Similarly, when a domestic firm exports to a firm in another country, foreign currency flows into the country.

Putting together, a country pays for its imports of goods and services from the foreign exchange earnings of exports. Thus, if the total demand for foreign exchange exceeds the total foreign exchange earnings, the rate at which currencies exchange for one another will change. Thus, the demand for and supply of foreign currencies will determine the *exchange rate*. If the value of one currency (in terms of another) increases, then the currency appreciates. On the other hand, if value of the currency decreases, the currency depreciates. For example, assume the exchange rate between Rs. and $ to be Rs. 40/$. If the exchange rate changes to Rs. 45/$, then rupee is becoming cheaper relative to $, hence rupee is depreciating against $. Similarly, if the exchange rate changes to Rs. 35/$, then rupee is becoming dearer relative to $, hence rupee is appreciating against $.

Exchange rate can be determined either by market forces (i.e., supply of and demand for foreign currency or by the government. Accordingly we have flexible exchange rate or fixed exchange rate.

17.4 DETERMINATION OF FLEXIBLE EXCHANGE RATE

The demand and supply schedules of foreign currencies will determine the exchange rate. For simplicity, let us assume that India and US are trade partners and the exchange rate between Rs and $ is to be determined.

17.4.1 Derivation of Demand Schedule for Rupees

As mentioned above, demand for Rupees arises in the US when India exports certain goods and services. In return, there is supply of US $ to India. Thus, in a two-country model, derivation of demand schedule for Rs. is the same as derivation of supply schedule of US $.

Assume a situation where India is exporting product X to the US, the price of which is Rs. 100. Given an exchange rate of 0.06 ($/Re), the dollar price of Product X is $6. At this price, assume the demand for product X to be 1500 units in the US. For the transaction to be completed, the demand for Indian Rupees would be Rs.1, 50,000 (=1500 × 100) while supply of foreign currency would be $9000 (=1,50,000 × 0.06). With a falling exchange rate (or rupee depreciating), the dollar price of the product

decreases. Simultaneously the demand for product X (in the US) increases thereby increasing the demand for Indian rupees (or supply of foreign currency).

Table 17.1: Derivation of Demand for Rupees (Supply of $)

Price of Indian Export good in Rs.	Exchange Rate ($/Re)	Price of Indian Export good (X) in $	Qty. of Indian Export (XI)	Demand for Indian Rupees (Rs.)	Supply of Foreign Exchange($)
100	0.06 (17.94)	6.0	1500	1,50,000	9000
100	0.04 (24.47)	4.0	1800	1,80,000	7200
100	0.03 (30.65)	3.0	2000	2,00,000	6000
100	0.029 (33.45)	2.9	2050	2,05,000	5945
100	0.023 (42.07)	2.3	2500	2,50,000	5750
100	0.022 (45.68)	2.2	2600	2,60,000	5720

Note: Figures in parenthesis are (RS/$)

The relationship between exchange rate and the demand for Rupees is highlighted below in Fig. 17.1. Corresponding to the above, the supply of foreign currency can be drawn which will be upward sloping (see Fig. 17.2).

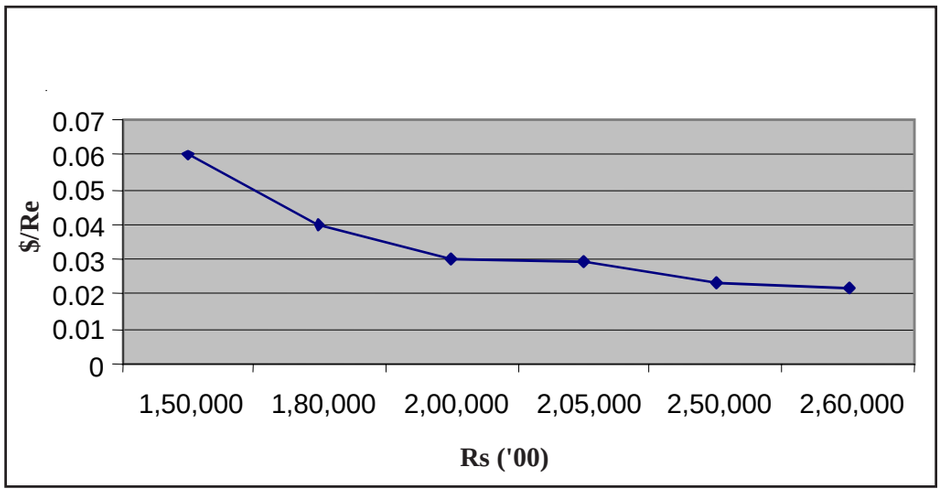

Fig. 17.1: Demand Schedule for Indian Rupees

Fig. 17.2: Supply Schedule for Foreign Currency

From Fig. 17.1, it is evident that the relationship between the exchange rate and the demand for rupee is negative. This implies that as rupee depreciates (or price in $ terms

decreases), the demand for rupee currency increases. In terms of foreign currency, i.e., $, the relationship between exchange rate and supply of foreign currency is positive. Thus, *exports* determine the relationship between exchange rate and *the demand for Indian rupees* or *supply of foreign currency.*

17.4.2 Derivation of the Supply Schedule of Rupees

Assume a situation where India is importing Product Y from the US, the price of which is $10. Given an exchange rate of Rs. 17.94/$ (or $ 0.06/Re.), the rupee price of Product Y is Rs. 179.40. At this price, assume that demand for import of Product Y is 100 units. To complete the transaction, the corresponding supply of Indian rupees is Rs. 17,940 and the demand for foreign currency is $ 1000. With a falling exchange rate (or rupee depreciating), imports become more expensive in the domestic market, thereby leading to a fall in import demand and hence a fall in supply of rupees. Conversely, if rupee were to appreciate, the rupee price of product Y falls thereby increasing the demand and increasing the supply of rupees.

Table17.2: Derivation of Supply Schedule of Rupees (India importing from US)

Price of Indian Import good (Y) in $	Exchange Rate (Rs/$)	Price of US Import good (Y) in Rs.	Qty. of Indian Import (Y)	Demand for $	Supply of (Rs.)
10	17.94 (0.06)	179.40	10	1000	17,940
10	24.47 (0.04)	244.70	60	600	14,682
10	30.65 (0.03)	306.50	45	450	13,792
10	33.45 (0.029)	334.50	40	400	13,380
10	42.07 (0.023)	420.70	30	300	12,621
10	45.68 (0.022)	456.80	25	250	11,420
10	37.16 (0.027)	371.60	35	350	13,006

Note: Figures in brackets are ($/Re.)

The relationship between exchange rate and the supply of rupees (and the demand for foreign currency) is highlighted in Fig. 17.3.

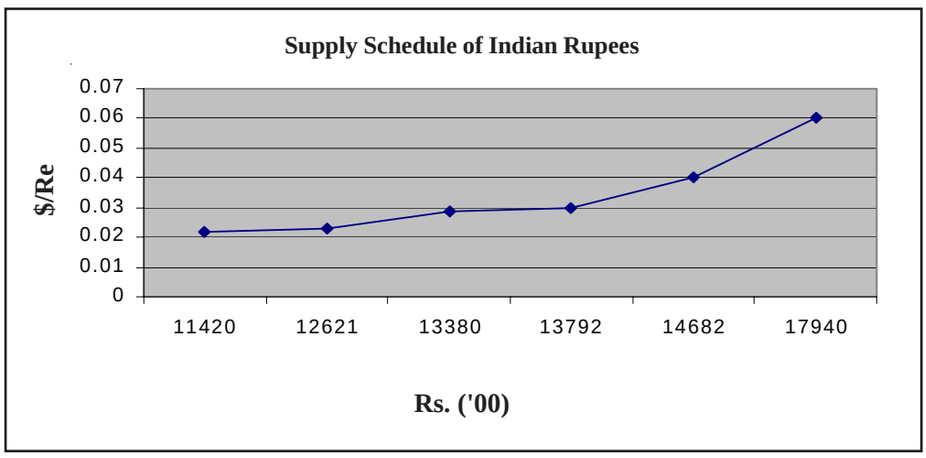

Fig. 17.3: Supply Schedule of Indian Rupees

From Fig.17.3, it is evident that the relationship between exchange rate and supply of rupees is positive. It implies that as rupee appreciates (depreciates), imports become cheaper (dearer) and the supply of rupees increases (decreases). In terms of the foreign currency, the relationship between exchange rate and demand for foreign currency is

negative. Thus, *imports* determine the relationship between exchange rate and the supply of Indian rupees or demand for foreign currency.

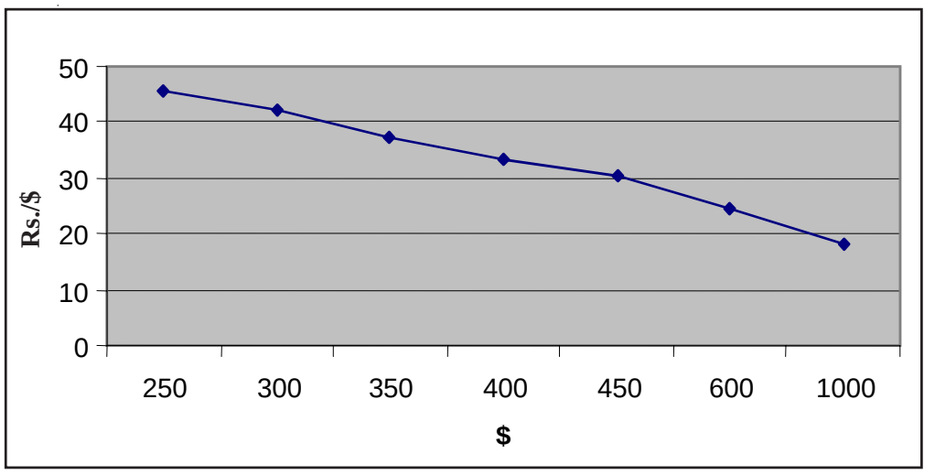

Fig. 17.4: Demand Schedule of Foreign Currencies

17.4.3 Equilibrium Exchange Rate

The theory of exchange rate determination explains how demand and supply of foreign exchange interact and jointly determine the equilibrium exchange rate.

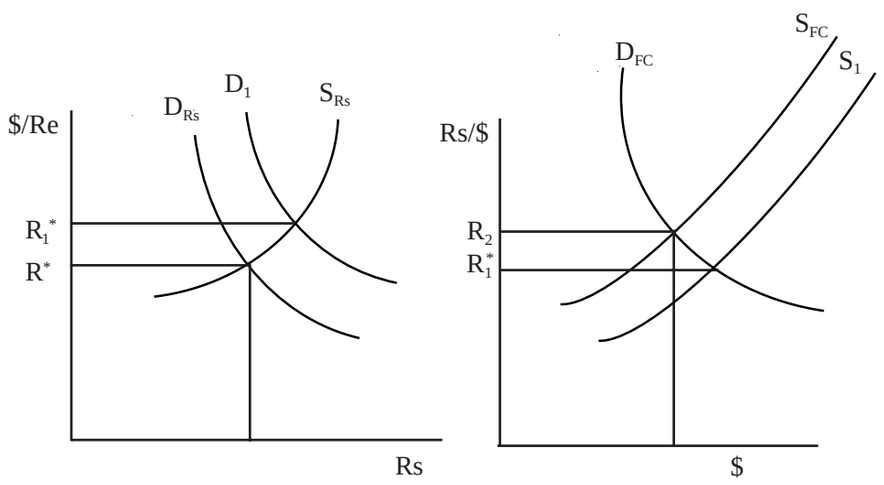

Fig. 17.5: Equilibrium Exchange Rate

As seen earlier, the demand schedule for Indian rupees (or supply schedule of foreign currency) arises from the foreign demand for Indian exports. Similarly, the supply schedule of Indian rupees (or demand schedule for foreign currency) arises from the Indian demand for foreign goods or imports. Together, they determine the equilibrium exchange rate (R^*)

Suppose there is an exogenous increase in income in the US and therefore an increase in demand for Indian goods. Correspondingly, the demand schedule for Indian rupees shifts to D_1 (see fig. 17.5 (a)). The resultant equilibrium exchange rate (R_1^*) indicates that the Rupee has appreciated against the dollar. Similarly, if Indian imports increase (relative to the exports) then the supply curve (SRs) shifts to the right (see Fig. 17.5(b)) resulting in the depreciation of Indian rupee from R_2 to (R_1^*).

Thus, in a *flexible exchange rate* regime, market demand for and supply of a country's currency determines the changes in exchange rate. As the demand and supply schedules

for currency are determined by many forces, there would be a tendency for high volatility of exchange rates in this regime. As there would be no intervention by the Central Bank in determining the exchange rate, the BoP will always be in equilibrium. It means that the exchange rate adjusts to make the balances in current and capital accounts sum to zero.

17.5 FACTORS AFFECTING FLEXIBLE EXCHANGE RATE

Shifts in the demand and supply schedules for foreign currency take place on account of a number of factors. Some of them are enumerated below.

If economic growth in India increases relative to the US, then Indian demand for US goods increases (imports rise). It shifts the supply schedule of Indian rupees to the right thereby depreciating rupee as against the dollar.

Second, if the inflation rate in India rises faster than that in the US, imports become cheaper. It leads to more imports resulting in supply schedule of rupees shifting to the right thereby depreciating the rupee against the dollar.

Third, if interest rate in India increases relative to that in the US, capital inflows rise. With an increase in demand for investment in demand, the demand schedule (for rupees) shifts to the right resulting in rupee appreciating against the dollar.

Fourth, expectations also affect the exchange rate. Speculations about interest rates, growth rates, etc. influence the supply and demand forces, which in turn, influence the exchange rate.

Check Your Progress 1

1) Fill in the Blanks:

   a) If the Indian economy is growing more rapidly than other economies, India's ..... are likely to grow more rapidly than its ..... . Thus India's demand for foreign currency will ..... . Consequently, the rupee is likely to ..... .

   b) When country *A*'s currency becomes more valuable relative to country *B*'s currency, country *A*'s currency is said to ..... relative to that of country *B*, and country *B*'s currency is said to ..... relative to that of country A.

2) State whether True or False and explain briefly:

   a) The balance of payments accounts always balances under flexible exchange rate regime.

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b) When currency depreciates, imports tend to increase.

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c) When exports rise currency appreciates.

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3) A can of soda costs $0.75 in the United States and 12 pesos in Mexico. What would the peso-dollar exchange rate be if purchasing-power parity holds? If a monetary expansion caused all prices in Mexico to double, so that soda rose to 24 pesos, what would happen to the peso-dollar exchange rate?

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17.6 LET US SUM UP

All transactions with the foreign sector are recorded under BoP accounts. The direction of money flows determines whether a particular transaction is a c*redit* or *debit* item. For example, export of goods is a credit item as the money flows into the economy. But, investment abroad (i.e., export of savings) is a *debit* item as the transaction results in money flowing out of the country.

The BoP has two accounts: *current* and *capital* accounts. All current revenue/ expenditure transactions (like exports and imports of goods and services) are recorded in current account. The current account balance reflects whether there is a surplus (+) or deficit (–) in this account. BoP equilibrium is achieved when addition of current account balance and capital account balance results in a zero, i.e., surplus in current account is exactly matched by deficit in capital account.

By definition, exchange rate is the price of one currency in terms of another currency, i.e., number of units of domestic currency that can be exchanged for foreign currency. For e.g., Rs./$ or $/Re. The demand and supply schedules of currency determines the exchange rate. The demand curve of currency is derived from the demand for exports. The supply curve of currency is derived from the demand for imports. In a *flexible exchange rate* regime, changes in market demand for and supply of a country's currency determines the changes in exchange rate.

17.7 KEY WORDS

Capital : Here, in this Block, the word connotes financial capital.

Currency : The sum of outstanding paper money and coins.

Depreciation : A fall in the value of a currency relative to other currencies in the foreign exchange market.

Devaluation : An action by the Central Bank to reduce the value of domestic currency vis à vis foreign currencies.

Exchange Rate : The rate at which domestic currency is exchanged with foreign currencies.

Exports : Goods and services sold to foreign countries.

Flow : A variable measured as a quantity per unit of time. This is different from stock, which is quantity of a variable measured at a particular point of time.

Fixed Exchange Rate : An exchange rate that is set by the Central Bank under the condition that it is willing to buy and sell foreign exchange at that rate.

17.8 SOME USEFUL BOOKS

Mankiw, N. G., 2000, *Macroeconomics*, Fourth Edition, Macmillan, New Delhi.

Baumol, W. J. and Alan S. Blinder, 1999, *Economics: Principles and Policy*, Harcourt College Publishers, Chapter 36.

Sachs, Jeffrey. D. and Felipe Larrain B., *Macroeconomics in the Global Economy*, Prentice Hall Inc., New York.

Salvalore, D., 2001, *International Economics*, John, Wiley and Sons, Chapters 13-14.

17.9 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) a) If the Indian economy is growing more rapidly than other economies, India's ***Imports*** are likely to grow more rapidly than its ***Exports***. Thus India's demand for foreign currency will ***Increase***. Consequently, the rupee is likely to ***depreciate***.

   b) When country ***A***'s currency becomes more valuable relative to country ***B***'s currency, country ***A***'s currency is said to ***appreciate*** relative to that of country ***B***, and country ***B'***s currency is said to ***depreciate*** relative to that of country A.

2) a) **True:**

   Equilibrium in BoP = Current Account balance + Capital Account balance. Surplus in current and/or capital account implies demand for domestic currency (eg., Indian rupees) increases. As such, the demand schedule shifts to the right resulting in currency appreciation. The converse is true for deficit situation. Under flexible exchange rate regime, these exchanges rate adjustments take place until the BoP is in equilibrium.

   b) **False:**

   When currency depreciates, the domestic price of imports increases. Hence, the demand for imports falls.

   c) **True:**

   When exports rise (relative to imports) the demand schedule for domestic currency shifts to the right. Assuming, unchanging supply schedule, this results in the appreciation of the equilibrium exchange rate.

3) The Peso-dollar exchange rate is 16 (12 ÷ \$0.75). If prices in Mexico double, the new peso-dollar exchange rate is 32 (2÷\$0.75). This implies that if inflation in one trading partner is higher, then the currency depreciates.