Economic Environment and Business Strategy
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Policy Interventions in the Forex Market

Welcome to this session on exchange rates and monetary policy interventions. In today's discussion, we will explore how exchange rate dynamics and central bank actions shape the economic environment in which businesses operate. We begin with the real exchange rate, which captures the relative price of domestic goods compared with foreign goods. This, in turn, determines a country's price competitiveness in global markets, directly influencing trade flows, export demand, and the cost of imports. For businesses, movements in the real exchange rate affect input costs, profit margins, and international market opportunities. We then turn to the role of the central bank in the foreign exchange market, specifically examining how the Reserve Bank of India intervenes to stabilize the rupee.

Intervention can take two forms. One is called non-sterilized intervention, and the other is called sterilized intervention. In this session, we will make a clear distinction between non-sterilized and sterilized interventions. Understanding these mechanisms is vital because they highlight the trade-offs in macroeconomic management for firms, businesses, and investors. Central bank actions affect borrowing costs, inflation expectations, capital flows, and ultimately strategic business management. By the end of this session, you should be able to connect exchange rate policy and monetary policy interventions with broader issues in the economic environment and business strategy, from investment decisions and risk management to long-term competitiveness in global markets.

To begin with, let's discuss the concept known as the real exchange rate. The real exchange rate is based on the relative prices in domestic and foreign countries. In international trade or international relations, there is normally a demand for foreign goods and services. At the same time, foreigners will be demanding Indian goods and services. We have already defined that the demand for foreign goods and services, which we call imports, and the demand from foreigners for our goods, which are exports, are influenced mainly by relative prices. So, the proper definition of a real exchange rate is that it measures how many units of a foreign country's goods and services can be exchanged for one unit of our goods and services.

There is also an alternative definition. It can be defined as the nominal exchange rate adjusted for price differences between countries. As you are already aware, there are price differences between countries, and consumers obviously prefer to buy the same product at a lower price. If our goods are relatively expensive, there will be less demand for them from foreign markets. Our export demand will decline. Not only that, but Indian consumers will also demand foreign goods, which means we will prefer imports. In this context, price competitiveness, an important parameter for comparing across countries, is measured by the real exchange rate.

Let me begin by giving a formal definition of the real exchange rate and how it measures price competitiveness. As you already mentioned, theta is the measure of price competitiveness. It is E times P star divided by P. Here, P star denotes the foreign currency product price in the foreign country; that is, P star is the price of the foreign currency product expressed in foreign currency in the foreign country, and P is the home price level expressed in home currency or domestic currency, while E is the nominal exchange rate measured as the number of home currency units per unit of foreign currency. In the previous session, we defined what is meant by the nominal exchange rate.

We have defined it as the number of units of the home currency divided by one unit of foreign currency. For example, the exchange rate is 88 rupees per dollar. That means one unit of foreign currency (one dollar) is worth 88 units of the home currency (INR). In this case, you know that this represents the number of units of the home currency. That means by paying 88 rupees, you will receive one unit of foreign currency. For instance, here, one unit of currency is one dollar. So, in this case, you know that the exchange rate is 88. What we define here is only the nominal exchange rate.

This is not the real exchange rate. What we are going to do is that this E in the formula also comes into play; we are adjusting it for the price differences between the domestic country and the foreign country. To illustrate this, let me show you an example. For instance, Mars Chocolate Bar exchanges at a different price in the UK versus Germany. Here, we present our first case.

Here, we will list the price of this product in the UK, treating the UK as the home country in this example, and the price of the same product in a foreign country, such as Germany. We will also include the nominal exchange rate. To begin with, the price of this bar in the UK is 30 pence, equivalent to 0.30 pounds. The price of the same product in Germany is 0.50 euros. The nominal exchange rate is 0.6. By applying this formula, you will obtain the real exchange rate, which is calculated by multiplying the nominal exchange rate by the price of the product in Germany and then dividing by the price of the product in the UK.

That is the home country in our example. So, we are getting 1. So, 1 here means I will explain what it means. That is one scenario. Now, let us suppose the price in Germany increases from 0.5 to 0.55 euros, while all other factors remain the same. Assume that our nominal exchange rate remains the same and the price in the domestic country, which is the home country, the UK, also remains the same at 30 pence. Then, applying this formula, we will obtain the real exchange rate, which we obtain at 1.1. So, in this case, what you can make out is that in case 1, when we found 0, the theta is equal to 1 when the real exchange rate is equal to 1; prices are equal across countries, though expressed in different currencies, but at that time, we assume that the prices are equal across countries.

And because there are already differences in the nominal exchange rate, this one is equal. In this scenario, when we proceed to case 2, we obtain the real exchange rate as 1.1. Therefore, in this case, you can see that UK goods are cheaper compared to those in Germany.

In this table, you have raised the price of the same product in Germany, a foreign country. That means, relatively, the price in the UK becomes cheaper; it declines. At the same time, in Germany, the price becomes higher. That means it becomes greater than 1%. Then that 1.1 means the UK real exchange rate has depreciated. In this phase, when the price of the same product in the UK became relatively inexpensive, the price of this product in Germany became relatively expensive. Consumers are now likely to demand more of this product from the UK, and as a result, the demand for the pound is expected to increase, while the demand for the euro is expected to decrease. As a result, you can say that the UK's real exchange rate has actually appreciated; it should have appreciated. Appreciated because there is more demand for UK goods and services.

The demand for the UK pound has increased, and it has appreciated. In this way, we can see that the price competitiveness of UK goods has increased. So, in the exchange rate, what will happen is that the real exchange rate equals 1, which means that currencies are at purchasing power parity; they are traded at the true purchasing power of goods and services, and they are traded at the purchasing power parity. If the real exchange rate is greater than 1, goods abroad are more expensive than at home, and if the real exchange rate is less than 1, goods abroad are cheaper than at home. Let me also introduce you to another concept, known as the law of one price.

Law of one price, in short, we call it a loop. It means that there is one price for the same goods and services in both countries, assuming the exchange rate remains stable in the long run, because the exchange rate is determined by the demand and supply of foreign currencies. The demand and supply of foreign currencies rise due to the demand for exports and imports. Therefore, in the long run, theoretically, we can predict that there should be a single price for the same product across countries. For example, the Mars Bar that we have taken here should be traded at the same price in both countries.

In a frictionless world, suppose you ask the question: Should the loop hold? Yes, in a frictionless world, it can. However, the reason is that if Coke costs $2 in the US and $5 in India, then you know that you can buy Coke from the US and sell it in India at a profit. That is arbitrage. And then you can make infinite profits by buying in the US and selling in India. However, you know that won't happen because if that were the case, there would be demand for it.

That means you will need to pay with US dollars to buy the cork from the US. And as a result, the Indian exchange rate depreciated. Then, over time, you can see that this transaction won't hold true because the exchange rate will either depreciate or increase. So, that means it wouldn't really work. Why may the loop not hold? Actually, there are international transportation costs, and that is one reason why transporting coke from the US to here is very high.

The second point is that there are distribution costs, including loading, unloading, storage, retail, and advertising. Additionally, there are domestic costs, as well as market frictions, tariffs, and quotas, which will increase the domestic price. Therefore, in identifying some goods where loops work well, such as commodities like gold, oil, soybeans, wheat, and luxury items, these are all homogeneous products. In this case, there will be a low price that would still be viable even if you cancel or neglect the international transportation cost, distribution cost, etc. Similarly, it would also work in luxury consumer goods.

However, personal services, goods, and services such as healthcare, education, restaurants, domestic health, and personal care all exhibit significant quality differences among these services across countries. Therefore, the law of one price does not hold true in this case. Similarly, non-tradable assets like housing, utilities, and local transport, in all these cases, the loop won't work well. Now, let's move on to the central government's intervention in the forex market. Before we proceed, let us recall the key points, particularly in the context of India.

First, the exchange rate regime in India is. India follows a managed flow that is largely market-driven, but this approach allows for a flexible exchange rate regime. We are primarily a market-driven, flexible exchange rate market, but with the RBI intervening very occasionally, there may be instances of RBI intervention in the forex market. This typically occurs when there is significant volatility in the foreign exchange rate market. So, we can see that if there is a trade imbalance, which means if imports are greater than exports, then obviously, you know that the demand for forex rises compared to the supply of forex.

That is the case because you know that the demand for foreign exchange is driven by the demand for exports. As a result, you can see that the rupee has depreciated. So, what is

the likely impact? So, one benefit, actually, when the rupee depreciates, is that exports become cheaper; Indian exports will become cheaper abroad, and at the same time, our import bills increase, resulting in higher import bills. Persistent depreciation may signal weaknesses that are hurting foreign investors' confidence. Assume that initially the foreign exchange rate is 90 rupees per dollar; then it becomes, for example, 100, and then it becomes 110. What does it mean? That means we are demanding more and more foreign goods and services. That means that is the reason we are demanding more forex. Therefore, persistent depreciation may signal the weakness of the economy; the economic foundation will be questioned, which will hurt foreign direct investor confidence. Foreign direct investment, as well as portfolio investment, will be adversely affected because of the persistent depreciation of the Indian currency. In this case, the RBI's role is to prevent persistent depreciation of the Indian currency.

To maintain stability by intervening in the forex market, the RBI intervenes. So, in order to do that, how does the RBI intervene? So, for this, first suppose it notices that Indian currencies are becoming weak in the foreign exchange market; then it uses the foreign exchange it already has and sells the foreign assets. Foreign assets mean mainly foreign currency. To offset the foreign exchange shortage, what we have seen here is that the Indian currency depreciates because demand for foreign exchange increases and the supply of foreign exchange decreases. To offset the decline in the supply of foreign exchange, the Reserve Bank of India sells foreign currency from its reserves into the forex market, thereby generating additional supply in the market.

To facilitate the forex intervention, the Reserve Bank of India accumulated reserves over time. It buys in good times; it also buys foreign assets, which are financed mainly by issuing currency or other liabilities. The key point to remember is that RBI interventions are often aimed at smoothing volatility rather than permanently fixing the exchange rate. The key point is that RBI intervention is not aimed at maintaining a fixed exchange rate, but rather to smooth the volatility in the foreign exchange rate. After discussing these points, we are now better equipped to examine another key aspect of the forex market and policy intervention.

Let me introduce a new aspect called the Invisible Trinity. That means a country can achieve only two of the following three goals simultaneously. One is called capital mobility; here, perfect is not required. The second one is a fixed exchange rate, and then an independent monetary policy. So, no country can achieve all three of these goals simultaneously.

Either you suppose that if you want to achieve capital mobility and a fixed exchange rate, then you have to give up independent monetary policy, or if you have to prioritize one of the two, then you must give up the other. Therefore, a country must choose two and relinquish one. I just introduced the term ' capital mobility' here. So, capital mobility

occurs mainly due to the integration of financial markets, as you are aware that bonds and stocks are two key financial instruments. Therefore, when financial markets are integrated globally, it means that these financial instruments can be traded across borders with ease.

In some countries, there is perfect capital mobility, which means investors can move capital internationally quickly in unlimited amounts with low transaction costs. This also means that financial assets in one country are considered perfectly substitutable in both countries. That means if there is, say, perfect capital mobility between India and the US, then a slight change in the rate of interest in one country would facilitate capital mobility between the two countries easily. There will be free capital and financial movement between each country. For instance, a better example is that of perfect capital mobility. A good illustration is to consider the US and Canada, where investors generally view the bonds in these countries as perfect substitutes. So, assume that in the US, the interest rate is 5%, and in Canada, also assume that the exchange rate is 5%.

If there is perfect capital mobility and the interest rate in the US increases to 6%, capital will move easily, immediately, and instantly from the US to Canada. So that means there is perfect capital mobility. Therefore, it denotes the behavior of asset holders, who seek to allocate funds across countries to maximize returns or minimize borrowing costs. It can impact interest rates because domestic rates cannot deviate much if there is free capital inflow between the two countries.

There is free capital mobility between countries. So, if there is a slight increase in the rate of interest in Canada, even 5.5%, then you know that all the money coming here causes the demand for foreign US bonds to decrease. As a result, its price will decline, and consequently, the rate of interest will increase, according to the theorem we studied in one of the previous sessions. So, as a result, if the rate of interest increases by 5.5 percent in Canada, then you can also see that in the US, there will be an increase in the rate of interest because of the demand and supply in the bond market.

That means the domestic rates cannot deviate much if there is perfect capital mobility between countries. Now, let me introduce a key concept related to foreign exchange rates and central bank exchange intervention. There are mainly two types of interventions. One is referred to as a non-sterilized intervention, and the other is referred to as a sterilized intervention. In the case of non-sterilized intervention, when the central bank intervenes, it either buys or sells foreign currency, which affects the domestic money supply.

let me connect with an example: suppose the RBI buys dollars from the forex market; how does it buy them? By paying money in return. So, when the RBI buys dollars from the foreign exchange market, it may do so through the banking system or the market, and it injects rupees; consequently, the money supply in the domestic economy increases. So

that is the non-sterilized intervention. But sterilized intervention is such that, if the RBI does it this way, then you can see that the money supply increases when the RBI buys dollars and injects rupees. So, in the forex market, intervention led to an increase in the money supply in this case.

You see that in order to offset the forex intervention, the domestic money supply increases. To offset this, the central bank must recoup the money; to do so, it engages in open market operations to neutralize the impact on the domestic money supply. In this case, the RBI is selling government securities to the banking system in the economy to absorb the additional money it has created through the increased money supply. That means that by selling government securities to the banking system, the central bank gets the money back into circulation. The RBI intervenes when it buys dollars but simultaneously sells government securities to offset the increase in the money supply.

That means the net change in the money supply is neutralized. In the case of non-sterilized intervention, there is no offsetting action. Therefore, changes in the monetary base will affect the money supply and interest rates. In sterilized intervention, it influences the exchange rate only without changing the monetary base. So the key points to remember in the case of sterilized intervention are that there will be two steps.

One question is whether there is buying or selling of foreign currency assets. This will affect the monetary base, and the RBI engages in open market operations to adjust the money supply and offset those changes. Here is how it works. Suppose there is depreciation of the Indian currency; then, to reduce further depreciation, the RBI intervenes in the market by buying Indian currency.

That means selling foreign exchange and, in return, buying Indian currency. As a result, you know that the money supply has declined. To overcome this, the RBI will purchase bonds and, in return, provide the funds to the seller. The money supply remains unchanged. Similarly, if the reason is appreciation, then the RBI will sell currency and buy dollars. At that time, you know that there is a change in the money supply; then, in order to offset it, open market operations will involve selling bonds, and in return, the central bank will receive the money, so that the money supply remains unchanged.

These are the impacts of sterilized and non-sterilized interventions on key economic variables, including the effects on the money supply and interest rates, which I have listed systematically in the table below. This is a brief illustrative example. I have already explained to you in one of our classes how to look at the central bank's balance sheet, specifically what the asset side and the liability side are. So, mainly on the liability side, let me repeat: this includes the bank's reserve, which is the reserves held with the central bank by the banking system, as well as currency in circulation.

These are the liabilities, and these are all the assets. What we can see here is that the foreign exchange markets and the money markets are highly interconnected. The assets show that, in the example we have already seen here, if there is a sterilized intervention using an appropriate policy, the RBI neutralizes the change in the money supply; that is, it is done through the foreign exchange market. Not only do they intervene in the foreign exchange market, but they also have to intervene in the money market through open market operations. Therefore, the central bank's asset sales and purchases in the foreign exchange market affect outcomes in the domestic money market, particularly when it targets inflation by maintaining a fixed policy rate at a specific level. Now, let me explain how a policy intervention clearly illustrates what a sterilized intervention would look like; in this case, assume this is the T-account of a central bank.

Just note that the assets are these; these are the liabilities. Now, assume that in this scenario, the central bank wants to make a sterilized intervention. Suppose the central bank goes to the forex market and sells $100 worth of foreign bonds for domestic currency. This sale reduces official holdings of foreign assets from 1,000 to 900, causing the asset side of the central bank balance sheet to shrink from 2,500 to 2,400. You can see that this has declined. And then, in this case, the central bank's balance sheet after the 100 of foreign assets looked like this, because, you know, when they are selling 100, you can see that there is a decline of 100 dollars in assets.

And in return, they receive equivalent money in Indian currency. Currency in circulation declined from 2000 to 1900. It can be done by the general public. It can also be done from this chain. It can also happen in the banking system. This can also be explained through the banking reserve and the banking system.

The deposit will be held by the banking system with the Reserve Bank of India (RBI). Suppose the open market operation is conducted through the banking system. In this case, if the central bank observes a decline in reserves, it compensates by purchasing government securities from the banking system worth 100. At the same time, the banking system will receive 100 worth of Indian currency as reserves from the central bank.

Because the banking system will sell $100 of government securities to the central bank, it will receive $100 worth of Indian currency in return. To summarize, in conclusion, what we have seen here is that the real exchange rate significantly influences a country's global competitiveness. The central bank's intervention, whether sterilized or non-sterilized, determines how exchange rate adjustments are transmitted to the domestic money supply and interest rates. So, for businesses and policymakers alike, these dynamics are crucial as they influence trade flows, capital movements, and the broader economic environment in which strategic decisions are made.

Thank you for watching this session. I look forward to seeing you at the next one. Thank you.