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[Trade Balance & Exchange Rate]

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Trade Balance and Exchange Rates

Introduction:

Hello friends, in this session I will discuss about the trade balance and exchange rate. To have a clear understanding of this topic, I will divide this topic in two parts. In the first part, there will be discussion about trade balance, concepts of surplus and deficits, meaning of exchange rate and types of exchange rate systems. And in the second part, there will be discussion about the relations between the exchange rate and trade balance.

Trade balance:

Trade balance is also known as Balance of trade. BOT is the difference between a country's imports and its exports for a given time period.

BOT = Export Value – Import Value

BOT constitutes the largest component of the country's BOP.

Importance of the concept of BOT can be gauged from the following points:

- The relative strengths of a country's economy with other country's economies and the flow of trade between nations can be understood by the help of balance of trade.
- To indicate an economy's health. For example, in a recession, countries like to export more, creating jobs and demand in the economy.
- In an expansion phase, countries prefer to import more, providing price competition, which limits inflation.

In 2015, the EU, Germany, China and Japan all had very large trade surpluses, while the US, the UK, Brazil, Australia and Canada had the largest trade deficits.

Concepts of deficit and surplus trade balance:

A country has trade deficit when imports of goods and services of a country is more than its exports of goods and services.

Imports of goods and services > exports of goods and services= trade deficit.

Conversely, a country has trade surplus when a country's exports of goods and services is more than its imports of goods and services.

Exports of goods and services > Imports of goods and services= trade surplus

Formula for the calculation of a country's BOT:

By subtracting the credit and debit items, we can arrive at a trade deficit or trade surplus for a given country over a period of time.

Credit items include exports, foreign spending in the domestic economy and foreign investments in the domestic economy, whereas **debit items** include imports, foreign aid, domestic spending abroad and domestic investments abroad.

Examples: US had a trade deficit since 1976 due to large imports of oil and consumer goods. On the other hand, China since 1995, recorded a trade surplus.

Exchange Rate:

The exchange rate is the rate at which one currency is exchanged for another. It is the price of one currency in terms of another currency. Example- $1 = Rs. 65

Two of the major types of exchange rate systems are as follows:

i. Fixed Exchange Rate System (Pegged Exchange Rate System)
ii. Flexible Exchange Rate System (Floating Rate Systems)

Fixed Exchange Rate System:

It is the system in which exchange rate for a currency is fixed by the government or the monetary authority.

Need of fixed exchange rate system-

- The main reason for adopting this system is to ensure stability in foreign trade and capital movements.
- To ensure this stability, when the exchange rate becomes weaker government buys foreign currency and when the rate of exchange becomes stronger, government sells foreign currency.
- To maintain the level of exchange rate fixed by it, government has to maintain large reserves of foreign currencies.
- Under fixed exchange rate, each country has to keep the currency in terms some 'External Standard'. This standard can be gold, silver, etc.

Flexible Exchange Rate:

It is the system in which exchange rate is determined by forces of demand and supply of different currencies in the foreign market.

Flexible exchange rate is also known as 'Floating Exchange Rate'.

The exchange rate is determined by the market, i.e., through interactions of thousands of banks, firms and other institutions seeking to buy and sell currency for purposes of making transactions in foreign exchange.

According to the changes in demand and supply of foreign exchange market, the value of currency is allowed fluctuate freely. There is no need of government intervention in this market.

Effects of Different Exchange Rate Systems on Trade Balance

The exchange rate is influenced by the balance of trade through demand and supply of the foreign exchange. Whenever exports are greater than imports, value of domestic currency increases known as appreciation and whenever imports are greater than exports, value of domestic currency decreases known as depreciation.

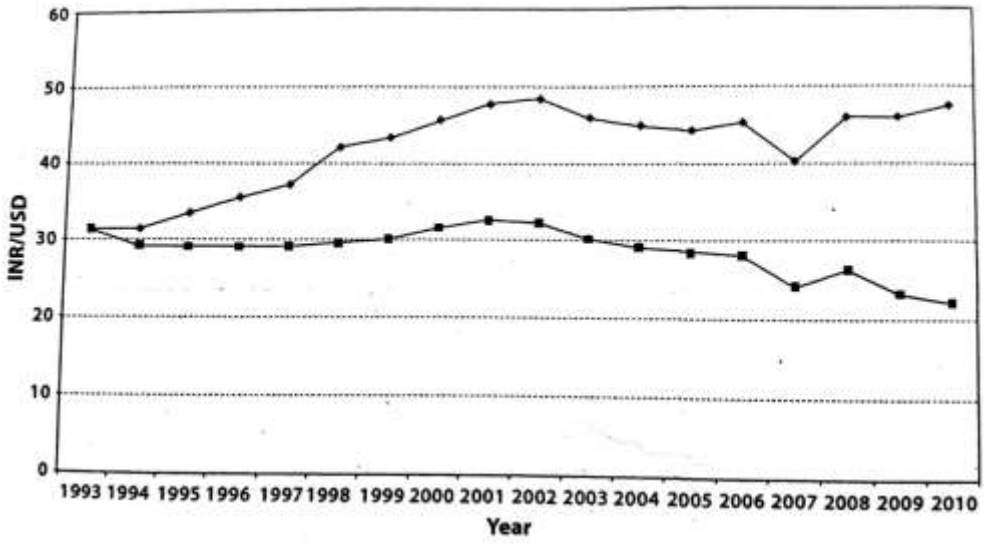
Real Exchange Rate and Net Exports:

A country's real exchange rate is the price of the average foreign good or service, when prices are expressed in terms of a common currency.

When the real exchange rate is high, foreign goods are, on an average, more expensive than domestic goods when they are priced in the same currency. A high value of real exchange rate means that domestic producers will find it easy to export to other countries, while foreign goods will be expensive as compared to goods produced at home. Thus, an increase in the value of the real exchange rate will tend to increase exports and reduce imports. Exports and imports are affected by changes in the real exchange rate. The real exchange rate always floats, even for a country that fixes its nominal exchange rate. When the nominal exchange rate is fixed or pegged to the value of another country's currency, the price level at home will adjust vis-à-vis price abroad, and the real exchange rate will fluctuate in response to mismatches between the demand and supply for goods traded between the countries. For example- the real exchange rate of Hong Kong is a floating rate, even though the nominal rate is fixed by Hong Kong's currency board.

Now we will understand this with a help of a graph-

Figure 1: Real and Nominal Exchange Rates



The graph of the real exchange rate and the nominal exchange rate of the rupee vis-à-vis the US dollar. The real exchange rate for the Indian economy has mildly fluctuated around a constant trend from 1993 onwards. It depreciated till 2002 and appreciated since then till 2007. However, the nominal exchange rate has been depreciating faster from 1993 to 2002 at a trend growth rate of 3.6 per cent, from INR 31.4 per US dollar in 1993 to INR 48.2 per US dollar in 2002. It appears that as the inflation differential between the two economies widened, the RBI intervened in the foreign-exchange market by allowing the nominal exchange rate to depreciate up to 2002, and then appreciate subsequently till 2007, so as to stabilize the real exchange rate. Since 2008, the nominal exchange rate has been depreciating and the real exchange rate has been appreciating. In this period, the central bank did not intervene in the foreign-exchange market, and the exchange rate was more market-determined.

Let a country produce only one good which is used for both exports and domestic consumption. Let Q_M denote real imports. Then P^*Q_M is the nominal value of imports in the foreign currency. The nominal value of imports in domestic currency

terms will then be EP^*Q_M, where E is the nominal exchange rate. The trade balance or net exports-exports less imports- in nominal terms will then be given by,

$$\text{Nominal Net Exports}=PQ_X-EP^*Q_M$$

In real terms- in terms of the price of domestic goods, net exports will be:

$$NX = \text{Qx} - \frac{EP^*}{\text{P}} Q_M$$

$$= \text{Qx} - qQ_M$$

In this equation- $q = (EP^*)/P$ is the real exchange rate.

Hence, net exports (NX) as defined in the national income accounts is given by-

$$NX = Q_X - qQ_M$$

$$= X - M$$

The Marshall-Lerner Condition

Marshall-Lerner condition named after the two economists who discovered it- Alfred Marshall and Abba Lerner explains the impact of real exchange rate on trade balance account of a country. To determine the impact of a change in the real exchange rate on net exports, we ignore the influence of net factor incomes and transfers from abroad as well as capital flows on the exchange rate. We begin the analysis at a point of time when the economy is experiencing balanced trade, or net exports are equal to zero. This starting point of the analysis implies that a change in the real exchange rate can have one of three impacts-net exports will stay unchanged at zero, net exports will improve and we will obtain a surplus trade balance, or net exports will worsen and we will obtain a deficit in the balance of trade the Marshall-Lerner condition then informs us how starting from a position of

balanced trade, a change in the real exchange rate affects the net exports of an economy.

To facilitate diagrammatic analysis, we will assume that the period of analysis is the short run where the level of output does not affect prices. In the short run, producers post a price for their product which is unchanged. They then meet the demand that is forthcoming at that price. A situation where the level of output does not affect prices is a situation where the supply curve is horizontal. We take it, then, that firms set a price and this remains unchanged. Domestic firms set a price $\bar{P}$ in domestic currency for the output which is to be exported, and foreign firms set a price $\bar{P}$* in their foreign currency (which is the foreign price at which goods are imported into an economy). This means that the real exchange rate, $E\bar{P}^*/\bar{P}$, can vary only when there is a changed in the nominal exchange rate, E.

A resident of a country that is importing a good will be connected with what the prices of that importable is in terms of domestic currency. Since the prices has been set by producers abroad at $\bar{P}$*, the prices the domestic economy experiences when the good is imported is $E\bar{P}$*. The supply of imported good is then infinitely elastic at $E\bar{P}$* (Figure 2). The demand for the import is a usual demand curve where the demand is decreasing in the price of the imported goods expressed in domestic currency units. We can write the demands for imports, M, as inversely related to the real or (equivalently) the nominal exchange rate given that the foreign currency price of the good has been set by the producer- this is depicted in figure 2. The demand curve reflects the situation where residents buy fewer products from abroad when the domestic currency price of those products increases.

In a symmetric way, the supply of exports is set by domestic producers at $\bar{P}$ and is an infinitely elastic supply curve (fig. 3). The demand for exports is by agent abroad, who like any agent on the demand side of a transaction, will demand less the higher the price. In the case, the price of the exportable good for a person abroad is in a foreign currency; P. Converting that price into the currency units of the person abroad makes the prices of the exportable good P/E.

Figure 2: The Imports Market

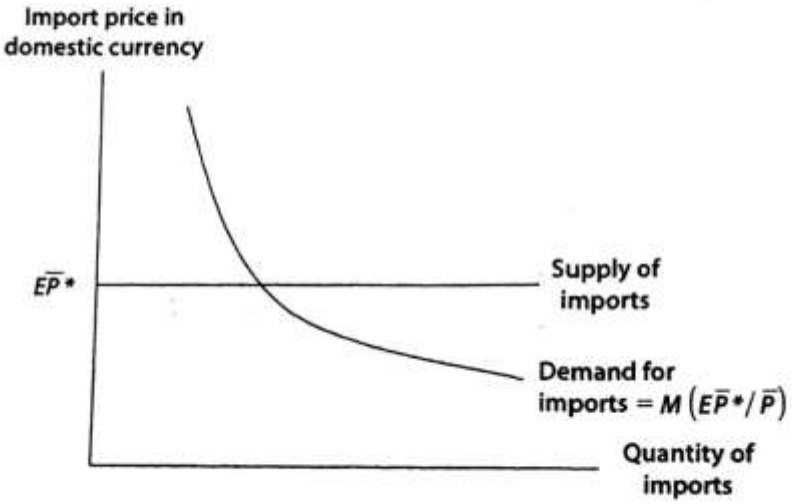
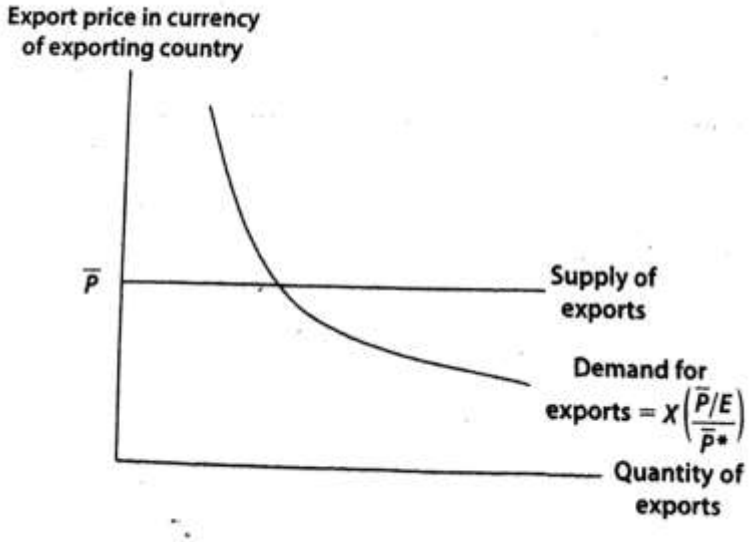


Figure 3: the Exports Market



The demand for exports is then a decreasing function of (P/E)/$\bar{P}$*, and we can write $X = X(\bar{P}/E)/\bar{P}$*. The demand and supply of exports is depicted in fig. 3.

In fig. 3, the demand curve for exports is drawn for a given nominal exchange rate- the price on the vertical axis is in terms of the currency of those who export the good and not in terms of the currency of those who demand the good. A change in the nominal exchange rate, then, will result in a shift of the entire demand curve for exports. A demand curve is the relation between the quantities demanded at the different prices represented on the vertical axis, with all the other factors that affecting demand held constant. As the price on the vertical axis, changes, there is a movement along the demand curve. If any of the other factors that affect demand changes, there will be a shift in the demand curve. As the exports have become cheaper, the demand for exports will increase and the demand for exports curve will shift rightwards at every price to reflect the increased willingness to demand exportable abroad. If the nominal exchange rate appreciates, on the other hand, then exportables become more expensive in foreign currency units, and the demand for exports curve shifts leftwards.

In figure 2, the demand curve for imports is with reference to the price of the imported good in domestic currency units, EP*. The nominal exchange rate effect of the price of an importable, then is already factored into the willingness to demand imports as depicted in the demand curve for imports. A change in the nominal exchange rate then is a movement along the demand curve for imports and a shift of the demand curve for exports. A depreciation of the currency is a movement upwards along the demand curve for imports and a rightward shift of the demand curve for exports. An appreciation of the currency is a movement

downwards along the demand curve for imports and a leftward shift of the demand curve for exports.

We now ask how a change in the exchange rate, say, through a devaluation of the currency affects the trade balance. The devaluation, let us say, causes the nominal exchange rate to change to $E^1>E$. The domestic currency price of importable goods supplied by business establishments abroad now increases to $E^1\bar{P}^*>E\bar{P}^*$ and shifts the supply curve of imports upwards (fig. 4A). The devaluation also makes exports cheaper for those who demand these exportable in terms of their currency and shifts the demand curve for exports to the right (fig.4B).

Figure 4A: Effect of Devaluation

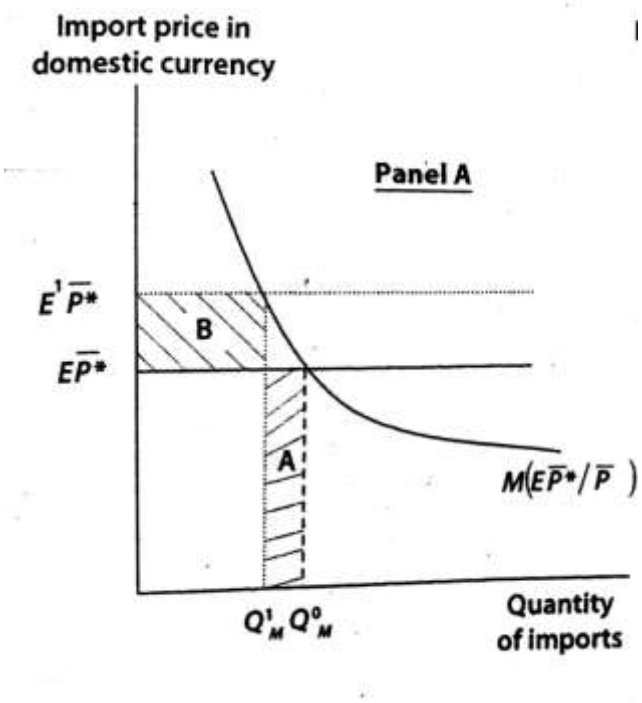
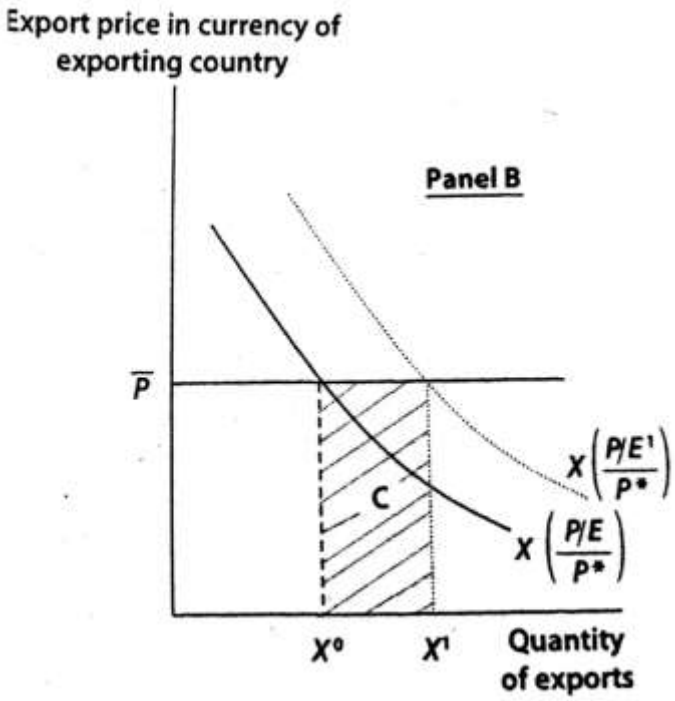


Figure 4B: Effect of Devaluation



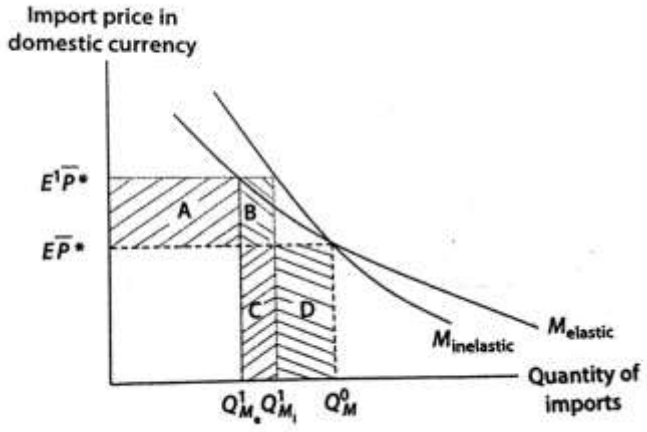
The devaluation results in three effects;

1. In fig 4B, the devaluation makes the production of the country relatively cheaper and this increases the value of real exports by the amount of the shaded rectangle C between X^0 and X^1. This improves the trade balance.
2. In fig 4A, the devaluation reduces the real quality of imports from Q_M^0 to Q_M^1 . This reduction in imports improves the trade balance.
3. In fig 4A, the devaluation raises the price that has to be paid for imports from $E^1\bar{P}^*$. This increases the price of the foreign good as compared to the domestic good. This change in the valuation of imports worsens the trade balance as more domestic output is being exchanged per unit of foreign goods imported. Suppose the shaded rectangular area B representing this valuation change in imports is larger than shaded rectangular area A representing the reduction in the volume of imports at the original valuation E. then, even though the volume of imports has declined, the country is

paying out more in value terms on that reduced import volume. Think of imports as spending on foreign goods and paying for it in terms of domestic goods. When the price of a good increases, demand falls, and yet the increase in price could be large enough that the expenditure on the reduced demand is higher than earlier. In a similar vein, the rise in the exchange rate can reduce the quantity of imports and yet the expenditure on imports in terms of the value of the domestic output equivalent of the volume of imports increases. Such is the case if rectangle B is larger than rectangle A.

The net outcome on the trade balance of a devaluation of the currency, then, is unclear. If the third effect is larger than the first two, the net outcome could be a worsening of the trade balance. The trade balance would improve if the third effect is small and the first two effects are large. The first effect is large if the volume of exports increases substantially when the exchange rate is devalued, if exports are elastic with respect to the exchange rate. The second effect dominates the third effect depending on the elasticity of import demand.

Figure 5: The Elasticity of Imports



In figure 5, we depict two import demand curves- the elastic curve $M_{elastic}$ and the inelastic curve $M_{inelastic}$. At the domestic currency cost of imports $E\bar{P}^*$, the quantity of imports is initially the same, Q_M^0, on both these demand curves. After the devaluation which increases the domestic currency cost to $E^1\bar{P}^*$, the quantity of imports declines relatively more to Q_{Me}^1 along the elastic demand curve and the change in imports is smaller at Q_{Mi}^1 along the inelastic demand curve. In contrast, the devaluation increases the relative price to be paid for imports and raises the valuation of imports more for the inelastic demand curve (given by the sum of areas A and B), than for the elastic import demand curve (given by the area A). The sizes of the second and third effect arising from the devaluation of the currency are summarized in the figure.

It is clear that the third effect is larger and the second effect smaller when import demand is inelastic. The valuation effect, then, is larger when imports are inelastic with respect to the exchange rate. The trade balance will then have a higher likelihood of worsening when the import demand curve is inelastic.

This implies that the more elastic are the import demand and the export demand curves, the more likely is it that the trade balance will improve. In fact, it can be proved that starting from a position of balanced trade, a devaluation will improve the trade balance if the sum of the elasticity of demand for exports (n_x) and the elasticity of demand for imports (n_m) exceeds unity. This is the Marshall-Lerner condition and may be written as- $n_m + n_x > 1$

The Marshall-Lerner condition holds if the elasticity of exports and imports were defined with respect to the real exchange rate instead of the nominal exchange rate instead of the nominal exchange rate. With the supply prices fixed by producers in

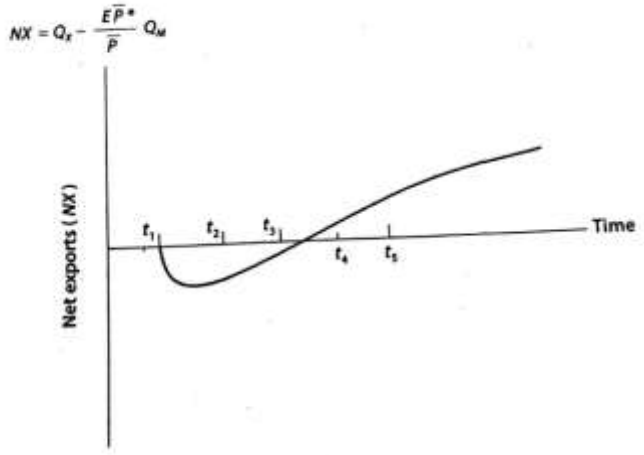
the currency of their countries, the real exchange rate is $E\bar{P}^*/\bar{P}$. a change in the real exchange rate, then, is identical to a change in the nominal exchange rate which influences the demand for importables and exportables. We should accordingly interpret the Marshall-Lerner conditions in terms of the elasticitites with respect to the real exchange rate rather than the nominal exchange rate.

The Marshall-Lerner condition applies when the initial position is one of trade balance. If a country has a trade deficit and seeks to reduce the deficit, then, for the trade deficit to improve the elasticities must be larger than the value of unity as given by the Marshall-Lerner condition. This is because with real imports larger than exports as in a trade deficit situation, the valuation effect of a change in the exchange rate is much larger as the value of imports initially were relatively large. The demand curves for imports and exports we have considered have been specified as functions of the relative price of foreign versus domestic goods. A more complete demand function would be in terms of the incomes in the country from which the demand originates as well. With exports and imports a function of the real exchange rate as well. With exports and imports a function of the real exchange rate as well as income

The J-Curve:

Goldstein and Kahn (1985) found that the medium to long run elasticities i.e. measuring the response of trade flows to real exchange rate changes over an adjustment period of greater than two years are about twice as large as the short-run elasticities i.e. measuring the response of trade flows in the first six months after the change in the real exchange rate. The short-run elasticities almost always fail to sum to unity while the long run elasticities almost always sum to greater than unity.

The possibility that in short run the Marshall-Lerner condition may not be fulfilled, although it generally holds in the longer run, is the J-curve effect.



Following a real devaluation at time t1, the trade balance deteriorates and after some time it improves.

The reasons for rising demand elasticities over time occurs (J-curve):

- Most orders for exports and imports are usually placed a few months in advance. The real depreciation or devaluation of a currency then raises the value of the quantity of imports that have been pre contracted for. As exports are measured in domestic output, the level of pre contracted export does not change. However, imports are valued in domestic output and this measure of imports rises following a real depreciation. Then, the trade balance initially declines because it is measured in domestic output.
- The pass-through effects of a change in the exchange rate may be partial. A pass-through effect occurs when a change in the exchange rate results in a change in the domestic prices of imported goods. Often, however, retailers do not immediately pass exchange rate changes through to domestic

currency prices. Instead, they absorb the increase in the cost of imports by reducing profit margins as would prefer to retain their market share.

- The quantity response to a change in the real exchange rate occurs with a lag. Producers who are exporters require time to scale up output by increasing plant and machinery and hiring new workers. Importers, if they are importing intermediate goods, will also install production units that economize in the use of these intermediate inputs. As these quantity changes become larger, the trade balance improves and at some point the trade balance is more favorable than the pre real exchange rate deprecation level and the J-curve tapers off.

Summary:

In this session, we have learnt about the various concepts of exchange rate and trade balance like deficits and surplus trade balance, fixed and flexible exchange rate respectively. We have also discussed about how trade balance gets affected by the exchange rate with the help of the Marshall-Lerner condition and the J-Curve.