Foundation Course in Managerial Economics
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Lecture - 06
Elasticity of Demand and Supply

Hello and welcome back to the second week of the foundation course in Managerial Economics. Last week we developed the concept of demand and supply and we developed the concept of how demand supply equilibrium shows us what the price the market price is and what the market quantity is which basically clears the market and today we are going to extend the discussion and talk about something called elasticity of demand and elasticity of supply.

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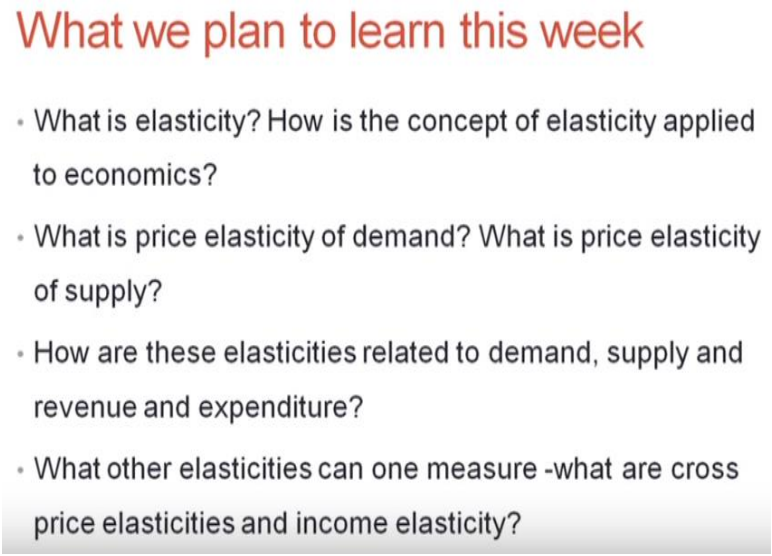

So elasticity is, so let me let me just quickly go through what we plan to learn this week. We are going to talk about what is elasticity. Most of know what elasticity is especially people with science and engineering background are very much conversant with the concept of elasticity, how it is measured etc.

And then we are going to see how is the concept of elasticity applied in economics in this framework of demand and supply and then we are going to talk about what do we mean by price elasticity of demand and what is price elasticity of supply and why is it why are we measuring these elasticity in the first place, what do we hope to achieve or understand when we are calculating the elasticities of demand and supply. What understanding or what further

understanding of the market do we achieve by studying the elasticity of demand and elasticity of supply and we are going to see that elasticity actually tells us a lot about the revenue or the expenditure that the revenue that the producer is hoping to get out of producing the total number of goods or selling the total of number of goods in the market that is the revenue and we are going to see that there is a linkage between the revenue that he may expect with the elasticity of say the supply curve and similarly with the elasticity of the demand curve when the elasticity of the demand curve actually is going to tell us that how much extra units of output the consumer is likely to buy when the price of that product falls.

So just holding on to that thought let us proceed and what other elasticities can one measure so we are going to start with the concept of price elasticity of demand and later we are going to talk about price elasticity of supply but we are going to also talk about diverse types of elasticities. We are going to talk about cross price elasticity, income elasticity and once we are conversant with the idea of elasticity we are going to see that it is very easy to understand how demand or supply would respond to changes in any of say price or income or say any other determinant of demand or supply that we talked about in the last week.

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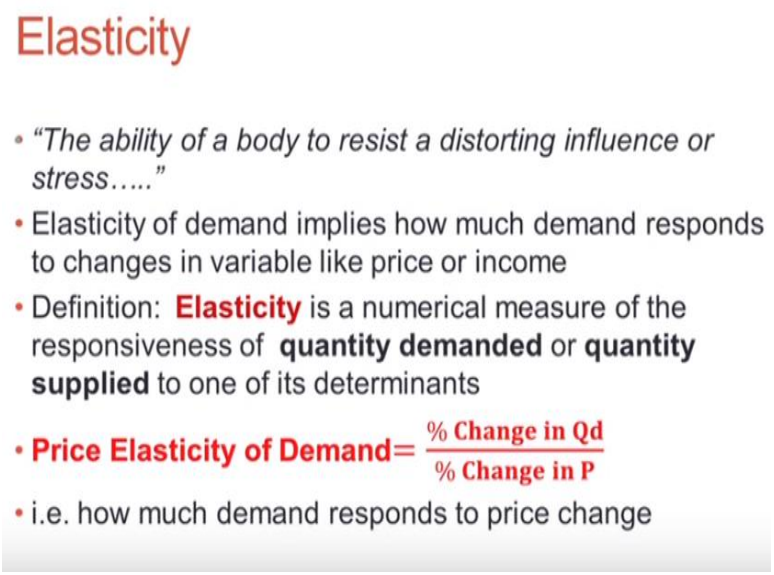

So what is elasticity? So the standard definition of elasticity is the ability of a body to resist a distorting influence or stress. That is we say that if it is in physics it is if the body can after distortion or stress if the body can come back to its original shape and size, so that is elasticity.

So we are using this concept here and we are saying that elasticity of demand implies how much demand responds to changes in variables like price or income.

So how much demand is resisting a increase in price or how much distortion is happening to say demand or supply when something like any of the determinants of demand or supply say for example price when the price changes how much demand is changing and how much supply is changing in response to that price. We are trying to evaluate that. So the definition here we are using is elasticity is a numerical measure of the responsiveness of quantity demanded or quantity supplied to one of its determinants.

This is the most general definition of elasticity that we are going to use and a very specific definition of price elasticity of demand that is how much demand responds to change in price is simply given by the or it is simply measured by the ratio of percentage change in quantity demanded to percentage change in price. That is how much demand responds to price change. So we can start with an example. Let us start with an example and we are going to take exactly the same example of the ice-cream market that we introduced in the previous class.

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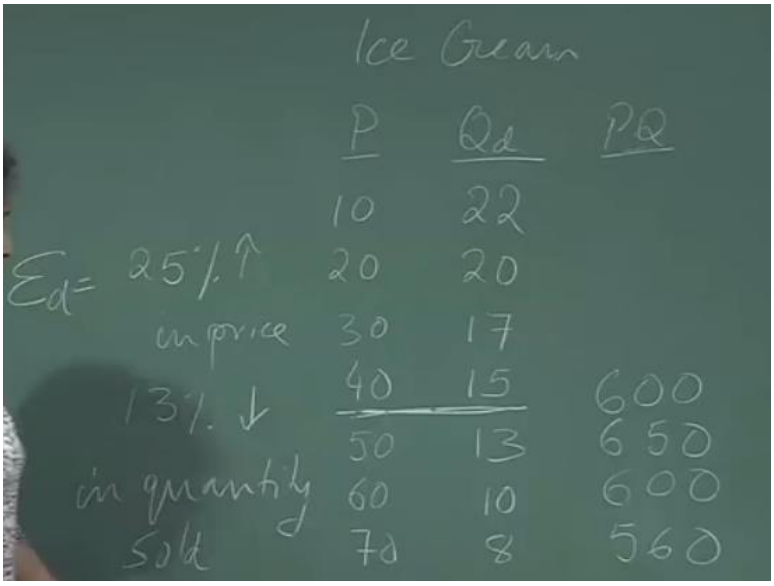

So say this is my demand schedule in the market, these are the prices, and these are the quantity demanded of ice-cream. So the prices were 10, 20, 30, 40, 50, 60, and 70 and against these prices the quantity demanded in the market were 22, 20, 17, 15, 13, 10, and 8. So we are assuming that this is the quantity so if the price is say 10 Rs per cone of ice-cream, the total amount that the

market is going to demand is say 22000 kgs of ice-cream or whatever depending on the size of the market.

So unit is not so important here. It is just enough to see that the quantity is increasing, is increasing as prices price is decreasing. So this is the demand schedule of the ice-cream. Now where does elasticity come in? Say for example, I am a ice-cream producer and I decide that somehow it does not it is not making sense for me to so earlier in the last class what was the equilibrium that we arrived at? We arrived at this equilibrium.

So say currently the market price is 40 and I am selling 15000 cones of ice-cream. So now and what is my revenue? The revenue that I am earning that this is the total amount of ice-cream, this is the total sale that I am that is happening in the market. That is 600. So now say for example, the ice-cream producers decide that 40 Rs is not enough, like my costs are going up.

Say for example my refrigeration cost as electricity bills are have gone up and refrigeration cost has gone up so I would like to increase my price from 40 to say 50 Rs. So my concern is by the law of demand I know that if I increase my price the quantity demanded in the market is going to go down. So to the producer the concern is, is my demand is my total revenue going to continue to be this or is it going to be more or is it going to be less.

It can be more if the amount, the quantity or the response in the market to the price change is not so much as the price change. Say for example if my P goes up by a higher percentage than Q in that case I can hope to have a increase in revenue. So in that case it makes, probably makes sense for me to increase the price. So let us see what happens here.

So now I am going to see so here if I would like to increase my price from 40 to 50 I am going to see what my elasticity of demand is and as per the definition that we have shown in the slide, earlier slide, it is percentage change in quantity demanded to percentage change in price. So if I increase my price to 50 Rs then by definition my elasticity of demand against price is 25 percent increase in price and around 13 percent increase sorry it is going to be a increase in price so 13 percent fall in quantity sold.

So if my price is the amount by which the price is increasing is more than the amount by which the percentage by which quantity is increasing it makes sense for me to increase the price. So here if I increase this it to 50 I can see that here it is 650 okay. Now if I decide to increase it to 60 then what happens? Then I am seeing that it is increasing to 60 and my price has sorry my the

price has increased to 60 and my quantity has fallen to 10 my but my total revenue continues to be 600.

So in that case there is the same amount of increase in price, the same amount of increase in price is leading to same amount of decline in quantity and finally if I decide that I my costs are really high and I would really like to increase the price let me increase it to 70. In that case what I see is it is 560. So when it is 560 I clearly see that there is a drop in my revenue. So having said that this is just to develop the concept of elasticity that basically elasticity what it is telling me.

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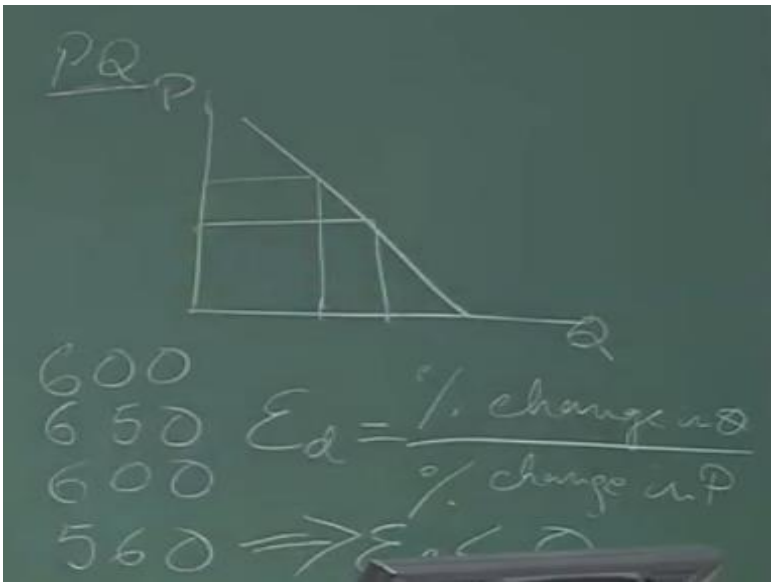

Elasticity is telling me that since P and Q move in opposite directions since we have a negatively sloping demand curve where this is P this is Q, since we have a negatively sloping demand curve every unit of price change that happens every unit of price change that happens is comes along with a change in quantity and that is going to change my revenue.

But right now we have not discussed anything about production, production function, cost, etc. How basically the producer decides if the price is to be increased or not. So this is not to say that the producer is not going to increase the price. This is not to say that since price is when he increases the price from 40 to 70 his revenue falls from 600 to 560 so the producer is not going to increase the price. No I am not saying that.

This concept this is a very simple example which I have developed to demonstrate what basically price elasticity of demand means and what it is what is its implication or usage. So along a

demand curve so along a demand curve as I have already said price and quantity move in opposite directions so what do I mean by that? So basically when I say that elasticity of demand is percentage change in quantity divided by percentage change in price.

So when price is increasing or decreasing quantity moves in the opposite direction which implies that elasticity of demand price elasticity of demand is always less than 0. Price elasticity of demand is always less than 0 because the demand curve has a negative slope because price and quantity moving opposite directions so elasticity of demand is always going to be less than 0 and let me clean up the board.

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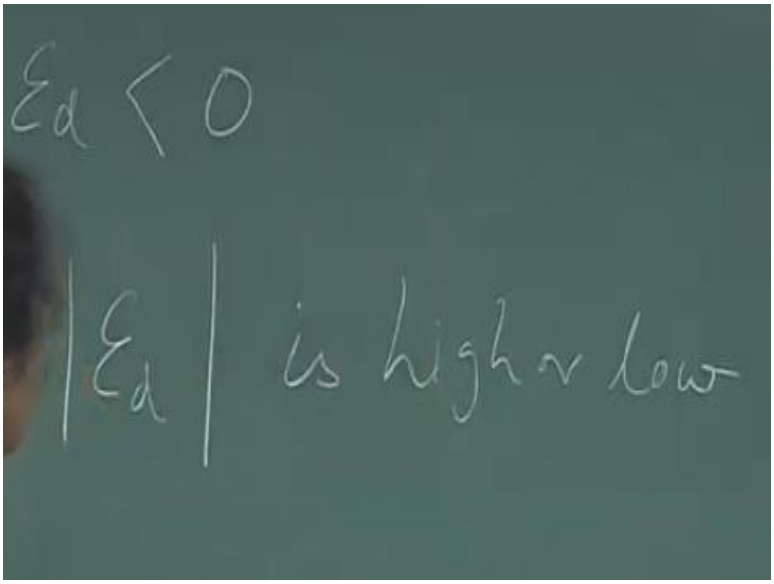

So elasticity of demand is always less than 0 and henceforth whenever I say that elasticity is high or low, what I mean by that is if demand is high or low. Basically I am taking the price elasticity value in absolute terms and I am saying whether elasticity of demand is high or low. So whenever we say price elasticity of demand is high or price elasticity of demand is low what we mean by that is the absolute value of the elasticity. This elasticity is always less than 0 but what I what I mean by elasticity being high or low is the absolute value of the elasticity of demand is high or low.

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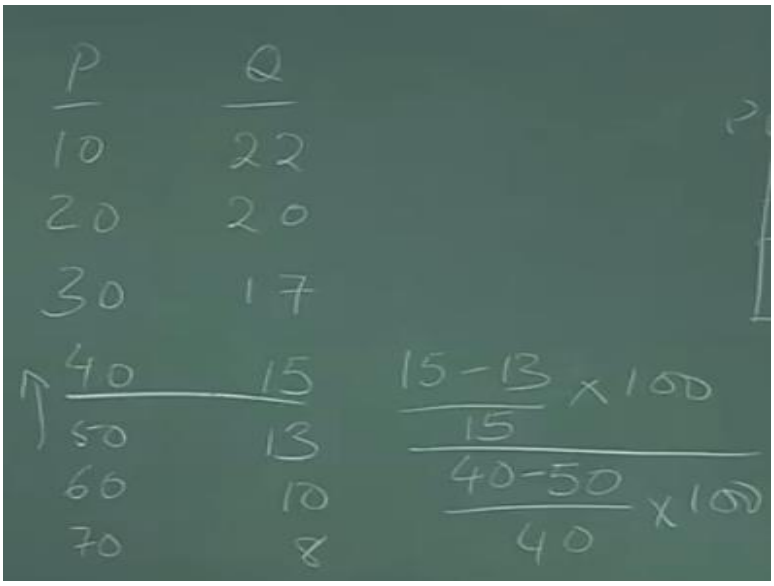

Okay another point is that going back to the same example I going back to the same example sorry I have to write it once more okay so we took the example that we are starting from this point. So equilibrium price is 40 and the quantity demanded right now in the market is 15 and we are contemplating increasing the price from 40 to 50 and we know that demand is going to decrease.

Now what is the response to price increase at this point? When I am the way that elasticity is calculated, how is it calculated? It is basically calculated when I am doing when I am trying to calculate this percentage change in quantity. So what I do is it is 40 - 50 divided by 40 into 100 I am sorry it is going to be in the this is the price increase so it will come in the denominator.

So this is how I calculate what the price elasticity of demand is when I am trying to increase the price from 40 to 50 or in other words I am trying to find out how responsive quantity is to price changes when my price is increasing from 40 to 50. Now what happens when I am trying to calculate exactly the opposite? If I am trying to calculate how is my demand going to change if my change my or if I decide to reduce my price from 50 to 40.

Is it going to be the same as increasing my price from 40 to 50? No, it is not. So in that case if I am if I am reducing the price from 50 to 40 in that case my elasticity price elasticity of demand is going to be so let me just clean this in the same way let me just clean this up and write here.

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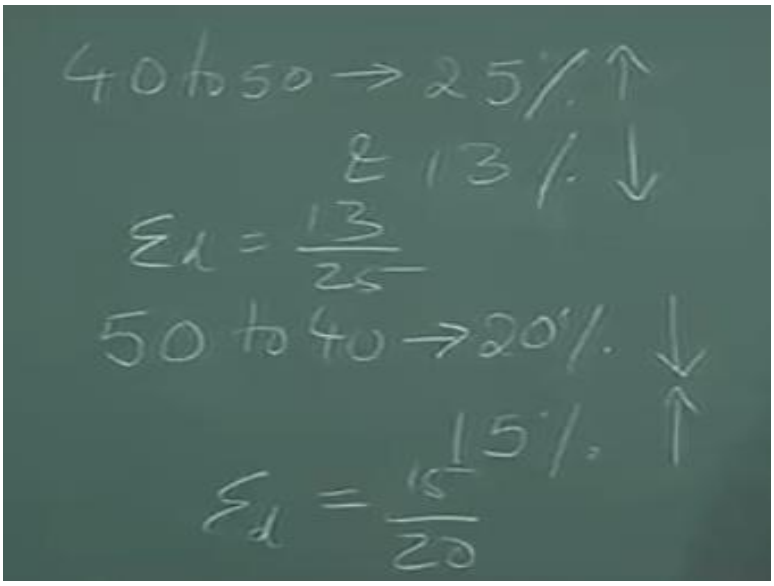

When I am increasing from 40 to 50 price is increasing in 25 % increase in price and 13 % fall in quantity but when price falls from 50 to 40 this is a 20 % fall in price and 15 % rise in quantity and my elasticity of demand here is going to be 13 by 25 and here it is going to be 15 by 20, 15 by 20. So obviously they are not the same. So they are not the same.

So basically what that means is at what point I start calculating my or what point I start calculating my price elasticity of demand that is important in determining what the price elasticity of demand is going to be. So that kind of makes things a little uneasy or complicated so what we usually do here is we use the midpoint method.

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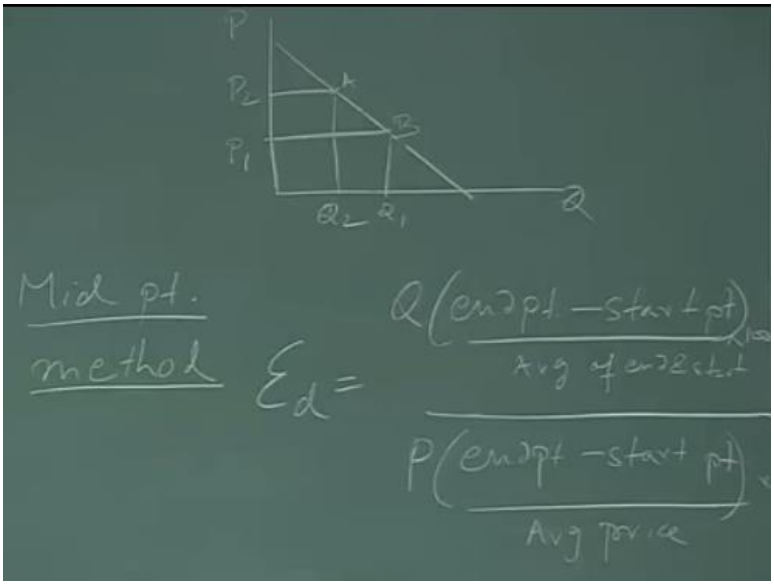

What we do is we use the midpoint method where we use the midpoint method where basically so if so this problem basically what we mean is if I move from A to B I get a certain elasticity price elasticity of demand which is not going to be equal to if I move from B to A. So to resolve that problem what usually is done is we take the midpoint of the 2 changes both in the numerator and denominator.

What we do is midpoint method is now I define elasticity of demand as Q endpoint minus starting point values divided by the average of the 2 points of end and starting point into 100 divided by price endpoint minus starting point divided by the average price at the 2 points. So this basically gives me the midpoint method of calculating the price elasticity of demand. So this is the midpoint method of calculating the price elasticity of demand.

And in the following lecture we are going to talk about so this is in this lecture or in this module we have developed the concept of elasticity of demand. We have seen how elasticity of demand is calculated and we have seen that basically the value of the price elasticity of demand varies or depends on the point at which it is calculated and so to resolve the problem what we have done is we have used something called the midpoint method where we are going to take the average of the beginning and the endpoint that we are looking at.

So if the price is increasing or decreasing we are going to get the same value of elasticity of demand in both the cases. Unlike in the earlier case where if your if one is moving from the point A to B on the demand curve the price elasticity of demand that we get is different from if we move from B to A.

So this was about calculation of elasticity of demand and this is general definition of elasticity of demand and this is price elasticity of demand if it is income elasticity of demand we are going to have income in the denominator. If it is something else we are going to have the so basically whatever determinant of demand or supply that is influencing the demand or supply let us not talk about supply right away. We will be taking it up in a different module.

So to continue if we would like to see what elasticity of demand is with respect to any determinant of demand this is how we calculate. We take the quantity change in response to any determinant of demand divided by the change in the determinant of demand. So we have taken the example and we are going to work more on this so we have taken the example of price here because price elasticity of demand is very important and we are going to talk more about it.

So in the denominator here we have price but we can also imagine something like income. Say a person how much his consumption of say luxury cars in a economy. If there is increase in income how much consumption of luxury cars increases in the economy? So something like that can be calculated by having instead of P here in the denominator we can have income variable in the denominator.

So this is how elasticity of demand concept is used in economics and we are going to use more of it in the later modules and we will be developing we will be looking at relationship between the demand curves, the shapes of the demand curves, and how elasticity of demand depends on them. We are going to look at determinants of elasticity of demand etc. in the following module. Thank you.