

Conservation Economics
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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

equilibrium 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 change? 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 closed 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 say 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,

computed 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 applied, 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!