

**Conservation Economics**  
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**Module 6**  
**Markets: Places where Economics works**  
**Lecture 1**  
**Demand and supply**

Namaste! Today, we begin a new module which is Markets, Places where Economics works. This module we will have three lectures - demand and supply, elasticity, and government policy. So, let us begin with Demand and supply.

A market is defined as a group of buyers and sellers of a particular good or service. So, it is a group of buyers and sellers. It is not just a single buyer and a single seller; it is a group of buyers and sellers. You cannot have a market with only buyers, or you cannot have a market with only sellers.

It has to be a market of or a group of buyers together with the sellers of a particular good or service which means that there can be different markets for different goods and services. So, for instance, we can have a market for food grains, we can have a market for goods, we can have a market for selling and buying stocks and so on. So, it is a group of buyers and sellers of a particular good or service.

Now, buyers determine the demand for a product and sellers determine the supply for the product. So, buyers are those who are asking for the product, they want to purchase these products. So, they create a demand in the market. So, the more the number of buyers, the greater will be the demand. Similarly, the sellers determine the supply in the market because the sellers are the suppliers of the good or service.

If there are more sellers or if each seller decides that your need is going to supply more amounts of these goods and services, then the supply in the market will go up. So, buyers determine the demand for a product and sellers determine the supply for the product.

And there are different kinds of markets. You can have an organized market such as the market for a food grain. So, in the case of an organized market, different buyers and sellers come to a place and they play by certain rules to sell their products. In a number of these organized markets, the buying and selling of goods could be through the use of auctions or through certain other institutional mechanisms. So, this is an organized market.

On the other hand, you can also have certain unorganized markets such as ice cream shops. Now, in the case of an ice cream shop, there is no fixed procedure for buying or selling. We do not have an auction, you just go to an ice cream shop, you pay the money and you get the ice cream. So, this is an unorganized market. We are not seeing any sort of an organization of different buy-

ers or different sellers who are coming together for meeting a specific purpose. So, this is an unorganized market. Similarly, the market may be competitive, or it may be uncompetitive.

A competitive market is defined as a market in which there are many buyers and many sellers, so that each has a negligible impact on the market price. A market in which there are many buyers and many sellers, so that each has a negligible impact on the market price. So, what we are referring to here is that in a competitive market there are several buyers, and so the buyer is unable to determine the market price.

Suppose, there were only a few buyers or let us say that there was only a single buyer. Now, the amount of money that this buyer is able and willing to spend in the market that would determine the price of the products, because if say the buyer goes to a market and says that I can only pay 100 rupees for this particular product.

Now, in that case, there is no way in which any seller would be able to sell it for more than 100 rupees because there is only a single buyer. Now, similarly, if there is a single seller, in that case the rate at which the seller is ready to sell that would be the market price.

But, in the case of a competitive market, we have many buyers and we have many sellers, so that any one buyer or seller is unable to determine the market price. So, for instance, if our buyer is there and he is ready to pay say 100 rupees or say 1 kg of price; and if there is another buyer who is ready to pay 105 rupees. So, in this case, the buyer who was ready to pay 100 rupees, he is not able to change the market price.

Similarly, if you have a number of sellers, the seller who sells at the lowest price would be determining the market price, but other sellers will not be determining the market price. So, in a competitive market, the buyer who pays the largest price at the seller who sells at the lowest price determines what would be the market price. Any other buyer or seller is unable to determine the market price, because they do not have the power to change the market prices or to increase the market prices.

Other characteristics of perfectly competitive markets include things such as goods that are offered for sale are exactly the same. Which means that if you have, say a market for food grains, and there is one seller who is selling a good quality food grain, and there is another seller or let us say all the other sellers are selling a bad quality food grain.

In that case, the seller who is selling the good quality food grain because he is the only one who is selling the good quality food grain, he would be able to increase the market prices.

But, if you have goods that are uniform, so every seller has the same goods of the same quality, then we would say that the market is competitive. If there is a variation in the quality of the goods that are being bought or sold in the market, then we will say that this is not a perfectly competitive market.

It is still a competitive market because you have many buyers and sellers, but it is not perfectly competitive because there could be certain buyers or sellers who value the quality of the goods. And in that case, they would be influencing the market prices. So, there is a slight influence on market prices. And so if the goods are not uniform, we will say that this is not a perfectly competitive market.

Then there are so many buyers and sellers that no single buyer or seller has any influence over

the market price; and all buyers and sellers are price takers. Now, what do we mean by price takers? It means that at the market price the buyers can buy all they want and the sellers can sell all they want.

What we are saying here is that there are many buyers and sellers. No buyer or seller has any influence over the market price. And once the market price has been determined by the behavior of so many buyers and sellers, then at the market price the seller should be able to sell as much of the good as he wants to, and the buyer should be able to buy as much of the good as he wants to. That is if the buyer has to purchase 10 units of something, then the 11th unit will also cost the same as the 10th unit, the 10th unit will also cost the same as the 11th unit and so on. So, once the market price has been fixed because of the actions of buyers and sellers, then everybody is a price taker, the buyer as well as the seller. The buyer will or can get the goods at the market price, and he can get as much amount of goods as he wants from the market because there are so many buyers and sellers.

And similarly the seller can sell as much amount of goods as he wants to sell at the market price. Then there is a perfect information transfer regarding prices. It means that if there is a market, there are so many different buyers and sellers; they are selling goods at different prices.

So, every buyer and every seller should know who is buying and selling at what price. What it means is that, suppose in the market you have 100 sellers, and say each of these sellers is selling the rice at the rate of 80 to 150 rupees a kg.

Now, if as a buyer, I enter into this market I should have perfect information about who is selling at what rate, so that I am able to buy at the lowest price. Similarly, if I am a seller I should know who is buying at what price, so that I can sell my products to that person who is buying at the largest price. And so when you have a perfect transfer of information, then there will be an equilibrium.

So, the seller will be selling the goods to the buyer who is paying the highest price, and the buyer is buying the goods from the seller who is selling at the lowest price. And this price which is the highest that the buyer is willing to pay, and the lowest that the seller is going to sell at this will be the market price. So, for a perfectly competitive market, there should be a perfect flow of information about the quality and the price of goods that are being bought and sold.

The market should have well defined property rights, which means that the only way in which you can buy or sell a good is through the market. Nobody can go to a seller and say snatch the goods because if the seller is having this idea that my goods can be stolen, then he or she will not be providing such a huge amount of goods to the market as he would have provided if there are perfect property rights.

Similarly, if there is a buyer, he should have confidence that there are property rights and his property rights are going to be respected. So, the working of the market requires well-defined property rights and this is a characteristic of a perfectly competitive market.

Then there should be a free entry and exit end to end from the market. What that means, is if there is a seller and the seller comes to know that say rice is being sold at 100 rupees a kg. Now, if this seller thinks that, oh, I can sell my rice at 99 rupees a kg, I can sell it for less than what the current market price is, then this seller should be able to enter into the market.

There should not be any restriction that only the sellers that are there in the market. They will be the only ones doing the same things. So, any seller should have the opportunity to freely enter the market.

Similarly, if there is a seller who finds out that I cannot sell below say 105 rupees, this seller should have the option of exiting the market. So, he can take his goods and move out of the market. Similarly, the buyer should be able to enter and exit freely. So, it means that there is no restriction on the number of buyers and sellers. And so anybody can enter the market or anybody can exit from the market. So, this is also another characteristic of a perfectly competitive market. Then it assumes that there is rationality both the buyers and the sellers are trying to maximize their utility. Now, we have seen before as well that economics assumes that everybody is a rational decision maker. And in the case of a perfectly competitive market, then we assume that everybody is a rational thinker, the buyers as well as the sellers. Now, both are acting to maximize their utility, they are trying to maximize their welfare.

And then there are zero transaction costs which means that if the market is large in size, I as a buyer should not have a thought that oh that seller is selling at a great distance, how am I going to go to that place. So, it says that there is zero transaction cost, there is no cost for a buyer to move from one seller to another seller. He does not have to pay money to go from one seller to another seller; he does not have to pay time to go from one seller to another seller.

And similarly the sellers also do not have any transaction cost. So, they can sell their goods to the buyer who is willing to pay the maximum amount of money. So, this means that there is no transaction cost.

Now, why are we making all these assumptions? This is because a perfectly competitive market is a theoretical concept. There is no market in the world that is perfectly competitive, because in any market there are transaction costs, in any market there are a fixed number of buyers and sellers. And in a number of markets, there is no free entry and exit. So, a number of these assumptions are violated.

The goods that are offered for sale, they may be different. There is a branding of goods in most of the markets. So, people may not consider one brand to be equivalent to another brand. Not everybody is a price taker. People try to negotiate, people try to haggle, people try to bargain.

We do not have a perfect information transfer regarding prices. So, it is possible that once we have bought your goods, you come to know that there is another seller who was selling at a lower rate. There is no perfect information transfer in the real world markets.

The property rights may or may not be well. So, well-defined free entry and exit into and from the market is not there in a number of cases. And also in a number of cases, people do not buy and sell rationally. A very good example is that in is that some people may try to buy from people who belong to their own community, or who belong to their own race, or people who are talking in the same talk.

Similarly, a seller might try to differentiate between different buyers. So, in these cases, the buyers and sellers are not taking a rational decision. In a number of cases, people are so overwhelmed by advertisements that they may buy a good which may be of an inferior quality or at a higher price just because they have been exposed to an advertisement.

Now, in a real world market these assumptions do not hold completely, which is why we are making this theoretical concept of a perfectly competitive market. And we will use this model of a perfectly competitive market to analyze what is going to be the ideal situation.

And from there, we can make a judgment about how good or bad the real situation is. So, we are talking about an ideal, perfectly competitive market. Now, in the market, there is a demand for products and there is a supply for products. So, we define quantity demanded as the amount of a good that buyers are willing and able to purchase. The quantity demanded is the amount of a good, how many units of the good are there that the buyers are willing to purchase and they are able to purchase.

Now, they should be both willing and able. It is not willing or able because there are certain buyers who want to buy a product, but they do not have money. So, in that case, their willingness does not count in the quantity that is demanded in the market.

Similarly, there could be buyers who are able to purchase the good, but they are not willing to purchase the good, say at this price. So, in that case, we will not include them in the quantity that is demanded of the good.

Then we define the law of demand. The law of demand is the claim that, other things being equal, the quantity demanded of a good falls when the price of the good rises. It is the claim that other things being equal. So, here again we are making an assumption that everything else being the same.

We are only changing one thing and that is the price of the goods; everything else remains the same, the quality of goods remains the same, the social structure that is there in the society remains the same, the level of advertisement remains the same, the transaction cost remains the same. If everything else remains the same, then if you change the price of a good what will happen to the quantity demanded?

So, here what we are saying is that suppose in a market, mangoes are available for say 30 rupees a kg. If the price goes up, if the price is down 40 rupees a kg, will people still be demanding the same amount of mangoes or will the demand change? So, the law of demand says that other things being equal the quantity demanded of a good falls or will reduce when the price of good rises. So, there is an inverse correlation. If the price increases, the quantity demanded falls.

And demand curve is a graph of this relationship between the price of a good at the quantity that is demanded. So, this is how a demand curve looks like. On the y-axis, we have the price of the good; on the x-axis, we have the quantity that is demanded in the good. And this green line shows us the demand curve. So, it is telling us that as the price increases, so when the price increases, we are moving on the y-axis from bottom to upwards.

If we take say two points - we take this point and we take this point, now at this point, so it is, draw these lines. So, what that law of demand tells us is that as the price increases, we are talking about these two prices. So, this is the price P1 and here you have the price P2. Now, as the price has increased from P1 to P2, what happens to the demand or let us say the quantity demanded.

At price P1, the quantity demanded was this much Q1; and at price P2, the quantity that is demanded is Q2. Now, the law of demand says that as the price increases from P1 to P2, the quantity demanded reduces from Q1 to Q2. So, there is an inverse correlation. This graph goes from

top left to bottom right. So, this is the law of demand. Other things being equal the quantity demanded of a good falls when the price of good rises. This is the demand - the law of demand.

And we can also make out a demand schedule. A demand schedule is a table that shows the relationship between the price of a good and the quantity demanded. So, we are not making a graph, we are making the table. Then we will say that it is a demand schedule.

This is an example of a demand schedule. We are talking about the price of a cake and the number of cakes that are demanded by an individual. Now, suppose there is a market for cake, you go to this market, and you decide that the value that a cake is going to provide to you is equal to 80 rupees which means that the value of the cake and your rice is 80 rupees.

Will you be paying anything more than 80 rupees? The answer is no, because you are doing rational thinking. But if the same cake is available to you for say 30 rupees, in that case you will not just take one cake, probably you will have more than a cake because you are trying to maximize your utility. So, in this case, the buyer will think that the value of the cake is 80 rupees; the price of the cake is 30 rupees. So, let me have more and more of this cake.

But then the demand or the quantity that is demanded will not be infinite. Why, because every buyer has limited funds, and the money that the buyer has could be used to purchase say this cake or it could be used to purchase something else as well. Now, because of that the quantity that is demanded will not be infinite if the value of the cake is greater than the price, then there will be a particular limit. But here the cheaper that you can get the cake that has a higher value in your eyes the more and more quantity you will be deriving or you will be willing to purchase. So, this is the demand schedule of an individual.

And when we plot this demand schedule, we get a demand curve. So, this demand curve is telling us here again you have the price of the cake and the quantity that is demanded. And you see an inverse correlation. If the price is less, the quantity demanded is more; if the price is more, the quantity demanded is less.

Now, in the market and especially in the competitive market, there is not just one buyer there are several buyers. And the market demand schedule is the sum of the individual demand schedules. So, if we say that the price of the cake is here in this column and the number of cakes that are demanded by 2 individuals - individual A and B are given like this. So, at a price of 0 rupees, individual A is demanding 16 cakes, individual B is demanding 6 cakes. So, the market demand will be the sum of both of these, which is 22 cakes.

When the price increases to 10 rupees, for A the quantity demanded reduces from 16 to 14; for B, it reduces from 6 to 5. And the total quantity demanded is now 14 plus 5 is 19. If the price increases further to 20 rupees, the quantity demanded reduces further. And here the market demand is 12 plus 4 is 16. And so we can figure out the quantity that is demanded in the market by adding up the quantity demanded by different buyers that are there in the market.

That is to say if this is the price, and this is the number of cakes that are demanded. If this is the curve for A, this is the curve for B, then this is the market demand curve by adding A and B.

Now, when we talk about the demand curve, there can be shifts in the demand curve. And we say that when the curve shifts to the right, then there is an increase in the demand. And when the curve shifts to the left, there is a decrease in demand. Now, what does that mean?

If the demand has increased, it would mean that at any price let us say at price P, so at any price P, the quantity that is demanded has increased if there is an increase in demand. So, earlier the quantity that was demanded was this Q0. The quantity that is demanded now is this Q1. So, if there is an increase in demand, then more will be the quantity demanded at any price.

In place of this price, if we say shift to another price, if we talk about the price here, so if this is P, this is Q0, and this is Q1. So, the quantity that is demanded at this price also has increased. You take any price and when there is an increase in demand, the quantity demanded will increase. And we represent it on the curve as the curve shifts to the right.

On the other hand, in the case of a decrease in demand, the quantity demanded at any price reduces, which is to say that earlier the price was Q0, and earlier the quantity that was demanded was Q0. Now, the quantity demanded is Q2, and Q2 is less than Q0. So, this is showing a decrease in the demand. So, the quantity demanded at any price reduces or the curve shifts to the left.

Now, it is important to remember here that there are two kinds of movements. One is the shift of the curve either to the right or to the left which is known as a shift in the demand curve. And the second thing is movement along the curve. So, if we talk about this green curve, if the price changes, then the quantity that is demanded also changes. And the price increases, so you can have a situation that you have, you have this point, and you have this point.

Now, in the case of this green curve, if we see that the price has increased, so we are moving from this point to this point, the quantity that is demanded decreases. So, the quantity demanded here is more, and the quantity demanded at this point is less. Now, this is known as a movement along the demand curve. But when the demand curve itself shifts when we say that there is a shift in the demand curve.

Now, what can cause such shifts? Things include changes in the income. So, if there is a normal good and you have an increased income, then you will demand or you will demand more quantity of the good. A normal good is defined as a good for which other things being equal and increase in income leads to an increase in demand such as ice cream. So, what we are saying here is that if your income is 10,000 rupees a month and you are demanding say 3 ice creams in a month. If your income increases, so in place of earning 10,000 rupees a month - you are now earning 30,000 rupees a month, then the number of ice creams that you will demand will also increase. In that case, we say that it is a normal good.

On the other hand, there could be certain goods that are known as inferior goods. An inferior good is defined as a good for which other things being equal, and increase in income leads to a decrease in demand such as coarse grains. So, what we are saying here is that when we were earning 10,000 rupees a month, suppose you were buying 30 kgs of coarse grains, say millets in a month.

Now, if your income increases in place of earning 10,000 rupees, you are now earning 50,000 rupees. Will you be eating more and more of these coarse grains or will you shift to finer grains? The answer is you will shift to finer grains. Probably, you will shift your food habits to incorporate more milk or more fruits or more meat. In that case the quantity of the coarse grains that you were demanding will go down. So, this is an inferior good, a good for which other things being

equal an increase in income leads to a decrease in demand such as coarse grains.

Changes in income will lead to changes in the quantity that is demanded at any price. Now, when we are talking about the normal good or the inferior good, we are only talking about changes in income which is leading to a change in the demand. Now, this change in the demand will be at any price.

Suppose earlier the ice cream was available at 10 rupees for an ice cream, you start earning more. So, you demand more ice cream at 10 rupees. Suppose, the price of the ice cream was 20 rupees, here again if you have an increased income you will ask for more ice cream. It does not matter what the price of the ice cream is.

So, other things being equal an increase in income, leads to an increased demand at any price, so this will shift the demand curve. So, if people have more income, the demand curve will shift towards the right. If people have a reduced income, the demand curve will shift towards the left for normal goods.

Other things that shift the demand curve is the price of the related goods in which case we talk about substitutes and compliments. Now, in the case of substitutes, it is two goods for which an increase in the price of one leads to an increase in the demand for the other such as rice and wheat. So, rice and wheat are substitutes, because they are both staple grains.

Now, if there is a family that eats rice as well as wheat, and if there is an increase in the price of rice - so rice increases from say 80 rupees a kg to 120 rupees of kg, and there is no change in the price of B. So, what would most people do? Most people would try to reduce their rice consumption, and would try to increase their wheat consumption because for the same amount of money, for the same income, you have to meet a good with the amount of grains that your family needs.

So, if the price of rice has increased, you will eat more wheat. If the price of rice decreases, in that case you will probably eat less wheat and eat more rice. So, the price of related goods may change the demand or the quantity that is demanded, that is there is no change in the price of wheat, but because the price of rice is changing, so that will lead to a shift in the demand curve.

Other goods are things that are known as complements. In the case of compliments, it is two goods for which an increase in the price of one leads to a decrease in the demand for another such as coffee powder and sugar. So, if there is an increase in the price of coffee powder, now coffee powder and sugar are used together when you make coffee.

So, if there is an increase in the price of coffee powder, so in that case your coffee becomes more expensive, and you will try to reduce the amount of coffee that you are drinking. And probably shift to something else such as tea or such as cola. Now, in this case, the price of coffee powder has increased, and so you have shifted to say drinking cold drinks.

Now, in the earlier case, you were having more amount of coffee and for that you were demanding more amount of sugar. Now that you are drinking less coffee, you will demand less quantity of sugar. So, an increase in the price of coffee is leading to a decrease in the demand for sugar because coffee powder and sugar are complements. A change in the price of related goods will lead to a shift in the demand curve.

Then taste, such as an increased demand for ice cream with the onset of summer, because with the onset of summer more and more people want to have ice creams. So, nothing else is chang-



ing, but the demand for ice cream will increase in the summer season. So, the curve will shift towards the right.

Other things include expectations. If taxes on petrol are to rise from next month, the demand in this month will increase because people expect that in the next month because of increased taxes we will have to pay more for petrol. So, why not fill our tanks to the brim. So, the demand in this month, in the current month, will increase if people are expecting the prices to go up.

Similarly, if you expect that the price of any product is going to increase in the future, you will try to have or hold more and more of that product. If the price is going to reduce in future, then probably you will cut down on the amount of that good that you are buying now.

For instance, when the price of real estate is going down, less and less people want to buy a home, because they think that if we do not buy the home now if we wait for a few more months, we will be able to get this home at a cheaper rate at a lower price. So, expectations can also lead to changes in the demand curve, and also the number of buyers.

So, the more the number of buyers in a market, the more is the demand. And this especially holds true when there is an economy that is opening up. So, earlier in our country when our market was not an open market then only the buyers in India were able to purchase the goods that were being produced. But these days our goods have a market everywhere they have a demand everywhere.

Even a person in the United States might want to purchase something that was manufactured in India. So, because the number of buyers have gone up, that will lead to a shift in the demand curve because more and more quantity is being demanded because there are more and more buyers at any price. So, these are shifts in the demand curve.

Now, similarly we can talk about supply. The quantity supplied is the amount of a good that sellers are willing and able to sell. The sellers should be willing to sell at that price, and the sellers should be able to sell that is they must be having the good or they must be in a position to make the good.

Law of supply is the claim that other things being equal, the quantity supplied of a good rises when the price of the good rises. Now, suppose there is a seller of mangoes, if the price of mango increases, then this seller will be ready to supply more quantity of mango because he wants to maximize his profit.

When the price increases, he will supply more mangos; when the price decreases, then probably he will supply less mangos. This is the law of supply, other things being equal, the quantity supplied of a good increases or rises when the price of good rises. And we can represent it through a supply curve which is a graph of the relationship between the price of a good and the quantity that is supplied of the good.

This is the supply curve. When the price increases, so you are moving from say this point to this point; so when the price increases the quantity that is supplied also increases. So, this is the law of supply. We can represent the law of supply through the supply curve or through the supply schedule. A supply schedule is a table that shows the relationship between the price of a good and the quantity that is supplied.

This is a supply schedule, the price of a cake and the number of cakes that are supplied. If the

price of a cake is 0 rupees, then probably no seller will be supplying any cake because it will only result in a loss because there is a cost involved in making the cake. If the price of 1 cake is 10 rupees, then again if the cost of manufacturing is greater than or equal to 10 rupees, then no seller will be able to or able and willing to supply the cake.

If the price increases to 20 rupees, probably, a seller is ready to supply 2 cakes. If the price increases further to 30 rupees, the seller will supply more cakes because now the seller is getting an incentive to increase his profit by making more and more cakes. If the price of 1 cake increases to 80 rupees, the seller will be ready to supply 14 cakes.

Now, here again if the cost of making the cake is 10 rupees, then at a cost at a price that is greater than the cost of manufacturing say at 80 rupees, the number of cakes that are supplied by the seller will not be infinite because there is an opportunity cost involved. So, even though by supplying more and more cakes, the seller can maximize his profit. So, the number of cakes that he supplies at any price will not go to infinity.

And we can use this supply schedule to make a supply curve. So, here it is showing that as the price of the cake increases, the number of cakes that are supplied also increases. And in a market as we have seen before, if there are multiple suppliers, then the total supply is equal to the supply of cakes by each seller. So, at 0 rupees, seller 1 is going to supply 0 cakes; seller 2 is going to supply 0 cakes.

So, the total market supply is 0. At 10 rupees, again 0, 0, that is 0. At 20 rupees, individual A or seller A is ready to supply 2 cakes. Individual B thinks that I still cannot supply anything. So, here the market supply is 2 plus 0 is 2. At thirty rupees, it is 4 plus 1 which is 5. At 40 rupees, it is 6 plus 2 is 8.

Here we are observing that at any price if you take the sum of the cakes that are being supplied by each seller, you will get the amount of cake that is being supplied to the market.

Or we can also say that if the red curve is showing the supply curve of seller A, the blue curve is showing the supply curve of cell B. Then this green curve which is the sum of A and B is telling us the supply curve of the market.

And as before we can talk about movement along the supply curve and shift in the supply curve. So, in this case, we are moving along the supply curve. But if there is an increase in supply, it would mean that at any price P, the quantity that is supplied would increase.

So, we will show it by means of a curve that has shifted to the right. The blue curve is showing an increased supply as compared to the green curve. Similarly, if there is a decrease in supply, it will mean that less quantity is supplied at any price. And this would be represented by a curve shifting to the left. So, this is a shift in the supply curve.

Now, what can cause such shifts? We can have changes in the input prices. So, in the making of a cake, you require flour, you require sugar. And if the price of flour changes or if the price of sugar changes, then each seller will be more or less able to supply the cakes to the market at any given price point. That would lead to a shift in the supply curve. Because earlier when the prices were low, one seller was ready to supply say 2 cakes for 10 rupees.

Now, the price of sugar has gone up, the price of flour has gone up, and it is now taking him 12 rupees to manufacture a cake. So, in that case the number of cakes that the seller is willing to

supply or is able to supply to the market at 10 rupees will become 0. So, in place of supplying 2 cakes, he is now supplying 0 cakes.

It is telling us that at this price point of 10 rupees, the number of cakes that are being supplied to the market have gone down. And so we will see a shift to the left in the case of the supply curve. Similarly, if the cost of inputs goes down that is if it has become cheaper to purchase flour and to purchase sugar, then probably each seller will be able to supply more of the cake at any given price point, and so we will see a shift in the supply curve towards the right which will show us an increase in the supply. So, the shifts in the supply curve can be caused by changes in the input prices or because of changes in technology which also changes the cost of producing a cake.

Also changes in expectations can lead to changes in the supply curve. So, if the price of sugar is expected to rise from next month, the seller may choose to stock the sugar and not supply it. So, it is telling us that similar to the case of an increased taxation in petrol - if next month the price of petrol is going to go up, then each person would want to stock the petrol and so the demand for petrol will go up.

Now, what will happen to the supply? If you think about petrol from the seller's point of view the seller would say that ok next month the price of petrol is going to rise, so and I have this stock of petrol, why should I sell it for a lower price, why should I not hold this petrol and sell it in the next month. So, because of an expectation of change in price, there can be a shift in the supply.

Also the number of sellers - so, if more sellers are available in a market, the supply curve will shift towards the right because now more and more quantities of goods will be available to be sold in the market because there are more sellers. So, these are the reasons for shifts in the supply curve.

Now, in a market, these demand and supply curves will meet at a point. They will intersect each other. So, if we show that this is the demand curve, this is the supply curve, there will be a certain point at which both of these curves will intersect each other.

And when that happens we will say that there is an equilibrium. Equilibrium is the situation in which the market price has reached the level at which the quantity supplied equals the quantity demanded. It is the situation at which the market price has reached the level which means that at this price the quantity that is supplied, and the quantity that is demanded is one and the same.

If we look at any other price, if we say look at this price, so at this price the quantity that is demanded is this much and the quantity that is supplied is this much. So, there is a difference between the quantity that is demanded and the quantity that is supplied.

If the price goes down, so in that case the quantity that is demanded will increase, because remember when the prices go down the quantity that is demanded goes up, whereas, because the price has gone down the quantity that is supplied will also go down because of the law of supply. So, now you have less of a difference between the quantity that is demanded and the quantity that is supplied, but still there is a difference.

But when the price goes down and reaches this point, so here the quantity that is demanded is this, and the quantity that is supplied is also this. So, now, this is showing us an equilibrium. So, an equilibrium is the state where the price is such that the quantity that is demanded is equal to the quantity that is supplied.

If the price goes down even further, so if the price is less the quantity that is demanded will increase, and the quantity that is supplied will decrease. So, here again we will see that there is a disequilibrium. There is a difference between the quantity that is demanded which is the point where this curve of price intersects with the demand curve - this point. This is the quantity that is demanded.

And this is the quantity that is supplied to the point where this price curve intersects with the supply curve. So, there is a difference between the quantity that is demanded and the quantity that is supplied.

But at this price point this quantity that is demanded is the point where this line the the price line intersects the demand curve which is this point. And the quantity that is supplied is the point where the price curve intersects with the supply curve which is also here because the demand and supply curves are intersecting each other. So, this is known as equilibrium, a situation in which the market price has reached the level at which the quantity that is supplied is equal to the quantity that is demanded.

Now, at this price, we will say that it is the equilibrium price, the price that balances the quantity supplied and the quantity demanded. And the quantity that is demanded or supplied at this price point will be known as the equilibrium quantity. So, equilibrium quantity is the quantity supplied and the quantity demanded at the equilibrium price. And both of these are equal to the same.

And this brings us to the law of supply and demand. The claim that the price of any good exists to bring the quantity supplied and the quantity demanded for that good into balance. So, what is the law of supply and demand? It is the claim that the price of any good adjusts. So, when we say that it is adjusting, we mean that this price goes up and down, but then it ultimately reaches to this point.

So, it adjusts to bring the quantity supplied and the quantity demanded for that good into balance. And at that price known as the equilibrium price, the quantity demanded is equal to the quantity supplied is equal to the equilibrium quantity.

Now, how do markets respond to changes in the demand and supply? So, there is an increase in demand, what happens? Now, what we are saying here is that in place of say a market with just 100 buyers, now we have 1000 buyers in the market and because the number of buyers has gone up.

So, the quantity that is demanded has also increased at any particular price point. So, this can be represented by a shift in the demand curve. Now, the supply remains the same, but the demand has changed. So, the demand curve has shifted to the right.

Which is what we can represent like this. So, earlier the green line - this one is showing us the demand curve, this is the supply curve. Now, because of an increase in demand, there is a shift in the demand curve. So, the demand curve from here shifts to this red line. An increase in demand is shown by the demand curve shifting to the right.

Now, what happens? Earlier the demand and the supply curve were intersecting at this point. Now, the demand and the supply curve are intersecting at this point. So, this is the earlier equilibrium, and this is the new equilibrium because of the change in demand.

What happens to the price and what happens to the quantity that is supplied? Earlier the price

was this one. So, this is the earlier equilibrium price. Now, because of a shift in the demand curve, the new equilibrium price is this much. So, the price has gone up which is expected because now more and more people are demanding the same goods. So, more is the demand, more is the price. Also earlier the quantity that was supplied was this much. Now, the quantity that is demanded and supplied is this much. So, there is an increase in the quantity that is demanded or supplied.

An increase in demand with no change in the supply will increase the price and it will increase the quantity that is demanded or supplied. So, an increased demand leads to more price and more sales.

What happens because of a decrease in supply? So, a decrease in supply will be shown by a supply curve that is shifting to the left. So, earlier this was the demand curve, and this was the supply curve. And this was the earlier equilibrium. Now, there is a decreased supply. So, the supply curve has shifted to the left. And we will now have this red color supply curve.

The demand has remained the same. And this point is showing us the new equilibrium. Now, what are the impacts in the market? Earlier the equilibrium price was this much, the new equilibrium price is this much. So, the price has gone up because there is a decreased supply in the market. So, decrease in supply will lead to more price.

What happens to the quantity that is demanded or supplied? Earlier the quantity demanded or supplied was this much, now it has reached this point. So, there is a decrease in the quantity that is demanded or supplied. So, a decrease in supply will lead to an increase in price, but a decrease in the quantity that is demanded or supplied means more price and less sales.

Now, what happens when there is an increased demand and there is a decreased supply? Now, in this case, we are saying that there is an increased demand plus a decreased supply. Now, an increase in demand leads to more price, a decreased supply leads to more price.

When both of these are acting together, we will have more price. Any increased demand led to more sales and decreased demand led to less sales. So, when both of these are acting together, then we may have more sales or less sales or the same sale.

Let us look at these. So, earlier the demand curve was this green line the supply curve was this green line. And this was the earlier equilibrium. Now, there is an increase in demand. So, the demand curve has shifted from here to here. So, the demand curve has shifted to the right, because there is an increased demand. The supply has reduced, and so the supply curve from this has shifted to this. So, there is a decrease in supply, and this is leading to this new equilibrium.

In this case, the earlier equilibrium price was this, the new equilibrium price was this. So, as was expected the prices increased, and in this case the earlier equilibrium quantity demanded or supplied was this, the new quantity is this. So, there is an increase in the quantity that is demanded or supplied, but it is also possible that when you have an increase in demand.

In this scenario, we are seeing that the main curve, the green demand curve, has shifted to the right. The green supply curve has shifted to the left. And in this case, the earlier equilibrium was here, the new equilibrium is here. Earlier equilibrium price was this; the new equilibrium price is this.

Here again the price or the equilibrium price has gone up, but the earlier quantity demanded was

this, the new quantity demanded is this. So, there is a decrease in the quantity that is demanding the supply of goods. So, it is possible in the case of an increased demand and a decreased supply at the same time. It is possible that the sales may increase or the sales may decrease, but in any case the price will go up.

We had seen in the 10 principles of economics that markets are usually a good way to organize economic activity. And in this case, we are observing that a very big benefit of a market is that it reaches into an equilibrium by itself. Now, in the case of a free market, in the case of a competitive market, there is no requirement of a government to state that this will be the price of mangoes, this will be the price of rice, this will be the price of dhal and so on.

The market will reach an equilibrium by itself through the working of the law of demand and supply. So, markets are a good way of organizing economic activity. And now we are analyzing how the markets work by using a theoretical formulation.

That is all for today. Thank you for your attention. Jai Hind!

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**Module 6**  
**Markets: Places where Economics works**  
**Lecture 2**  
**Elasticity**

Namaste! We carry forward our discussion on Markets. And in this lecture, we will have a look at elasticity. So, before we begin let us recap what we had seen in the previous lecture.

We saw that there is a market equilibrium which is defined by the point where the demand and the supply curves meet each other or intersect each other. The demand curve as we had seen it slopes downwards which means that if there is an increase in price from this point to say this point, if there is an increase in price, the quantity that is demanded goes down. On the other hand, the supply curve is sloping upwards because if there is an increase in price from this point to this point, then the quantity that is supplied increases.

And when the demand and the supply curves intersect each other, we reach this point. The price that is defined by this point of intersection is known as the equilibrium price. And this is the price at which the quantity that is demanded is equal to the quantity that is supplied which is the equilibrium quantity. And we also explored what happens when there is a change in the demand for change in the supply.

A change in demand is represented by a shift in the demand curve. So, if there is an increase in the demand which is shown by this demand curve that is shifting towards the right; and a decrease in demand is shown by the demand curve that is shifting towards the left. Now, if we consider an increase in demand, so here the earlier demand curve was this, the new demand curve is this.

If there is an increase in demand, then what happens to the price and to the quantity that is demanded or supplied? What happens to the equilibrium? As we can observe here, the earlier equilibrium is at this point, the new equilibrium is at this point. Now, at the old equilibrium, this way this was the equilibrium price; at the new equilibrium this is the equilibrium price, which means that the equilibrium price increases if there is an increase in demand.

Similarly, earlier the quantity that was demanded at the equilibrium was this; now with an increase in demand the quantity that is demanded is this. So, there is an increase. So, if there is an increased demand, then we have observed that there is an increase in the equilibrium price and an increase in the equilibrium quantity that is demanded or supplied in the market. So, this is an increase in demand. In the case of a decrease in demand, we will have this curve which is towards the left side. So, we will have a curve like this. And in that case, we will find that the equi-

librium price reduces and the equilibrium quantity also reduces.

What happens when there is a change in the supply? Now, an increase in supply is shown by the supply curve that will shift towards the right, and a decrease in supply is shown by the supply curve that shifts towards the left. Now, in this case, this is the original supply curve, and this is the new supply curve. So, the supply curve has shifted to the left which means that we are now talking about a decreased supply.

Now, there is no change in the demand curve. So, the earlier equilibrium was at this point; the new equilibrium is at this point. Now, earlier the price at equilibrium was this; the new price at equilibrium is this. So, what we are observing here is that if there is a decrease in supply that leads to an increase in the equilibrium price. So, less is the quantity that is being supplied in the market, so there will be more price at which people will have to buy this product.

What happens to the equilibrium quantity, will earlier the equilibrium quantity was this; the new equilibrium quantity is this. And as we can see there is a decrease in the quantity that is demanded or supplied. So, with a decreased supply, there is an increase in the price; and a decrease in the net quantity that is demanded or supplied in this market.

Now, when both of these processes happen together, that is, there is an increase in demand and a decrease in supply, then we observe that the price will increase, but the quantity that is demanded or supplied may either increase or decrease. So, we saw that if the situation is like this, so this is the earlier demand curve, this is the new demand curve which is showing that there is an increase in the demand. This was the earlier supply curve. This is the new supply curve which is telling us that there is a decrease in supply.

So, we are looking at an increased demand and a decreased supply. The earlier equilibrium was at this point, the new equilibrium is at this point. So, where there two red curves are intersecting with the new equilibrium, where there two green curves are intersecting is the old equilibrium.

This was the old equilibrium price; this is the new equilibrium price. And so we are observing here that the price has increased, the equilibrium price has increased which was expected because in the case of an increased demand the price increases, in the case of a decreased supply the price increases. And so when both are acting together, the price will increase.

But what is happening to the quantity that is demanded or supplied? Well, the earlier quantity was represented by this point. This is the quantity that was demanded or supplied earlier. The new equilibrium is at this point. The quantity that is demanded or supplied nowadays has this point.

In this case, what we are observing is that the new quantity that is demanded or supplied is greater than the earlier quantity that was demanded or supplied. So, what we are observing here is that with an increase in demand and a decrease in supply, there is an increase in the quantity that is demanded or supplied.

But, this is not always the case because we also saw this market equilibrium in which case the earlier equilibrium was here. This was the old demand curve; this is the new demand curve. So, here again we are looking at an increase in demand. This was the old supply curve.

This is the new supply curve. So, here the supply curve has shifted to the left. So, we are looking at a decreased supply. So, as in this slide, we have an increase in demand and decreased supply



and the same thing here as well, an increase in the demand and a decrease in the supply.

The question is what is happening to the equilibrium in this case? The earlier equilibrium was here whether the green curves are intersecting. This was the equilibrium price, and this was the equilibrium quantity. The new equilibrium is at this point where the red curves intersect. And this is the new price, and this is the quantity that is demanded or supplied.

Here again we are observing that the earlier equilibrium price goes here, the new equilibrium price is here which means that there is an increase in the equilibrium price. However, the earlier quantity demanded was this much, the new quantity demanded is this much. So, there is a decrease in the quantity that is demanded or supplied in this market.

Earlier we saw that there is an increase in the price, and there is an increase in the quantity that is demanded or supplied. Whereas, here there is an increase in price, but there is a decrease in the quantity that is demanded or supplied. So, what we are observing here is that in the case of an increased demand and decreased supply, there will always be an increase in price, but the equilibrium quantity that is demanded or supplied that may increase or that may decrease.

Now, the question here is in what circumstances would these equilibrium quantities increase, and in what circumstances would they decrease? What are the factors that govern that? And that brings us to the topic of elasticity.

The amount of these shifts depends on the shapes of the curves, and that tells us about the elasticity of demand and supply.

We define elasticity as a measure of how much buyers and sellers respond to changes in the market conditions. So, we are trying to measure the response of buyers and sellers, and we are trying to measure how much this response changes the extent of the state.

So, we are trying to measure the direction of change and we are trying to measure the magnitude of the change, and these changes in response to changes in the market conditions. So, whenever there is a change in the market conditions, does this demand and supply increase or decrease, and in which direction, and by how much is the question?

That is if we look at the demand curve, the demand curves are always sloping downwards. But then does it look like this, does it look like this, or does it more or less flat? So, these are all different demand curves, but they have a different angle of slope. And what we are trying to understand now is how this angle of slope determines the market outcome or influences the market outcome.

Similarly, if we look at the supply curves, the supply curves are always moving upwards. But do they slope upwards in a nearly vertical manner, or do they slope upward in a very flat manner, or is it somewhere in between? So, there are all these different kinds of supply curves, the question is how does the shape or the slope of the demand and supply curve influence how the market behaves.

So, elasticity is a measure of how much buyers and sellers respond to changes in the market conditions. Also we can define it as a measure of the responsiveness of quantity demanded or quantity supplied to a change in one of its determinants.

Now, in the earlier definition, we said how much buyers and sellers respond. Now, this response is seen in terms of how much is the quantity demanded or supplied. So, if there is a response

from the buyers, then we will see a change in the quantity demanded. If there is a response in the sellers, we will see a change in the quantity that is supplied.

And we are trying to measure what is this response in terms of changes in the market conditions or in terms of changes in the determinants of the quantity demanded or supply. So, this is elasticity.

So, the question is that we are trying to measure what is the response of the buyers and the sellers, but then is there a way in which we can quantify this? Because remember we are trying to measure the change in the direction and we are trying to measure the change in the magnitude.

Now, if we wanted to do that, we would require certain formulas. And this is one such formula. The demand and supply can change in response to changes in their determinants. So, what are these determinants? One determinant is price. So, what is the change in the demand curve in response to the price or changes in the price of products?

So, for instance, if you were buying rice at 100 rupees a kg, if the price increases to 120 rupees a kg, would you demand more of rice, would you demand less of rice? And if you do make a change in the demand, what would be the magnitude of the stream? That is if earlier you were buying 30 kgs of rice, and if because of an increase in price you are reducing your consumption, will it reduce from 30 to say 29 kgs? How will it reduce from 30 kgs to 10 kgs? What is the magnitude?

So, we are looking at what is the direction of change, is it increasing, or is it decreasing, and the magnitude by how much is it increasing or decreasing. So, the price elasticity of demand can be defined as a measure of how much the quantity demanded of a good responds to a change in the price of that one. To remember it easily, you can always remember the example of how much the quantity demanded of rice responds to change in the price of rice. And it is computed as the percentage change in quantity demanded divided by the percentage change in the price.

So, we are saying that there is a change in price and there is a change in the quantity demanded. The price elasticity of demand is the percentage change in the quantity demanded, that is whether you have decreased your consumption if you say decrease it from 30 kgs to 27 kgs.

There is a 10 percent decrease because you are reducing it by 3 kg: 10 percent of 30 kg. If you reduce it from 30 kgs to 15 kgs, then there is a 50 percent change. So, this is what is there in the numerator, percentage change is the quantity that is demanded divided by percentage change in price.

If the price has increased from 100 rupees a kg to 110 rupees a kg, there is a 10 percent increase. If the price increases from 100 rupees a kg to 125 rupees a kg, there is a 25 percent change in price. So, in the case of class price elasticity of demand, we are measuring the percentage change in quantity demanded divided by the percentage change in price.

Now, this figure price elasticity of demand can be 0. Why 0? If there is no change in the quantity that is demanded, which means that when the rice was available at 100 rupees a kg, we were buying 30 kgs of rice. But when the price increases to 110 rupees a kg, you are still buying 30 kgs of rice because rice is the staple food.

In such a scenario, we will find that there is a certain change in the price by 10 percent, but there is no change in the quantity demanded. So, the change is 0 percent. So, in that case, the price

elasticity of demand will be 0.

Now, in cases where the price elasticity is 0 or close to 0, we said that the demand is inelastic which means that you are not changing your demand on the basis of the changes in the price. So, the price elasticity of demand when it is close to 0, we say that it is an inelastic demand.

On the other hand, it is also possible that with a small change in price new for instance make a big change in the quantity that is demanded. A good example is suppose you are equally fond of eating chocolate ice cream, and vanilla ice cream. Now, if the price of vanilla ice cream increases, what you do is that even if there is a small increase earlier you were having a cone of both of these ice creams for say 20 rupees. Now, currently the price of chocolate ice cream has remained at 20 rupees, but the price of vanilla ice cream has increased from say 20 rupees to 25 rupees.

Now, what do you do? Now, your response could be that because the price of vanilla ice cream has increased, but I am equally fond of chocolate ice cream as well. So, let me now forgo the the vanilla ice cream and let me have more and more of the chocolate ice cream.

In that case even though the price has increased only from 20 rupees to 25 rupees, you will spend most of your money purchasing the chocolate ice cream and you will purchase a very less amount of the vanilla ice cream. It is also possible that in the case of eating 20 vanilla ice creams, now you are eating just 2 or 3 vanilla ice creams or you are not eating any vanilla ice cream.

When that happens, there is a small change in price, but there is a big change in the quantity that is demanded. When that happens, we will have a price elasticity of demand which is very large because the numerator is large, the denominator is small. And in that case, we will say that the price elasticity is very much. In a theoretical sense, we can say that the price elasticity is so large that it can even tend towards infinity.

So, an elastic demand will tell us that there is a big change in the quantity that is demanded even though the change in the price is very small. And inelastic demand would say that even if the price increases by a lot, there is hardly any change in the quantity that is demanded.

And we can see these in this price elasticity or  $p$  of demand in the shape of the demand curves. Now, this is a perfectly inelastic demand curve that is the elasticity is equal to 0. Why, because even though you have a big change in the price, there is hardly any change in the quantity demanded.

So, the percentage change in quantity demanded is 0, the percentage change in the price is very large and so the price elasticity of demand in this case, is the percentage change in quantity demanded is 0 divided by percentage change in price which is the very large value. So, in total it becomes percent price elasticity of demand is equal to 0 which is what we are seeing here elasticity is equal to 0. So, this is a perfectly inelastic term.

On the other hand, this is a perfectly elastic curve which means that if there is a small change in the price, there is a large change in the quantity that is demanded. That is the numerator here is very large because there is a big change in the quantity that is demanded, then the denominator here is very small because there is hardly any change in the price and so the price elasticity of demand in this case is close to infinity.

And we say that this is a perfectly elastic demand curve. We can also have a unit elastic demand curve in which case the elasticity is equal to 1. So, the percentage change in price and the percentage change in the quantity demanded are equal.

Now, an easy way to remember the shapes of these curves is by remembering the word inelastic. Now, the word inelastic begins with an I. And we can see that in the case of an inelastic demand curve it looks like the alphabet I. So, it is vertical. So, when you have a vertical demand curve, then it is inelastic. When you have a horizontal demand curve, then it is elastic now.

When you have a demand curve like this, it is not completely vertical, but it is more towards an inelastic demand shape than an elastic demand shape. We will call that this is still an inelastic demand curve, but it is less elastic than see this inelastic demand curve. This demand curve we will say that this is more elastic than this, but it is less elastic than the perfectly elastic demand curve which is completely horizontal. So, these are different price elasticities of demand.

Now, what determines whether this demand curve will be vertical or horizontal or something in between? What are the determinants of the price elasticity of demand? The first determinant is whether you have close substitutes that are available. If close substitutes are available, the demand will be more elastic, which means that when we say that we will have a more elastic demand, it would mean that there will be a big change in the quantity that is demanded if there is a small change in the price.

Now, why would that happen? Because, if you have things such as rice and wheat, now rice and wheat are close substitutes, so, in case the price of rice increases, then you can reduce your quantity of rice demanded, and you can shift more towards wheat. So, in this case, if you have a close substitute that is available, whenever there is a change in price, you can reduce the quantity of that particular product and you can shift to its substitute.

Another example is say different flavours of ice creams. They are close substitutes. So, if the price of one flavour increases, you will shift to another flavour, or the option of having different flavours of cold drinks. Now, all of these are close substitutes. And so if you have a close substitute, then the demand becomes more elastic because you have the option of shifting to the substitute if the price increases or decreases.

Another determinant is whether the item is a luxury or whether it is a necessity. Now, luxuries have a greater elasticity of demand than necessities. Because, in the case of necessities, you have to have that item because it is necessary for your survival. So, if you talk about a thing such as food, now food will have a pretty inelastic demand curve because even if the price increases, people need to have access to sufficient quantities of food.

But if there is a thing such as a luxury item, say ornaments, now if the price of gold increases, it is possible that people will decrease the amount of money that they will put into gold. They will in turn start to purchase stocks or they will start to purchase land because in this case gold is not a necessity, it is a luxury. Now, in the case of necessities, the demand curve is very inelastic. In the case of luxuries, the demand curve is very elastic because here again you can shift to something else if you have the option.

Then it also depends on how you define the market. Because if we look at food, food has an inelastic demand, because people need to have access to food whatever be the price. So, even if the

price increases, people will have to eat roughly the same quantity of food and so the demand for food is inelastic.

But if you look at the market in a very narrow manner, then we will see that different things have large elasticities such as chocolate, ice cream has an elastic demand. Why? Because, if the price of chocolate, ice cream increases, then people will reduce their consumption.

But when we look at food in total then even if the price increases or decreases the quantity that is demanded will remain the same. So, the definition of the market can play a role in determining whether the price elasticity of demand is elastic or inelastic. And the more generalized way you look at the market the demand will be very inelastic. But if you look at the market in terms of very specialized products then you will have an elastic demand curve.

This is also true because when you look at specialized items, then there are a number of substitutes that are available. And because of the presence of close substitutes the demand curve will become more and more elastic.

Another determinant of price elasticity is the time horizon which is are you looking at things in a short term or in a long term. Now, elasticity increases over longer time horizons as more substitutes become available. Now, here again it is the availability of the close substitutes that we are looking at. If you have a close substitute, then probably that the demand curve will be more elastic.

The question is how soon will you have these close substitutes? In a short term, it is possible that you will not have access to the closer substitute because they either do not exist or because they are not available in your market. But on a longer time horizon, people will come up with new inventions or people will bring closer substitutes from other markets because the price of something has changed in your market.

So, elasticity increases over longer time horizons as more substitutes become available. Example, when the price of petrol increases, the demand is pretty inelastic in the short term. Why? You do not have an alternative for petrol, because if you have a vehicle which runs on petrol and the price of petrol has increased, but even then you have to travel from point A to point B, so you will have to purchase the same quantity of petrol, no matter what the price is.

But on a longer time horizon, it is possible that you shift from your vehicle to some other vehicle, probably you purchase an electric vehicle in which case because the price of petrol has increased you will now start to travel more and more in the electric vehicle. And so you will reduce your consumption of petrol.

Now, this is generally not very feasible in the short term, but in the longer term we can make changes to our lifestyle, we can make changes to the products that we are using. So, the demand is pretty inelastic in the short term, but it is very elastic in the long term due to greater availability of more fuel efficient cars or electric cars.

So, in the long term, you make changes to the items that you are using. And you make changes in a way that you have access to some of the other substitutes. Probably, you will shift from a petrol car to a diesel car or a CNG car or an electric vehicle, or maybe to a more fuel efficient vehicle, so that you are able to reduce the quantity of petrol that you are demanding. So, the important thing to remember here is that in the short term the demand curves are generally inelastic, but in

the longer or time horizons the demand curves become pretty elastic.

Now, similar to the price elasticity of demand, we also have the income elasticity of demand. The income elasticity of demand asks the question that if your income increases what happens to the demand for a certain good or service that is it is a measure of how much the quantity demanded of a good response to a change in the consumer's income.

If the income increases or decreases, does it lead to a change in the quantity demanded? And it is computed as the percentage change in quantity demanded divided by the percentage change in income. So, very similar to what we saw here, in the case of price elasticity, it was the percentage change in quantity demanded divided by the percentage change in price.

Here we have percentage change in quantity demanded divided by percentage change in income. Now, there are certain products for which the income elasticity is very close to 0 things such as food grains So, for instance, if your income doubles, you are not going to consume double the amount of food grains. You will probably consume only that much amount of food grains that you are having before. So, in things such as food grains, the income elasticity is very less.

On the other hand, for luxury goods, the income elasticity is pretty high because if you have more income, then probably you would want to have finer clothes or you would want to have more ice creams, or you would want to go out to watch movies even more.

For things such as going out for a movie, the product here is the movie ticket. And when the income increases, the demand for the movie ticket increases; when income increases, the demand for ice creams increases; when income increases, the demand for clothes would increase. So, there are certain products for which the income elasticity is very high. On the other hand for things such as necessities the income elasticity is pretty low.

Similarly, we also have the cross price elasticity of demand. Now, in the case of cross price elasticity, it is a measure of how much the quantity demanded of one good responds to a change in the price of another good, computed as the percentage change in the quantity demanded of the first good divided by the percentage change in the price of the second good.

Now, in the case of cross price elasticity of demand, the question that we are asking is if the price of one good increases, what is the impact on this increase in price on the demand for another good? So, for instance, if the price of rice increases, will it lead to a change in the demand for wheat? Because when the price of rice increases people would probably go for consuming less quantity of rice, and they will want to have more quantity of wheat because rice and wheat are substitutes.

In this case, the question being asked is if there is say a 10 percent increase in the price of rice, what is the percentage change in the demand for wheat? Or, similarly, if the price of chocolate ice cream increases, is there a difference in the demand for say pineapple ice creams?

So, cross price elasticity of demand is the percentage change in quantity demanded of good 1 divided by percentage change in the price of good 2. So, in the price of good 2 changes what is the impact on the demand for good 1 is what we are asking in the cross price elasticity of milk

Now, similar to the elasticity of demand, we also have the elasticity of supply. Now, price elasticity of supply similar to what we had in the case of price elasticity of demand is a measure of how much the quantity supplied of a good response to a change in the price of that good, com-

puted again as the percentage change in the quantity supplied divided by the percentage change in price.

So, if there is a change in the price of a good, does that impact the quantity that is being supplied in the market? Now, for a number of goods, there will be a change because when the price of mangoes increases people would want to supply more mangoes to the market. Probably they would even pluck out those mangoes that are not ripe because of an increase in price. They want to maximize their welfare, they want to maximize the profit that they have. If the price of food grains increase, then the sellers would even take out the food grains that they have stockpiled, and they would bring that out to the market because of an increased price they would think that ok let us have a greater amount of profit.

Now, the price elasticity of supply is asking the same question. If there is a percentage change in price, what is the percentage change in the quantity that is supplied of a good? And different items may have different price elasticities of supply.

We can have a perfectly inelastic supply curve such as this. Now, in this case, even though there is a big change in the price, there is hardly any difference in the quantity that is being supplied. So, even at this price, the quantity supplied is this much; and even at a higher price within this, the quantity supplied is the same.

So, here again we are having the same supply. So, this sort of a curve is a perfectly inelastic curve. And we will say that the elasticity in this case is 0 because even though we have a big difference in price. So, here the denominator is a big term. There is virtually no change in the quantity that is supplied, that is the numerator is 0. So, this is an example of a perfectly inelastic supply.

Now, in the case of a perfectly elastic supply, if you have a very minuscule change in price, you will have a big difference in the quantity that is supplied that is in the case of an elastic supply when the percentage change in price is close to 0 that is the denominator is close to 0, the numerator is a very very big value. So, this is a perfectly elastic supply curve. So, elasticity is close to infinity.

Now, as we have seen in the case of the demand curves, when there is an inelastic supply, we can remember it by remembering that the word inelastic begins with the letter I, and I is roughly vertical. So, if you have a curve that is roughly vertical, then it is in inelastic supply.

If you have a curve that is roughly horizontal, then it is an elastic supply. Then we can have different levels of elasticity. So, this is perfectly inelastic. This is still inelastic. This is an elastic supply curve. And this is perfectly elastic. And then we also define unit elasticity in which case the elasticity is equal to 1.

Now, the question is what determines the price elasticity of supply. One is the ability of sellers to change the amount that is supplied, because there are certain items such as land that cannot be created, and in that case the supply has to be inelastic.

Why? Because, in this equation, the numerator is the percentage change in the quantity supplied. So, if the quantity supplied cannot be changed for a thing such as land that cannot be created, we will have a numerator that is 0. And in that case, the price elasticity will be 0 or that would mean that it is completely inelastic.

So, the ability of sellers to change the amount that is supplied governs the price elasticity of supply. It is also governed by the time horizon, because even in the case of those items for which the sellers can change the amount supplied, this change in supply cannot be entered in a moment's notice. It will take some time.

So, for instance, in the case of ice creams, if the price changes, the sellers would want to manufacture more ice creams and supply it to the market. But this change in the manufacturing capability will not happen in a day. The seller would have to hire more people, the seller would have to or the manufacturer would have to install new machines which will take time.

So, time horizon is also a determinant of the price elasticity of supply. Firms cannot change equipment in short time spans. And so the elasticity is less in the short term.

In the long term, more equipment can be installed or discontinued, newer firms may enter or exit the market, which increases the elasticity. So, in the case of elasticity of supply, there are two things that mostly govern the behavior: one is whether it is possible for a seller to increase the supply or to change the supply, and even if it is possible how long it will take.

Now, why are we interested in knowing elasticity? This is because it changes a number of consequences in the market.

So, let us look at this application. If there is a bumper harvest, what happens to the amount of revenue that the farmer earns? So, what we are saying here is that earlier there was a fixed supply of food grains by the sellers, or in this case, the agricultures. Now, if there is a change in the technology that they employ or if there is a change in the seeds that they use, they are now using high yielding varieties and they are able to increase the output by a very large extent. If that happens, will they earn more or will they earn less?

Now, as you will remember the food grains are a necessity and in a number of cases the demand is very inelastic because whatever happens to the prices, whatever happens to the income people require a fixed quantity of food grains. So, this is what we are representing here. The demand curve is pretty inelastic. So, it is looking very close to the vertical. It looks like the letter I.

The food names have an inelastic demand. Now, earlier the supply curve was this. And now because of a change in technology or shift to high yielding varieties, the new supply curve is the red one. We are seeing that there is a shift to the right in the case of the supply curves.

Now, what happens to the revenue that people would earn? Earlier the equilibrium was at this point. This is the demand curve. This is the earlier supply curve. So, this is the point of equilibrium. This is the equilibrium price, and this is the equilibrium quantity that is demanded and supplied. Now, the curve the supply curve has shifted to the right. And now it is intersecting the demand curve at this point. This is the new equilibrium price. And here you have the new equilibrium quantity that is demanded or supplied.

Now, the revenue that the farmers earn is given by the price of the product multiplied by the total quantity that is in the supply. So, if the price increases, the revenue increases; if the total quantity that the supply increases, the revenue increases. So, earlier the price was given by this figure; the quantity supplied was given by this figure.

And so the revenue is given by the area within this rectangle as shown in green color, because this was the earlier equilibrium. So, from this point, we can get the price that was there; from this



point, we can get the earlier equilibrium quantity. And multiplication of both of these will give you the revenue that was there beforehand.

Now, because of the bumper harvest, the equilibrium is here. So, the new price is this much. The new quantity is given by this line that touches the quantity curve at this point. The new revenue is equal to this  $P$  prime multiplied by  $Q$  prime. So, this is the new revenue.

Now, as you can observe in both of these rectangles, this area is the same that is in this area is one and the same. Now, earlier, this rectangle was included in the revenue. Now, in the new circumstances this rectangle is removed, and this rectangle is added. Now, as is very evident from this curve, this area in green color is larger than this area in two colors.

What we are observing is that even though the sellers are able to increase the supply, the agriculturalists have probably invested a lot of money into getting the tractors or into getting more equipment or better seeds. So, they are investing. But what is happening to the total revenue? When the total revenue is going down? Why because the demand curve for food grains is inelastic.

In this case, the result is that a bumper crop is bad news for a number of farmers. Because even though they have increased the supply, there is a decrease in the revenue that these farmers get. So, a bumper harvest in this scenario is bad news for the farmers.

In this case, we are considering that the demand for the food grains is inelastic, but in a number of cases we also observe a differentiation in the market. It is possible that out of say one thousand farmers that are supplying the food grains, there are only 10 farmers who have shifted from the old supply curve to the new supply curve.

In that case, the total amount of supply in the market would not change by too much, but these individual farmers who have increased the supply increase the quantity that they are supplying to the market. So, in that scenario, it is possible for them to increase their revenue. So, for a few farmers, if you have a scenario in which there are only a few farmers who have increased their output.

In that case, because the revenue is equal to the price multiplied by the quantity. So, if there is a very little change in the price and a few farmers are able to increase the  $Q$ , in that case those farmers would be able to increase their revenue. But if a majority of farmers are able to increase the output, in that case because the demand for food grains is inelastic, the total amount of revenue that these farmers would be again would go down. So, this is one application of elasticity.

Another application is concerned with the market power of the sellers. So, if the sellers are able to change the supply or the quantity that they are supplying to the market, how much power do they have, how much is their influence in changing the price of the products? Now, this is an important consideration for things such as petroleum.

In the case of the organization of petroleum exporting countries, if they come up with a resolution that we are going to reduce the supply, we are not going to extract as much petroleum. So, in the short term, we always observe that there is a big rise in the price of petrol and diesel. But then how long does this market power stay is what we are now interested in.

What we are saying here is that this is the demand curve, and this is the supply curve as shown in green color. Now, in this example, the sellers are reducing their supply. So, they are shifting the

supply curve to the left. So, earlier it was this green curve, now it is the red curve.

The earlier market equilibrium was at this point. So, this is giving us the price. And this is giving us the quantity that is demanded or supplied. Now, they have shifted it to this point. So, this is the new equilibrium price, and this is the new equilibrium quantity.

Now, if the demand and supply both are inelastic which means that there is very little change in the quantity demanded or supplied because say things are a necessity. So, things such as petrol or diesel are a necessity for the running of the economy. So, in this case, we are observing that the demand curve is pretty much vertical, the supply curve also is pretty much vertical.

If such a scenario occurs, the sellers have a huge amount of market power because if they reduce the supply the price changes by a very large value. So, as we can observe the price earlier was this the new price is this. There is an upward shift in the price of this particular product.

So, the price increases. This is telling us the market power that these sellers have. If they reduce the supply, they can change the price that is there in the market.

If you will remember when we talked about a perfectly competitive market, it means that the sellers and the buyers should not have the ability or the power to change the prices. But if the demand and supply are inelastic, then the sellers have a great amount of market power, but then that is this is in the short term.

In the long term, what happens is that people may shift their demand curves. If the rate of petrol is too high, people would shift to more fuel efficient vehicles or they will shift to electric vehicles, or they will start using public transport, or they will start doing carpooling.

In such a scenario, the demand becomes pretty much elastic because people are now shifting the equipment that they were using. Earlier their equipment required a great amount of petrol or diesel, the new lifestyle requires a much lesser amount. So, now, the demand becomes elastic.

And inelastic demand is shown by this curve which is not that much vertical as we were having in this case. So, here it is a pretty vertical curve. And in this case, it has become much flatter. Also in the long term, the supply also changes because if the price is large, then more and more people would start to extract the oil.

Even those oil firms that were not competitive enough in this market because the prices were low and they had a very high cost pattern of extracting the petroleum, they will now enter into the market because again if you remember a competitive market it allows a free entry and exit.

Now more and more extractors would get into the market, and so even the supply curve will become more and more elastic. And an elastic supply curve is shown by this curve which is now pretty much horizontal. Earlier the curve was having a very great angle, and now this curve is very close to the 0 degrees line.

In the long term, when this happens, when you have an elastic demand and an elastic supply curve, what happens now? Now, again if the seller tries to reduce the supply, so in this case, the curve is shifting from this green line to the red line. So, it is shifting to the left which means that there is a change in the supply. What happens to the prices now? Now, the earlier equilibrium was this where the green points were intersecting.

So, this was the early price, and this was the quantity that was demanded or supplied. In the new scenario, this is the new equilibrium. And this is the equilibrium price, and this is the equilibrium

quantity that is demanded or supplied

As we can observe here because both the demand and supply are very elastic, there is hardly any change in the equilibrium price, but there is a big change in the quantity that is demanded or supplied when the sellers have reduced the supply into the market. This small price difference is telling us that now the market power of the sellers is very less. In the long term, these sellers have a very less amount of market power because the supply and demand curves both become more and more elastic.

What we can make out of this is that the market power of sellers to impact the prices is only in the short run, it is not there in the long run. So, in this lecture, we observed that the quantity that is demanded or supplied in a market depends on a number of factors. It can change because of a change in one or more of its determinants.

So, for certain items, such as food grains, the elasticity is very less; they are pretty inelastic in the demand curves. Why, because even if the income of a person increases he or she will be consuming roughly the same amount of the food grains.

If the price of food grains stays even then the person would be consuming roughly the same amount of food grains. If there is a change in the price of potatoes, even then the people would be consuming roughly the same amount of food grains. So, there is a pretty inelastic price elasticity of demand because a change in the price of food grains will hardly change the quantity that is demanded.

There is very little income elasticity of demand because even when a person is having a larger income or a smaller income, there will be hardly any change in the quantity of food grains that they want. And there is a very less cross price elasticity of demand when we look at the food grains in total.

For instance, if the price of clothes increases, that would not lead to any great difference in the quantity of food grains that are demanded. But then if we look at the market in a much finer detail, if we differentiate between whether a person is demanding the rice or is demanding wheat, in that case we might observe that there are greater elasticities involved.

For instance, if the price of rice increases, the people would want to have less quantity of rice and probably more quantity of wheat. So, in that case, we will start observing price elasticities in the demand for rice. And we will start to observe a cross price elasticity in the demand for wheat. We have observed that in a number of scenarios, there is an elasticity that is involved. Now, whether the demand or supply curve is elastic or not can very easily be made out by looking at the shapes of the curve. So, if the curves are roughly vertical, if they have a shape like the letter I, then it is inelastic.

If they have a shape that is close to the horizontal, then the supply or the demand is pretty much elastic. Now, the importance of knowing the elasticities is that they determine to quite an extent, what would be the direction of change in equilibrium, and what would be the magnitude of change in the equilibrium. For things that have an inelastic demand, there is hardly a change in the demand because of any of the determinants.

In those cases because the demand is inelastic, the sellers have a much greater amount of market power. But at the same time, if the demand is inelastic such as in the case of food grains, then a

bumper harvest might also result in decreased revenue for the farmers because in these cases the demand is inelastic. So, any changes in the supply will have a huge bearing on the prices that are involved.

If the supply is lowered, the prices would increase; if the supplies are increased the prices would decrease to a very large extent because of an inelastic demand. But in the case of items that have an elastic demand, then the changes in the prices will be very less because people will very easily shift to something else. And this also brings us to the point that these changes will have a different ramification in the short term and in the long term. Because in the short term the demands and supplies are pretty inelastic; in the long term more and more sellers can enter or exit from the market.

The buyers or the people who are demanding the goods, they might shift to something else they might go for, say a better vehicle or say some other food grains. Now, in the long term what happens is that the market power of the sellers reduces considerably because the demand and supply both become elastic. So, there is hardly any change in the prices when there is a change in the supplies. So, these sorts of ramifications have to be understood. And they will have a very important bearing in how the market reacts. That is all for today. Thank you for your attention. Jai Hind!

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**Module 6**  
**Markets: Places where Economics works**  
**Lecture 3**  
**Government policy**

Namaste! We move forward with our discussion on the working of markets and in this lecture, we will explore Government Policy. Now, we had seen in the 10 principles of economics that markets are usually a good way to organize economic activity. The question is what is so special about markets that makes them a good way of organizing economic activity when there are several things that markets do?

1, they permit the expression of free will which means that if I go to a market as a buyer, then nobody is compelling me to buy a certain product. If I find that there is a product say mangoes that are going to increase my welfare, I will purchase mangoes. If on the other hand, I feel that I should purchase apples, I purchase apples.

Nobody is there to tell me what is the quality that I should be buying? So, if I find mangoes and I find that they are not of a very good quality, I might not purchase them. There is no compulsion on me to buy something. So, it is an expression of free will. Now, because a market works on free will, it also permits the expression of a number of choices or freedom of expression.

What it means is that if in a market people want to purchase jeans, then more and more sellers would provide jeans into the market. If more and more people want to purchase suits, then probably more and more number of sellers would bring in suits. So, because there is nobody to do a moral policy in a market so, people are able to express themselves in a much better way. So, it permits the freedom of expression.

Thirdly, there is a fast movement of information. What it means is that suppose in place of a market, we were having the command economy. Now, in that case, there would have been a central planet to decide what good should be manufactured in what quantities, in what qualities, where they should be manufactured and for whom they should be manufactured.

So, there are all these questions of economics that would have to be decided by say a central planner. Now, in the case of a market, the prices provide this information. So, if the demand for something goes up, it will tell the market that this is a product that more and more people want and we have observed before that in the working of a market, if the demand increases without changes in the supply, then the price increases.

Now, this increase in the price will automatically provide information to the sellers that if they want to maximize their profits in that case, they should be bringing more and more of these

goods, more and more of these products into the market and when that happens, when the supply side increases, the prices go down to the normal levels.

So, these prices act as a very quick movement of information, nobody needs to decide what or how much of any particular product should be manufactured, but the prices will give this information. So, prices because they work in the market, they permit a very fast movement of information.

They also permit automatic decision-making because in this case, people are making these decisions automatically, the central government does not have to tell the sellers that ok, the demand for such and such a product is increasing so, why do not you make more and more of these products. These decisions are being made automatically.

And because of all of these, what happens is that we have an increased welfare in the market, or we can also say that there is an increase efficiency because of all of these. So, the market is a very good mechanism to increase the welfare of people because they are doing things that they want to do, and we can make this assumption that people best know what is best for them.

So, the markets allow the expression of this information and because it does everything in a very efficient manner so, it is the way of maximizing the welfare. So, this is why, we say that markets are usually a good way to organize economic activity, but at the same time, the government can sometimes improve the market outcomes.

Now, why would we require governments to do the market outcomes? If everything is being done by the market in the most efficient manner, why should we do government at all? Now, the government is required because market has a few prerequisites for it to function properly. What are they? We have seen before that a market can only function if you have property rights.

So, the seller must know that the only way in which he or she can increase his or her property is by having more and more profit, by selling more and more of the goods. Now, if it was possible for people to just snatch these goods from somewhere else to snatch the money from somewhere else, then in that case probably, the market would fail to function because whether or not we have the market, you can always go and snatch the products.

So, the working of property rights is extremely crucial for the market to function. Another thing that we need is institutions. Now, if I feel that my property rights have been violated, what should I do? I require institutions such as the police or the judiciary to enforce the property rights.

So, not only should property rights exist, but at the same time, they should also be enforceable and thirdly, they should not be an externality because if there is an externality, then probably, the market will not be to the highest amount of social welfare. Now, externality as we have observed is the property or the phenomenon in which the actions of a doer have a bearing on the welfare of a bystander who has got nothing to do with that particular action.

Good examples include things such as pollution. So, a polluted by polluting the environment, he is maximizing his profits because he is not spending money to install a pollution controlling device, but this pollution is going to impact the health of so many different people.

So, if you permitted this sort of a phenomenon to go on, then probably you will have so many different industrialists just who would be polluting the environment to maximize their profits by

reducing the cost of production that are involved, but at the cost of that health of so many different people. So, this is something which is not giving the highest welfare to the society, it is not giving the highest welfare to the people to the citizens.

Now, this is where the government needs to step in. The government needs to say that ok, you want to maximize your profit that is fine, but you are not going to do this at the cost of the health of other people. So, the government is required whenever there is an externality because the externality reduces the efficiency of the market; reduces the efficiency of the market by not permitting the maximum amount of benefit.

Similarly, in the case of positive externality, since it is education or health care of people. Now, it is possible that if a market is only working on the profit motive, then things such as health care of the masses might not get completely provided for. Now, health care of the society is an example of positive externality.

So, if somebody vaccinates himself or herself, he or she is not protecting himself or herself but is also acting in a way to stop the spread of infections through the whole of the society. Now, such things need to be incentivized. Now, who is going to incentivize them? The market is not going to incentivize, and which is why we need the working of governments.

Another thing where we require the working of governments is where people have market power. Now, what is market power? Market power is the ability of one or a few number of buyers or sellers to influence the market prices. A very good example is a person in a village who owns a well and there is a drop. Now, this person can charge any amount of sum because he is the only one in the village who has a well.

Now, this person can influence the market prices. Now, this is known as market power. Now, in the case of a market which has certain players who are exhibiting market power, we will observe a number of things that reduce the benefit of people. So, for instance, we will start observing that there are certain people with market power who force people to work without paying them money or by paying them very small amounts of money.

So, for instance, in our country also, we had the system of begar. In begar, people used to force others to work for them without paying them anything. Now, in our country, the system of begar, it was abolished through the constitution. So, which is why we require the working of the government? If we did not have the government, probably begar would have continued.

Another example is employment of children. Now, children may not be in the best position to bargain for their rights and in a number of cases, we observe that children are exploited. Now, through much of the 18th and 19th centuries, we observed that industrialists were using children to work in their factories and in a number of cases, these children used to get involved in accidents, they used to lose their limbs, they used to die.

Now, who is going to fight for the rights of children? If not the children and if not the market, then government has to step in. So, in cases where there is market power, where there are certain players or certain actors in the market who are able to influence the prices, who are able to dictate their terms, we require the working of the government to maximize the welfare of the society.

So, in all of these, what we are observing is that we require government to maximize the wel-

fare of society. So, what is being expected of the government is that the government will provide for a mechanism that permits the market to work efficiently, to have all the benefits of the market, but to overcome the shortcomings that the market would have without the supervision of the government.

So, which is what brings us to the working of government policies. Now, in a number of cases, the government influences the market outcome through things such as price controls or taxes and in a number of cases, things might be outrightly banned. Now, we are not talking about things that are completely banned by the government because that comes under the ambit of law.

But here we are talking about ways to nudge the market outcomes that is if the government wants that people should have more of minimum wages, that is people should be paid a bare minimum for the services that they are rendering, then what are the mechanisms that the government has?

If the government wants to say minimize the use of a certain good or a service that is harming the society, what are the mechanisms that government has? Well, one mechanism is outright banning that particular thing, but if the government wants to reduce the influence, then what are the mechanisms with the government?

Now, in this case, two ways of controlling market outcome are price controls and taxes, but these impact the running of the market and so, must be used with care because we have observed before that markets are generally a good way of organizing economic activity.

So, if you are influencing with the market, it should be done in a very settled manner, the government should not influence the market to such an extent that the market forces themselves to stop operating. So, we will observe what are the kinds of influences that, these price controls and taxes can have on the market outcomes. So, let us explore the impact of these interventions beginning with price control.

Now, price control can have two formats: one is a price ceiling and the other is the price floor. Now, if you consider a room, then you will have the ceiling above and you have the floor below. So, price ceiling is the maximum price that can be charged. Price floor is the minimum price that can be charged or must be charged.

So, price ceiling is the legal maximum on the price at which a good can be sold. So, when we are talking about price ceilings, this is the maximum that somebody can charge such as the maximum cost a company can charge for say electric vehicles. Now, a good way of understanding price ceiling is our example of the village person with a well in a (Refer Time: 16:28) situation.

Now, this person may charge any amount. So, suppose he charges 500 rupees for a bucket of water. Now, the government can intervene, and the government can say that no, we are not going to permit you to charge 500 rupees for a bucket of water, the maximum that you can charge is say 20 rupees. Now, when the government puts up certain intervention, then this is known as a price ceiling.

The maximum that you in charge your customers, the maximum the sellers can charge their buyers for any particular good or service is the price ceiling and in a number of cases, this is legally defined. So, it is the legal maximum on the price at which a good can be sold. A price floor is the legal minimum on the price at which a good can be sold such as the minimum you need to pay a



company that is selling solar cells.

Now, in a number of cases, we have things such as a minimum support price. So, for several food grains, this is a price that the government has set that is the minimum that needs to be paid to the farmers because if you pay anything less than the minimum support price, then probably the farmers will not be able to recuperate the cost of agriculture. So, this is the minimum that needs to be paid.

Similarly, we have minimum wages which means that this is the minimum amount of wage that you need to pay to a person when he or she is providing you his or her services for a day because this is the minimum that is required for any person to lead a successful life. If you pay this person less than this amount, then probably he or she will have to cut down on the amount of food that they are getting or the clothes that they are wearing.

So, this is the minimum that we need to pay. Now, such a price which is the legal minimum on the price at which a good can be sold is a price floor. Now, how does the government implement these? So, we can we will look at the price ceilings as well as the price floors.

Now, here we are observing that if you make the demand and the supply curves, now here again the demand curve moves from top left to the bottom right because as the price increases, the quantity demanded will go down so, which is the law of demand. In the case of the supply curve as the price increases, the quantity supplied increases which is the law of supply.

Now, both of these curves intersected in this point which is the point of equilibrium. So, at this point, we have an equilibrium price so, if you draw this horizontal line, the point where it cuts the price axis, or the y-axis gives you the equilibrium price. You also have the equilibrium quantity, which is if you draw a vertical line, the point where it cuts the x-axis will give you the equilibrium quantity that is being demanded or supplied in this market.

Now, at this equilibrium, the quantity demanded is equal to the quantity supplied and the price that it gives you is the equilibrium price. So, if the market is working as it is that is without any interventions, then this is the equilibrium price and the equilibrium quantity that are being demanded and supplied in the market.

Now, the government may say that there is this price ceiling that is this is the maximum price that anybody can charge for the good. Now, in this case, what we observe is that this the price ceiling that is the maximum that anybody can ask for so, this price ceiling is telling us the maximum amount that can be charged.

Now, here we can observe that the maximum amount that can be charged and this is the the amount that the market is already charging which is very less than the maximum that can be legally charged. Now, in this case, the price ceiling does not have any impact on the market because you are well within the price ceiling.

The market has reached an equilibrium at a point where the price is less than the price ceiling and so, we call this a non-binding price ceiling, it is not binding on the price and quantity because in any case by the natural equilibrium is bringing the price to a point which is less than the price ceiling. So, this is, this this graph tells us that there is no impact of a non-binding price ceiling.

But what happens if the price ceiling is less than the equilibrium price? That is the market

brought us to this equilibrium, this is the equilibrium price, and this is the price ceiling. So, there is a difference between both of these. So, here we are finding a difference between the natural equilibrium price so, this is something that the market has reached naturally without intervention and this is the price at which the government is intervening, here we have intervening.

Now, the question is what is the impact of such a price ceiling which is less than the natural equilibrium price that the market will provide you? Now, at this price ceiling, the quantity that is supplied is given by this point, where the supply curve intersects the price ceiling. So, this is the quantity that gets supplied in this market. So, this point will tell us the quantity that is supplied in this market at this price.

Because remember that when we talked about the supply curve, the supply curve tells us the quantity that the sellers are able and willing to supply to the market at different price points. So, if the price increases, people want to supply more. If the price reduces, people want to supply less. So, the amount of goods or services that people will be able and willing to supply to the market is given by this quantity where the supply curve is intersecting with the price curve.

Now, the quantity that is demanded by the consumers at this price point is given by this point. Now, this is the point where the demand curve is intersecting with the price. Now, here again you will remember that a demand curve tells us the quantity that is demanded at different price levels. So, if the price of something goes down, then people start to demand more and more of that particular good or service.

So, at every point, the demand curve tells us what is the quantity demanded at that price point. So, at this price point, which is the intervention price point or the price ceiling that has been set up by the government, the quantity that is demanded is given by this vertical line which intersects this curve at this point. So, this is the quantity that is demanded in the market, this much; this much amount of quantity is demanded in the market and this much amount of quantities supplied in the market.

So, there is a difference between the quantity demanded and the quantity supplied. The demand is more, the supply is more. Now, if you remember the law of demand and supply, the demand curve and the supply curve intersect each other at a point that makes the quantity demanded equal to the quantity supplied because of which there is no shortage.

But, at this price point, at the price ceiling which is binding, we are observing that the demand is much greater than the supply. So, in this case, the market will observe a shortage of goods. Now, shortage is the difference between the quantity demanded and the quantity supplied.

Shortage is defined as a situation in which the quantity demanded is greater than the quantity supplied to the market. Now, what are the impacts of a shortage? Now, obviously, as we have observed, the market is a good way of organizing economic activity. So, at the natural equilibrium point, the market will reach the situation where there is no shortage.

So, everybody who is able and willing to pay at that price point will get the stuffs, but when you have a binding price ceiling, then the shortage will manifest in the form of long queues. So, because there are less goods that are supplied to the market, more and more people want to have that good so, there will be long queues, people will waste their time standing in the queues, people will waste their time irritation and frustration of not being able to get that good.

Now, there will be certain people who would say that ok, the government has said this price ceiling of 10 rupees, let me give you 12 rupees, you give me this product or let me give you 20 rupees and you give me this problem. So, the people will always try to bring the market to the natural equilibrium point, but because of the price ceiling, if it is legally enforced and if it is enforced properly which means that people are not able to cross this ceiling by means of black marketing or by paying bribes.

So, if that happens, then there will be a shortage of this market. So, there will be long queues, lost time, there will be unfairness because there will be discriminatory selling to close friends or relatives. So, the seller would say that ok, I only have 10 pieces of this particular good, there are 100 people who want to have this good, whom do I sell it to? And I cannot increase the price so, I cannot increase my profit.

What the seller would do is ok, let me give it to my relatives, let me give it to my friends. We will start observing discrimination in the society. We will start observing black marketing and bribery. So, even though legally you can sell this good for 10 rupees, there will be a black market that will come up in which people will be able to buy this good for 100 rupees.

People will try to bribe the shop owners to allocate them the goods, and will observe rationing. Now, in the case of rationing, the government will say ok, no there is nobody who will be able to purchase more than say two pieces of this particular good.

Even if there are people who want more of these goods because say they have a larger family or because there is say some medical situation or this person is going out and so, he or she requires more of these goods because he or she will not be able to go to the market every day so, in that case, people generally want to have more of the goods, but because there is a price ceiling, the government might even have to enforce rationing.

The government will say no, every day you can only have two ah; two pieces of this particular good, say 2 pieces of bread now, in that case, you cannot say bring 14 pieces of bread and store it into your fridge, you will have to go to the market every day so, that is rationing.

There will be many potential buyers who do not get access to the goods at all because there is a shortage. So, not everybody will get the goods. There will be long term impacts including the reducing supply, not innovating, not doing maintenance, a reduced quality and so on.

A very good example is the rent ceiling. So, what the government did sometimes back was that they said that the landlords are charging exorbitant rents from the tenants. So, the government said ok, nothing doing, you cannot charge more than this particular amount. So, suppose in the market the landowners were charging 20,000 rupees for a particular flat and the government says no, you cannot charge more than 5000 rupees. What will happen?

One, the landowners will find it no longer lucrative to put this flat into the market. So, they will reduce the supply because then they were willing to put this flat up for rent for 20,000 rupees, but for 5,000 rupees, it does not make sense for them. And for those landowners who actually put the flat on for rent, what they will do is they will cut down on something, they will cut down on maintenance, they will not upkeep the flat, they will not paint it regularly.

So, the tenant who gets into this flat will find that all the walls have peeling paints, the windows have broken glasses, the taps do not work and things like that because it is now no longer

lucrative for the landlord to maintain this flat will start observing that people stop doing any maintenance, there is a reduced quality, people stop innovating and people try to take things more and more away from the market. So, the supply reduces even further.

And in a number of cases, the government will find it difficult to improve the norms. So, we may start observing difficulties in enforcing norms which actually defeat the government interventions. So, if the government needs to intervene, the government should be prepared to enforce the norms otherwise, it does not make any sense.

Another impact is the impact of a price floor. Now, the price floor is the minimum that can be charged. Now, here again, we can have a non-binding price floor in which case this is the natural equilibrium point; point without intervention and this is the intervention. The government in this case for example, is saying that this is the minimum wage that you need to pay to people, but the natural equilibrium has brought the wages to this one.

Wages like other goods also have a demand and a supply. The demand is by those people who want to employ others and the supply is those people who want to give their wages or who want to sell their wages because not everybody wants to work for wages. So, those people who want to sell their wages, they will be supplying to this market and those people who want to hire others, will be the buyers in this market.

We are talking about the market for labor. Now, in this market as in all the other markets, there is a demand curve, there is a supply curve and the point where both of these meet is the natural equilibrium one which gives us the equilibrium price and the equilibrium quantity.

In this case, the government is saying that the minimum wages that you should be paying is so, and so which means that in the national market suppose everybody is being paid 500 rupees for a day worth of labor, but the government says the minimum you need to pay is 100 rupees now, because the market is already paying 500 so, this becomes a case of a non-binding price floor.

This price floor is not binding on the market. So, it will not have any impact on the market. On the other hand, we can have a situation where the price floor becomes binding. Now, when the price floor becomes binding, the quantity that is demanded is given by this point where the demand curve is intersecting with the price floor. So, the quantity demanded will be this much.

The quantity supplied is given by this point where the supply curve intersects with the price floor and the quantity that is supplied will be given by this point. Now, in this case, what we are observing is that the quantity that is supplied to the market is more and the quantity that is demanded is less.

Now, why is that so? Because as we have seen in the law of supply, as the price increases, the quantity supplied also increases. Now, because the price floor in this case is more than the equilibrium price so, more the price means more the quantity supplied. On the other hand, in the case of the law of demand, if the price increases, the demand falls.

So, the quantity demanded is now less which means that suppose if the market was paying 500 rupees for a day of labor and the government says no, you cannot pay 500 rupees, you have to pay 700 rupees for every day. Now, for 700 rupees there would be a number of people who were not willing to work for wages for 500 rupees, but for 700 rupees, they would say ok, let me work

in the market because every day I will be getting 700 rupees.

Now, the quantity supplied will increase, but the quantity demanded will decrease because there were a number of people who were able and willing to pay 500 rupees. But when it comes to 700 rupees, there will be a number of buyers of labor or the employers who say that no, 700 rupees is a bit too much because by hiring this person, I am only able to get a revenue of 600 rupees.

So, if I pay him 500 rupees, I have 100 rupees of profit, but if I hired this person for 700 rupees, I will be at a loss of 100 rupees for each labor that I am hiring. So, the demand will go down. So, in this case, what we are observing is that the quantity supplied is more, the quantity demanded is less which means that there will be a surplus in this market.

So, more and more people want to work at this wage, but fewer and fewer people want to hire people at this high wage. So, this leads to a surplus. And a surplus is defined as a situation in which the quantity supplied is greater than the quantity demanded.

Here again, it will have certain impacts such as selling which is possible only for a few sellers who can appeal to rational, familial or other ties which means that the people who want to work for these wages would not find the work when they go to the market because the price is a bit too high. But then, they will probably go to one of their relatives and say that ok, you are hiring such and such number of people, why do not you throw them out and why do not you hire me because I belong to your own family.

If you are paying 700 rupees, let it remain within the family. We will start observing that people are now using their family and friends, people are using their friendly ties. So, people would say ok, your father is employing so and so number of people and you should ask your father to hire me. So, in this situation of surplus, selling is possible only for the few sellers who can appeal to these ties.

There will be a loss for sellers due to unsold inventory. There will be a large number of people who want to sell their labor, but they are not getting any market for them. So, they have got nothing to do, but they can only sit down. So, in that case, we are observing that there is a loss for these people.

A number of these people would have happily worked for 500 rupees so, at least they will be getting 500 rupees every day, but when the government increases the floor to 700 rupees, then these people are completely out of the market. In that case, they will be earning 0 rupees, this is also a situation that will come up.

And the long term impact will be closing of different industries because people are not getting labor at requisite or natural equilibrium rates, there will be job losses. And also there will be a number of situations where the government will not be able to enforce these points because on paper, people would be saying that we are paying 700 rupees, but when the labor comes, the employer might say ok, I am going to pay you 500 rupees.

But, you sign this paper saying that you are receiving 700 rupees, either you do this or I will throw you out. Because I do not have any other option, I cannot pay you more than 500 rupees, but the government is insisting that I pay you 700 rupees so, let us close the papers. So, the enforcing of these price floors at times also becomes very difficult, but at times, these are important.

So, markets are usually a good way to organize economic activity, but the point here is usually, not always because if you allowed the market to work as it is, then there might be cases of exploitation, there might be cases in which people are reducing the welfare of the society so, the government will have to intervene, but if the intervention is a bit too high.

Suppose in place of 500 to 700, the government had said that ok, in place of paying 500 rupees, the price floor is 550 rupees or say 520 rupees, then probably the intervention would be much more fruitful because it would actually increase the amount of remuneration to different laborers. But if these interventions are used to a very large extent, then probably, they will defeat the purpose. So, these interventions are important to increase the welfare of the society to reduce exploitation, but at the same time, they have to be used with a very great amount of concern and with a judicious amount of usage.

Another intervention that the government does is through taxes. Now, the government collects taxes for their functioning and for the financing of public projects. So, as we had observed, there are a number of sectors such as health care or education where the market may not provide sufficient quantity and quality of goods.

Now, because these are those sectors that have a very large positive externality, a person who is educated is not only benefiting himself or herself but is also an asset to the society. A person who is healthy is not only protecting himself or herself but is also an asset to the society because he or she is also preventing the spread of diseases.

These are things that need to be incentivized, but the market may not incentivize these activities because the market works on a profit motive. So, the government will have to intervene, the government will subsidize these sectors, but to subsidize these sectors, the government also requires funds. Now, where did the government get these funds from? One option is taxation.

So, the government taxes different people especially, those activities that need to be brought down, so they will be taxed at a higher level. But a number of other activities such as earnings will also be taxed and these taxes, the funds that are received through these taxes they will be used for the working of the government and they were also be used to subsidize these priority sectors and these days, we are also observing that the government is using tax money for conservation purposes.

Such as this, pollution tax businesses will face higher taxes on the gas they use in a bid to cut pollution. What the government is saying here is that because pollution is having a negative externality, we are going to put a higher tax on the use of fossil fuels so that it becomes disincentivizing for people to use more and more of these fossil fuels. So, here the government is using the tax for conservation procedures.

Federal carbon tax jumps 50 percent. So, in Canada, the government is putting a carbon tax so that if people are emitting carbon, they will have to pay for it. Car tax what you need to know about vehicle excise duty. Now, here again, because cars pollute the environment, the government puts up a tax on cars to reduce their usage.

Excise tax: the right step to combat plastic pollution. Now, in this case, the government is trying to bring the supplies down. How? So, we have observed that in the case of the supply curve, the supply curve looks like this. So, we have the price, and we have the quantity. Now, in the case of

a supply curve, when the price is less, the quantity supplied is less. When the price is more, the quantity supplied is more.

Now, when we talk about the excise taxes, what they do is that they increase the cost of making funds which shifts the curve to the left. So, what we are saying here is that we had observed in the case of the supply curve that an increase in the cost price of making or the increase in the cost of making things, shifts the curve to the left, that is it reduces the supply, what it means is that for any given price point.

Let us say at this price point, earlier the market was able to supply this much amount of the product, but now, the market was only able to supply this much amount of the product. So, the quantity that has been supplied reduces if we increase the cost of making the things and a good way of increasing the cost of making things is through tax increase. So, in this case, the government uses excise tax to combat plastic pollution so that less and less amount of plastic is imported for manufacturing.

Now, whenever we have a taxation, this tax may have to be paid by the buyers, they have to be paid by the sellers or by both of them. So, for instance, if the price of this bottle goes up, who is going to pay this price? Is the company going to pay this price out of its profits or will the buyers have to sell out more money to get this bottle?

Who is paying the price of these plastics is the next question, which brings us to tax incidents. Tax incidence is the manner in which the burden of a tax is shared among the participants in the market. So, who pays, the buyer pays, the seller pays or both of them pay? Now, we will look at the complete impacts of taxation in a later lecture, but in this lecture, we are concentrating on who will pay the taxes and by how much.

It is important because in certain cases, if say artisans have to pay the taxes for something, then in that case, they might lose out on their jobs because their profits are already wafer thin and so, if the revenue reduces, then probably, they will be out of the jobs. So, which is why we need to be very careful about the tax incidence.

Now, what is happening in the case of taxation and if the government says that we are applying a tax only on the seller which means that the government is saying here that when the manufacturer makes this bottle, then the manufacturer will be taxed, the more the number of bottles will make the more will be your tax the the government says that.

Does that mean that only the manufacturer will have to pay for the taxes? It is what we are trying to analyze here. In this curve, this is the demand curve, this is the supply curve and because of a tax, there is a shift in the supply curve to the left because we are adding a tax and we are taking this tax from the sellers which means that the sellers have to pay more to make each bottle.

The cost of making goods has increased and so, the supply curve is shifting to the left. Now, what happens here? Earlier, the equilibrium price was this much. So, this is where the earlier demand and supply curves were intersecting each other, but now, what is happening is that because the new supply curve is here, this is the new equilibrium point.

The equilibrium point has shifted from this point to this point. Now, what is happening is this is the price that the buyers will have to pay to get this bottle why? Because at this point, the point where it is cutting the demand curve, this is telling us the equilibrium price that the buyers pay,

and this is telling the equilibrium quantity that they will be getting.

At this equilibrium quantity, the price that sellers get is given by this point. So, in this case, this is the price that the buyers pay, this is the price that the sellers get and earlier, the equilibrium price was this. So, in the case of a normal functioning of the market without the taxation, the price that the buyers pay is equal to the price that the sellers get, but with taxation, the buyers pay more, the sellers receive less, and the difference is the tax that the government gets.

It is important to note here that this share of what the buyers were paying now and had to pay earlier is the share of the buyers in the amount of tax. And the price that the sellers are getting now is this earlier they were getting this price. So, this is the seller's share. Even though we have added a tax only on the sellers, the tax is distributed between the buyers and the sellers.

This is where we can talk about the tax incidence. Even though the government put this tax only on the sellers, the buyers also have to pay a share. So, what happens? 1, the market activity is reduced because less goods are sold in purchase. Earlier, the quantity that was supplied and demanded was this, the new quantity is this. So, the market activity has gone down, it has reduced and 2, the tax burden in this case is being shared by the buyers and the sellers.

Now, the government can do one other thing, the government can say that we are going to put a tax only on the buyers. Now, in that case, the government will say that ok, the price at which this bottle was being sold, we are going to add to that price so that only the buyers will have to pay because they are purchasing this bottle.

Now, what happens in the tax in the case of tax incidents in that case. Now, because the government has added to the price, the demand will go down. So, in this case, this was the earlier demand curve, this is the new demand curve because we are putting the tax only on the buyers, this and the supply curve remains the same.

Now, here again the point where the supply curve is cutting the new demand curve is giving us the equilibrium quantity that is now demanded or supplied in this market and because this point is where it is cutting the supply curve so, this is the price that the sellers are getting. Earlier, the price without taxation was this. So, this was the price that the buyers were paying, and the sellers were getting.

Now, the price that buyers will have to pay for this much quantity will be given by this point where the vertical intersects with the earlier demand curve. So, this is the price that the buyers will have to pay. Now, in this case as well, we are putting a tax on the buyers only, but we will have a buyers share because earlier the buyers were paying this amount. And now, they have to pay a higher amount so, this is the share of the buyers.

Earlier, the sellers were getting this amount, but now they are getting this amount so, there is a share of the sellers. So, in this case as well, even though we have added, we have put at some buyers only, the tax gets shared between the buyers and the sellers and here as well, the market activity is reduced because earlier the quantity demanded or supplied was this, the new quantity that is demanded or supplied is this.

There is a reduction in the quantity that is demanded or supplied in this market. So, the important thing to note here is that even if you put a tax on the buyer only or on the seller only, the tax will be distributed between the buyers and the sellers. Now, the question is in what ratio? Suppose



there is a tax of 1 rupee on this bottle so, how much amount will be paid by the buyer and how much amount will be paid by the seller?

This again brings us to the topic of elasticity. Now, if the demand is inelastic and the supply is more elastic, we will find that the point where it cuts is way higher than the point without the tax. In this case, the buyer's share is more, the seller's share is less. In the case of an inelastic demand, the buyers will have to pay more.

In the case of an inelastic supply, here the supply curve is now becoming more vertical. So, in this case, the sellers will have to pay a larger share of the tax burden which is telling us that whichever curve is more inelastic, that party will have to pay more. If the demand is inelastic, the buyers will have to pay more. If the supply is inelastic, the sellers will have to pay more.

So, when we talk about the incidence of the tax burden, then the tax burden is shared between the buyers and the sellers, but the amount that each party will be paying will be determined by the elasticity of demand or supply. So, what we are getting here is that the largest share is faced by that party which has the inelastic curve.

Now, we have seen before that elasticity depends on whether something is a necessity or whether it is a luxury. In the case of luxuries, we have a demand that is more elastic. In the case of necessities, the demand is very inelastic. So, if there is a tax on something that has an inelastic demand, things like food - in the case of things like food because that demand curve is inelastic so, the buyers will have to pay more.

In the case of things that are luxuries so, if the one might say imposes a tax on a luxury car, then because luxuries have an elastic demand so, in that case, the burden on the buyer will be very less so, the buyer will have to pay less of the amount and probably, the seller will have to pay more why?

Because even if there is an increased amount of taxation in the short run, the seller or the artisans who were who were involved in say painting of the car or making it through a handmade fashion, they will not be able to shift to some other profession so, they are having a larger in elasticity in the in their supply terms and when that happens, the sellers will have to pay the larger share of the tax burden.

Now, in this case, what is happening is in the case of luxury items such as luxury cars or yacht, the artisans who are involved in painting of these things or in handcrafting different components of the luxury cars, they are extremely poor and when the government imposes a tax on these luxury items, this tax burden goes to the seller which means that it goes to the artisans because they have the inelastic supply whereas, the demand is more elastic.

If the government puts tax on luxury cars probably, the rich people will shift from buying luxury cars into say buying luxury homes or say buying a private jet. Now, in such cases, whether or not the government should tax things, it becomes a bit more intricate because the tax burden is falling more on the seller that is the RTCs.

So, taxing luxury products such as private jets, yachts or luxury holidays with elastic demands and inelastic supply may hurt the sellers who are often poor workers more than the buyers who are the rich. Taxes, though they are a tool for conservation, have to be used with extreme caution to ensure that it does not have a very large social cost.

So, in this lecture, we had a look at the government interventions in the form of price controls, price ceilings and price floors and taxation and we examined what is the incidence of tax burden on the buyers and the sellers and the bottom line here is that if the buyers have an inelastic demand, they will have to pay more, if the sellers have an inelastic supply, they will have to pay a larger share.

The government can intervene with the market outcomes, the government has to intervene in a number of cases to ensure that the market works in a manner that is beneficial for the society, but because we have these negative side effects of any such intervention, these tools have to be used with extreme problems.

That is all for today. Thank you for your attention. Jai Hind!