Managerial Economics
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Lecture - 20

Then we will consider, come to the measurement or how we generally get the value, or how we compute the value of price elasticity of demand. So, if you look at, how we are going to measure the price elasticity of demand? In a typical demand curve.

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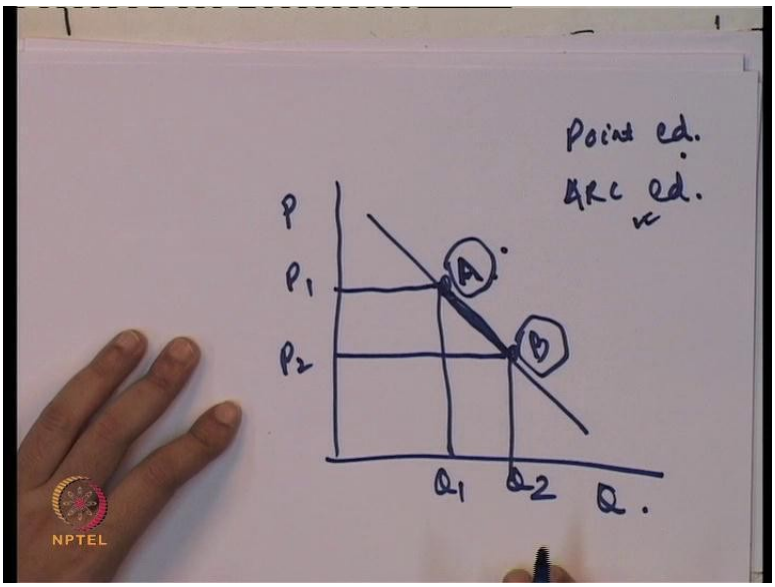

So, if you are taking a linear demand curve, here we take as price, here you take as the quantity demanded. Each point of the demand curve, it gives us the different quantity of price and quantity combination. So, this is P1, this is P2, this is Q1, this is Q2. Suppose it is point A, this is point B. So, when it come to the computation of price elasticity of demand, when you compute the price elasticity of demand at a individual point, either at point A or either at point B, generally this is known as point elasticity of demand. But when you measure the elasticity of demand in a segment like, between A and B, in the linear demand curve, what is the price elasticity of demand? That generally known as the arc elasticity of demand.

So, there are again two type of price elasticity of demand when it comes to the computation. One, when we measure of the elasticity point and the second one when we measure the elasticity of demand, in a segment or in arc. And this, in the first case, this is known as point elasticity of demand and second case it is known as the arc elasticity of demand.

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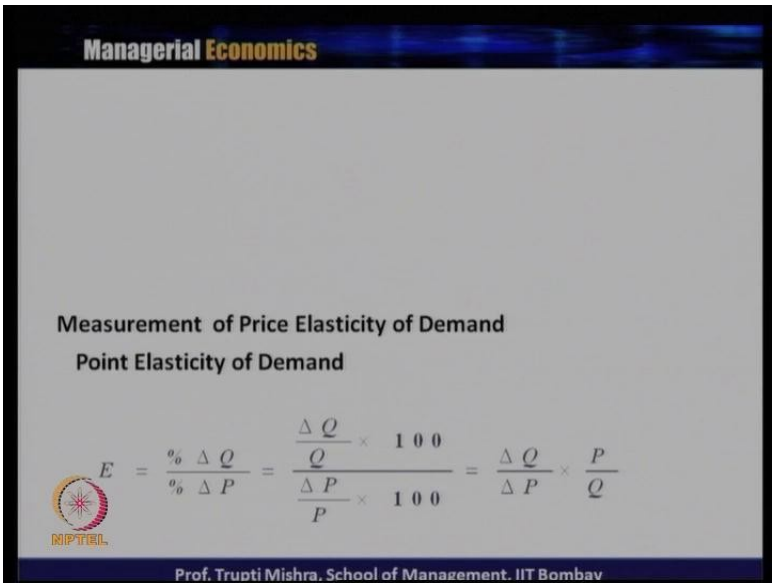

Let us see, what are formulas to compute this point elasticity of demand and the arc elasticity of demand. So, in case of measurement of price elasticity of demand, they follow the same formula again that elasticity is the percentage change in the Q and the percentage change in the price. And if you simplify this, that gives you the del Q by Q multiplied by 100 and del P of P multiplied by 100.

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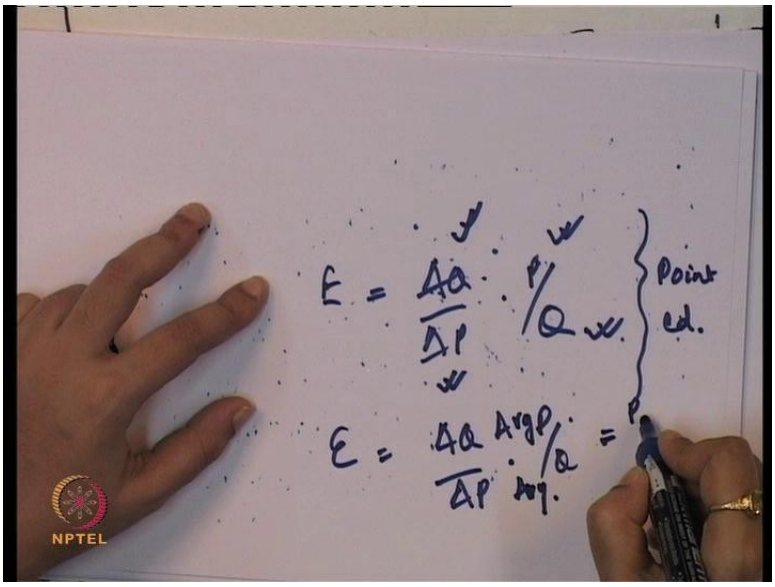

If you simplify this we get a formula, where you say that E is equal to del Q del P, by, multiplied by P by Q. So, this is change in the quantity demanded, this is change in the price;

this is the original price, this is the original quantity demanded. This is the formula we use, when we calculate the point elasticity of demand. Now what happens, when we are calculating the arc elasticity of demand. In this case also if you look at, the formula or the basis of calculation remain constant, there is no change in that, that is del Q by del P and P by Q, but here P by Q since it is in the segment, we take the average P between two point, and we take the average Q between two point.

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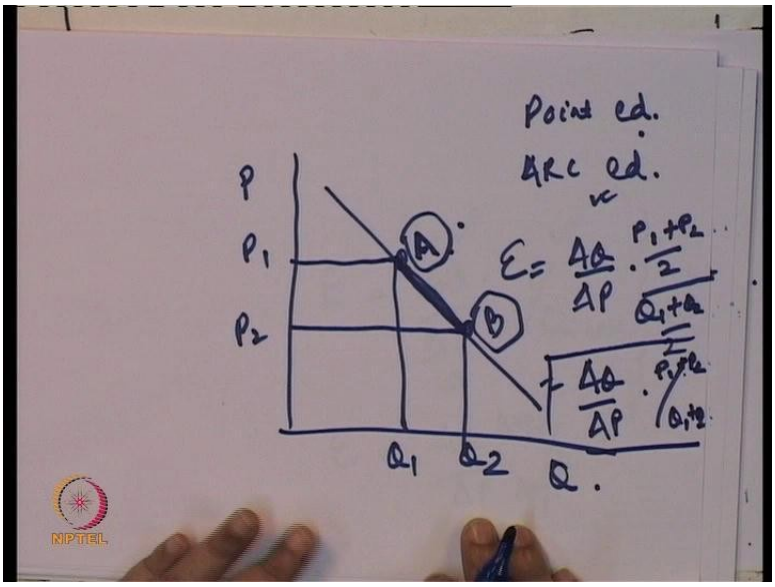

So, this is like, if you look at in the previous graph. So, if you are calculating between A and B In this case, to calculate the elasticity of demand we require, del Q by del P, multiplied by P 1 plus P 2 by 2 and Q 1 plus Q 2 by 2 . Because since we are calculating in a segment, we need to take, we need to take the average price between both the points, when we are considering what is the original P and original Q before the change in the price. So, again if you simplify this, then you get del Q by del P multiplied by P 1 plus P 2 and Q 1 plus Q 2. So, this is the case when you calculate the arc elasticity of demand that is elasticity between two points.

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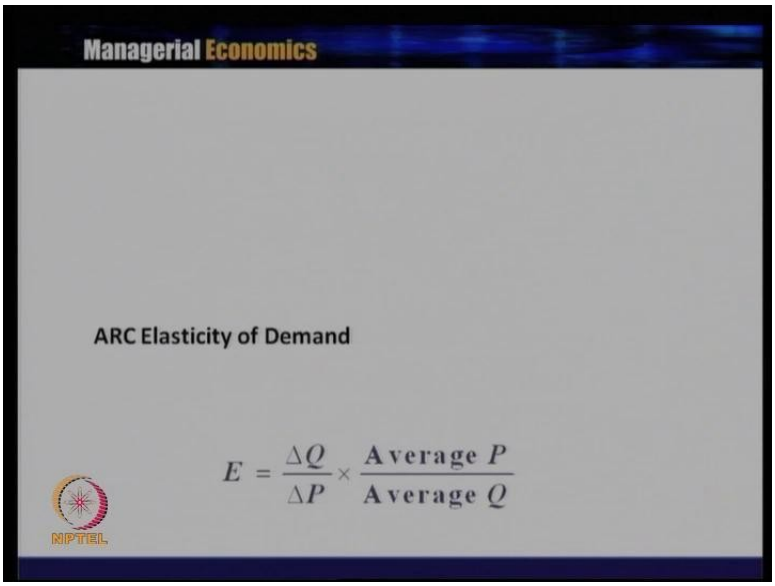

So, as you see in this slide also, this is arc elasticity of demand del Q by del P. And that leads, that is multiplied by average of P and Q. So, average P, Q is like, average price between two points and average Q between two points in which segment, generally you are measuring the arc elasticity of demand.

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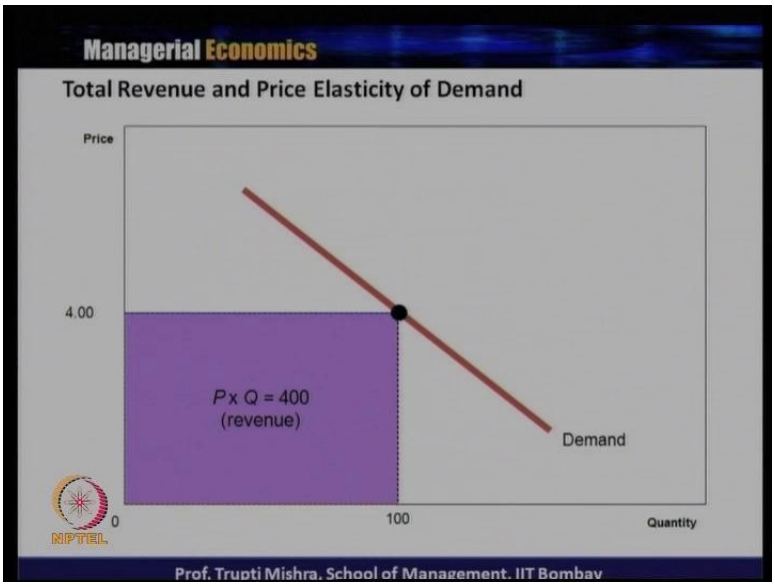

Now, we will see, how the total revenue changes in case of elastic demand and inelastic demand. Here we have taken a case of demand curve, linear demand curve, and how we

generally find out the revenue. Revenue is the area under the curve that is price and quantity. So, if you are taking a specific point and you are finding out the revenue, then how do we find out it generally. So, price is 4 rupees like you draw a, may be line to x axis, draw a line to y axis; y axis will give us the corresponding price, and x axis will give us the corresponding quantity. Multiplying price and quantity gives us the revenue. So, corresponding to the, point as mentioned in the graph, the corresponding quantity is 100 unit, the corresponding price is 4 rupees. So, the revenue is equal to 400.

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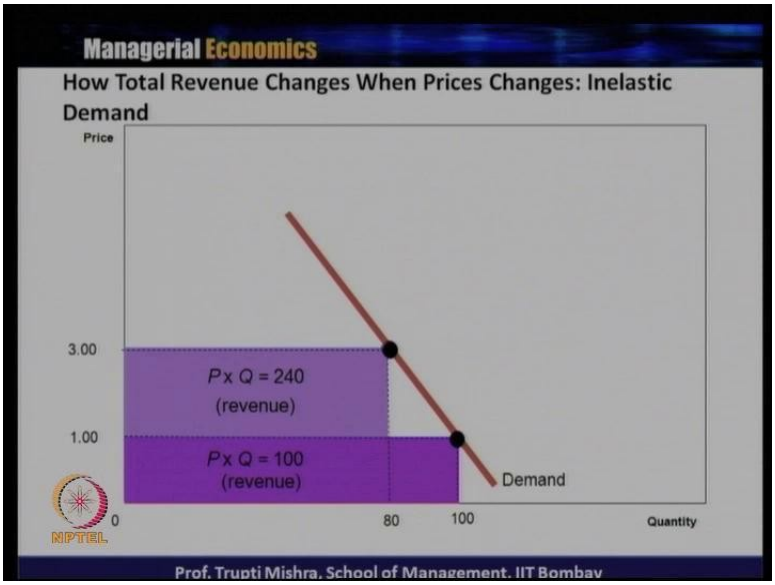

Now, we will see, how the total revenue changes when the price changes, in case of an elastic demand. In case of an elastic demand, the demand curve is more steeper, but in case of elastic demand, the demand curve is more flatter. So, in case of inelastic demand, as you see, in the first point, price is 1 rupees and the revenue is, the quantity demanded is 100 units. That leads to the revenue which is equal to 100 because price is 1 and quantity demanded is 100; P multiplied by Q that gives us the revenue which is equal to may be 100 rupees.

Now, price increases from 1 rupee to 3 rupees. Remember this is the case of inelastic demand where the responsiveness of buyer is little less as compared to the elastic demand. So, even if there is a change in the price from 1 rupee to 3 rupees, if you look at, the change in the price is almost more than double, still the quantity demanded is just changing by 20 percent, that is 80 units, because this is the case of in elastic demand. So, if you look at, that leads to the revenue which is equal to 240 rupees, because price is 3 rupees and quantity demanded is 80

units. So, if it is the case of inelastic demand, if we look at, revenue is more, because even there is a increase in the price still there is no decrease in the quantity demanded.

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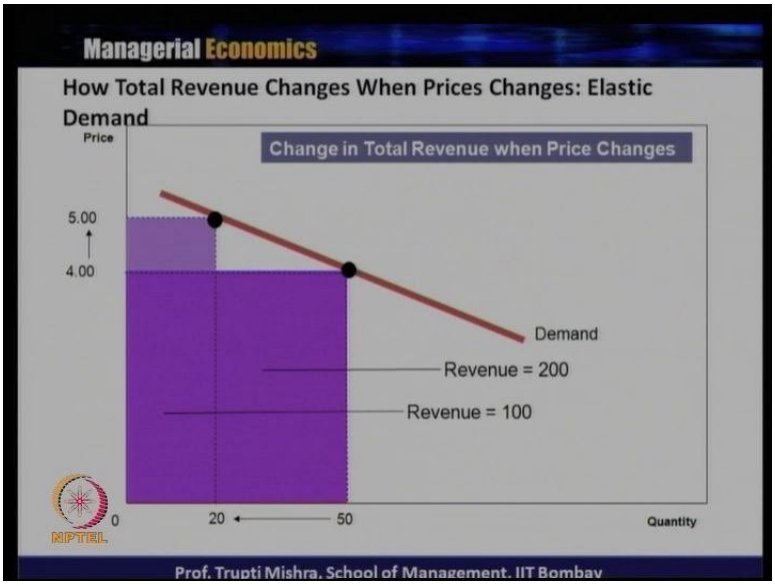

Next we will check, how it happens in case of the elastic demand. How the total revenue changes, when there is a change in the price. So, if you look at here, look at the graph, the demand curve is flatter because this is the case of your elastic demand. Initially the price is, may be 4 rupees and the quantity demanded is 50 units. So, this is, revenue is 200 units. Price, may be increases from 4 rupees to 5 rupees, the quantity demanded, look at the change in the quantity demanded. Again remember, this is the case of elastic demand; small change in the price will lead to greater change in the quantity demanded. So, the change in the price is 25 percent.

But if you look at the change in the quantity demanded, look at it from the 50 unit to 20 units. So, the change in the quantity demand is more than 50 percent. So, in this case, what happens to the revenue? The revenue becomes exactly half, if you look at, because there is a small change in the price but there is a greater change in the quantity demanded. So, there is a decrease in the total revenue, when there is a increase in the price in case of the elastic demand.

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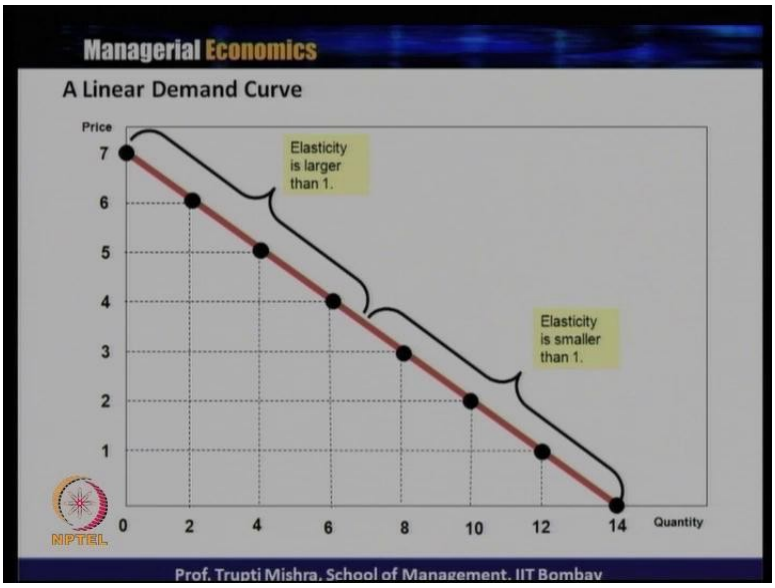

So, this is the case of a linear demand curve, at the different point of the linear demand curve, the elasticity of the demand takes a different value.

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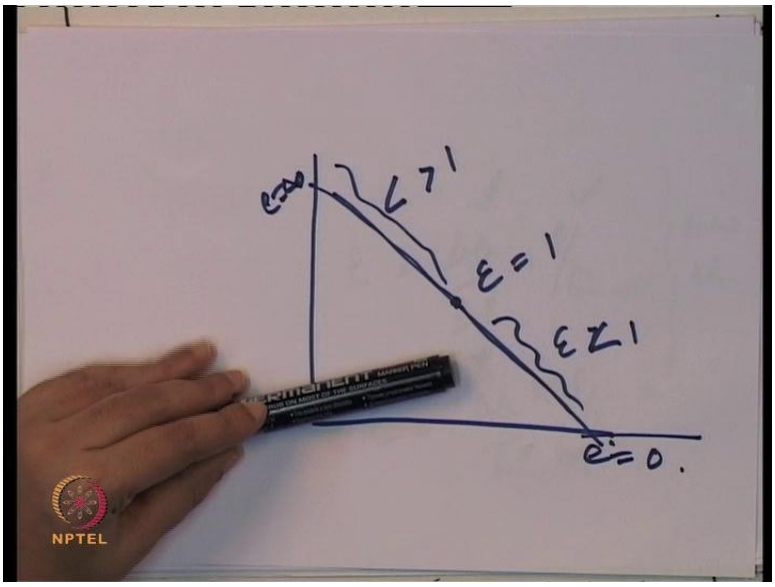

So, if look at in the linear demand curve, at this segment elasticity is less than 1; at this segment elasticity is greater than 1; and at the mid point the elasticity is equal to 1 . So, this is the elastic segment of the demand curve, and this is the inelastic segment of the demand curve. In this case, if you look at, the elasticity is equal to 0 and in this case the elasticity is equal to infinite.

So, if in a typical linear demand curve, at different points the elasticity of demand takes different values. In case of mid point E is equal to 1; in the upper segment, it is a elastic segment is greater than 1; at the extreme point we get the value E which is equal to infinite; at the lower segment it is an inelastic segment, elasticity is less than 1 and at the x axis, corresponding to the x axis, E is equal to 0.

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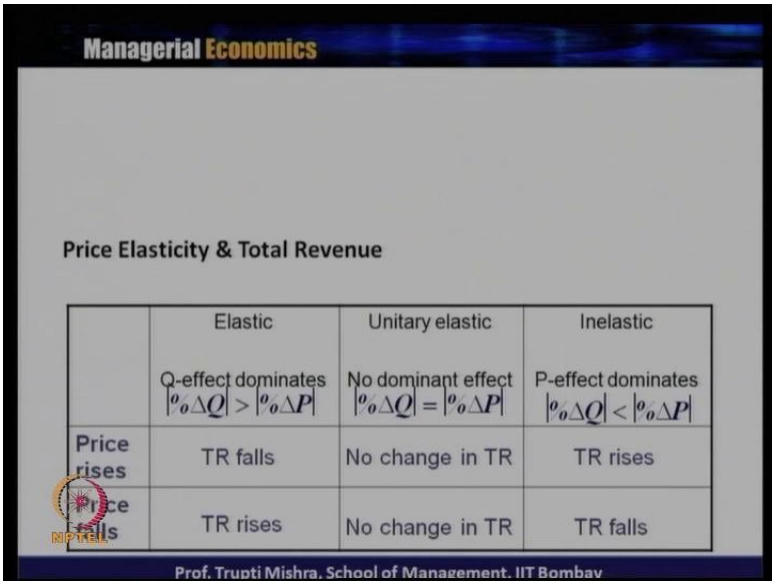

Now, if you summarize, the relationship between the price elasticity and total revenue, what happens? There is a increase in the price, there is a decrease in the price. If you look at the table then, elastic, the first column talks about elastic, elastic demand. The second column is unitary elastic demand, and the third column is inelastic demand. In case of elastic demand, there is dominance of Q effect, because quantity demanded changes more than price; and in case of unitary elastic no dominant effect because the percentage change in the price is just equal to percentage change in the quantity demanded. And in case in elastic demand there is a dominance of P effect, because the change in the quantity demanded is less than change in P.

Now there is a increase in price, if it is the case of elastic demand, total revenue decreases because small change in the price, the consumer they become responsive to the change in the price. They are sensitive to the change in the price. In case unitary elastic, there is no change in there may be insignificant change in the total revenue; and in case of inelastic demand total revenue increases because when there is a increase in the price still there is no significant decrease or not more decrease in the quantity demanded.

Similarly, in case of decrease in the price, total revenue increases because decrease in the price, small decrease in the price will lead to greater increase in the quantity demanded, and that is the reason the total revenue increases. There is no change in the total revenue or very insignificant change in the total revenue, in case of unitary elastic; and in case of inelastic generally the total revenue decreases.

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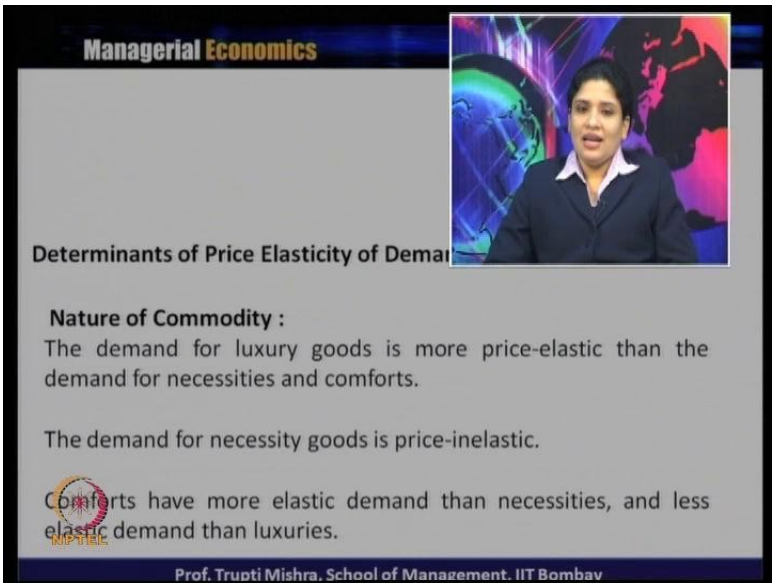

Now we will see what are the determinants of the price elasticity of demand? Because till now, we know that, price elasticity of demand, the value is dependent on the, by what percentage the quantity demanded changing, due to change in the price, or how much the consumer responsive to the change in the price. Then we will see that, why the buyers, why the consumers they are responsiveness to the change in the price in a different pattern in a different time period. We then, we will see what are the underline factors that buyers behave or buyers sense sensitive to the change in the price.

The first determinant or the first factor which decides, or which determines the price factor of demand is the nature of the commodity. So, let me introduce the concept of different kind of goods, at the different kind of commodity. They are basically three types of commodity or the goods: one is luxury goods, second is the comfort good, and the third one is the necessity good. Necessity good is one which is necessity for the life and necessity for the survival; comfort goods are one where at least we get some level of comfort, just not the necessity.

And luxury good is as the name suggests what we require for the luxury. But do remember here that, across all the income segment, the definition of luxury, comfort , and necessity goods are not same. Like if you take the example, for someone if the mobile is necessity, someone it is comfort, someone it is for the luxury. Take the case of laptop, may be for someone it is necessity, for someone it is just comfort and someone it is luxury. Or you take a case of your television, or take a case of your branded clothes, for someone again it is necessity, for someone it is comfort, for someone it is luxury goods.

Now, who are the someone here? They are different income group. And the income group is again categorized into three types of income group: one is low income group, second one is the middle income group, and the third one is the high income group. So, if you look at for something, for a, for a typical good, if it is necessity for the high income group, may be a comfort for the middle income group and for a, luxury for a low income group. Like owning a house in a metro. May be it is a necessity for a high income group, may be a comfort for a middle income group and may be a luxury for a low income group.

So, after this definition of these different types of groups, now, let us see how this nature of the commodity generally influence the price elasticity of demand. The demand for luxury good is more price elastic, than the demand for the necessity and comfort. Why the demand for a luxury good is more price elastic? Because this is not necessity, this is not comfort, you can postpone the purchases like if it is, there is a decrease, increase in the price you are not going to buy the good immediately, you can postpone it, because this is not required for your, may be survival.

So, in this case, what will, what generally the consumer do? The consumer wait for a time when the price comes to a, again to a moderate level, but there is a decrease in the price and they postpone the consumption of the luxury good. That is the reason the demand for luxury good is more price elastic because the buyers are more sensitive to change in price, simply because they can postpone the consumption at a later period of time when price comes down or price comes to a moderate level.

On that basis, it can be said that the demand for luxury good is more price elastic than the demand for the necessity and the comfort. The demand for necessity good is, price inelastic because it is necessity for life, you cannot postpone the purchases or you cannot reduce the purchases, whatever may be the price, still you have to do the purchases, still you have to

consume the product and that is the reason the demand for necessity good is price inelastic. When it comes to the comfort goods, it has to be more elastic demand than the necessity, and less elastic demand than the luxury.

Even if it is a comfortable good, you cannot postpone the entire, all the comfort goods required, and that is the reason it is partly elastic, partly inelastic, but it is more elastic than the necessity because this is not required for survival; and less elastic demand for a luxury, like if you are taking a case of buying a two wheeler. You know, when there is a price, when there is a increase in the price, may be you can postpone it for few months buying this two wheeler you can still you use a public transport.

But it is less elastic demand than the luxury, you cannot postpone it, may be for two years may be for three years, still longer time because it gives you a comfort, when you cannot travel may be, when you have a capacity to own a two wheeler, may be you will always prefer to go by that because it is a comfort for you. And you can may be just wait for few months, to come the price, price comes to down, but you cannot wait for a longer time period for two years, three years and that is the reason this less elastic demand, than the luxury. But when it leads to look for a asset like may be it is a jewelry, it is may be a house, or it may be something in that category, you can again postpone the purchase for two years, three years, may be one year down the line, till the time price comes to the moderate level. So, the comfort product is one, which are more elastic demand than the necessity, but the less elastic demand than the luxury.

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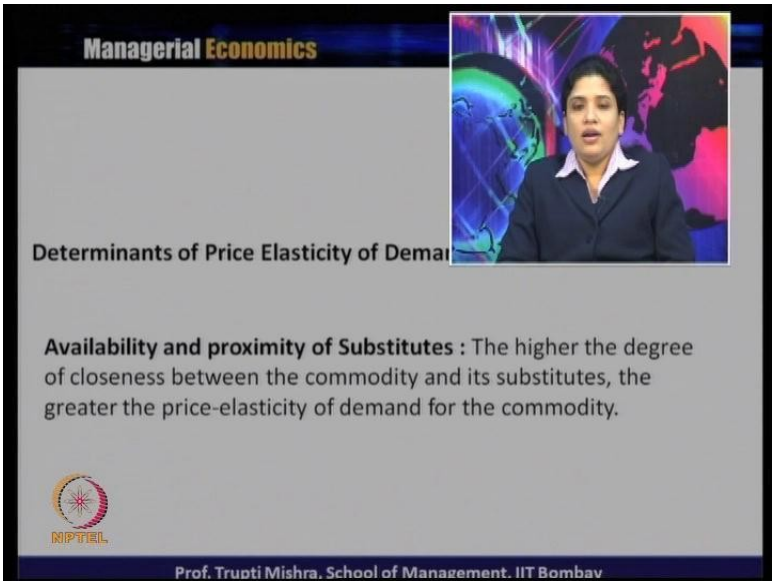

The second determinants of price elasticity of demand is availability and proximity of the substitute. I think we have already introduced the concept of substitute goods, like tea, coffee, or may be petrol, diesel; these are the substitute goods because you can consume one, it gives the same level of utility, both the good they give the same level of usefulness and same level of utility. The higher the degree of closeness between the commodity and its substitute, the greater the price elasticity demand for the commodity.

So, higher the degree of closeness between the commodity and the substitute, the greater the price elasticity of demand for the commodity. Like if it is tea or coffee, if you are considering this two, they are closely substitute. If the price of tea increases, the consumer will be more sensitive and move to the coffee because it almost give the same usefulness to the consumer. So, in this case more is the availability of the substitute and the proximity of the substitute, higher the degree of closeness between the commodity and its substitute.

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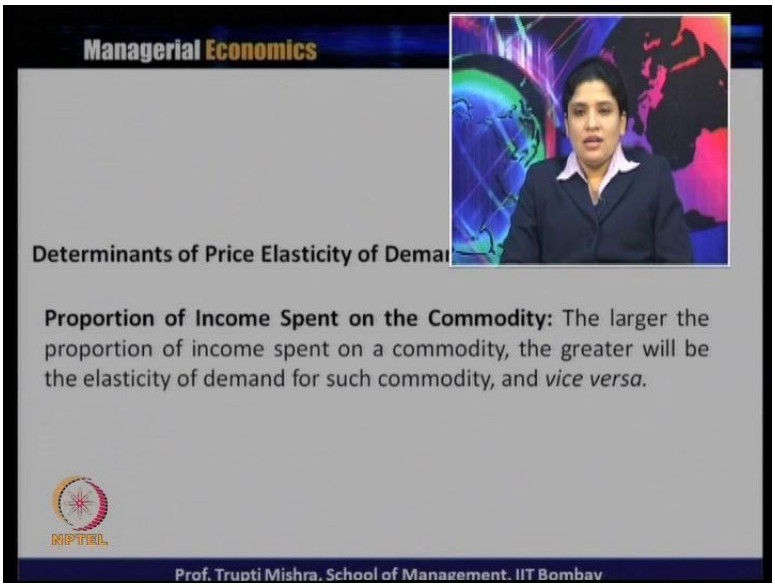

Then the third determinant of price elasticity of demand is the, what is the proportion of income spent on the commodity or goods by the, the consumer. The larger the proportion of income spent on the commodity, the greater will be the elasticity of demand for such commodity and vice versa. So, if you look at, suppose if you are spending from your monthly budget, you are spending 20 percent on transport, if the price of transport increases it will be more elastic.

Because you will prefer to move to a different mode of transport, because you are spending 20 percent of your monthly budget on that. So, in this case, the demand is more elastic. But suppose if you are just taking one cup of coffee in a day which is cost you just 6 rupees, 7 rupees, if the price of coffee increases to a 8 rupees may be you will not prefer to change or you will not prefer to look for the other alternatives to the substitute available in the market. Because the proportion of money what you are spending on this good, is insignificant less as, as compared to the other goods in the, in your monthly budget.

So, if you are spending less proportion of your income on this product, then your demand is inelastic, the buyer is less responsive. But if you are spending more on it, more proportion of your income on a typical goods and if the price of goods increases, you always look for the alternate, immediately the consumer is more responsive, and the nature of elasticity of demand is elastic.

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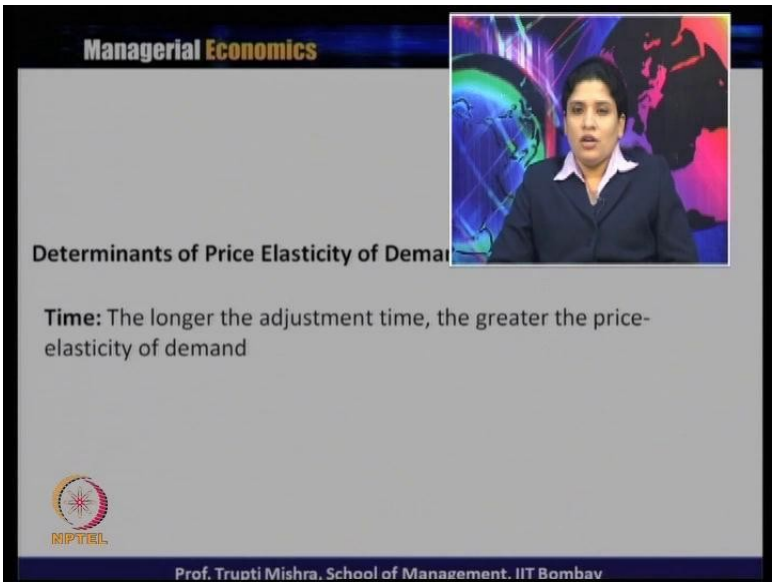

Similarly time, it plays a greater role when it comes to determinants of price elasticity of demand. The longer the adjustment time, the greater is the price elasticity of demand. If you see that yoka, the time is there, immediately there is no, you do not have to make the changes in the quantity demanded, you always look for alternates .

You know that the price level, you take the example of LPG , the price of LPG is going to increase. Now there is a time available for the consumer to do their adjustment, whether they

are going to a different mode of cooking, different mode of water heating. So, there is a longer adjustment time, in this case, people they will be more sensitive to the change in the price. But when something happens immediately like, you come to know that, the petrol price is going to increase from tonight, in that case you cannot restrict your travel for the next few weeks. Because you are not going to do the immediate arrangement, with respect to change in the price. So, the longer is the adjustment time, the elasticity of demand is elastic; the less is the adjustment time, the elasticity of demand is, may be inelastic or less elastic.

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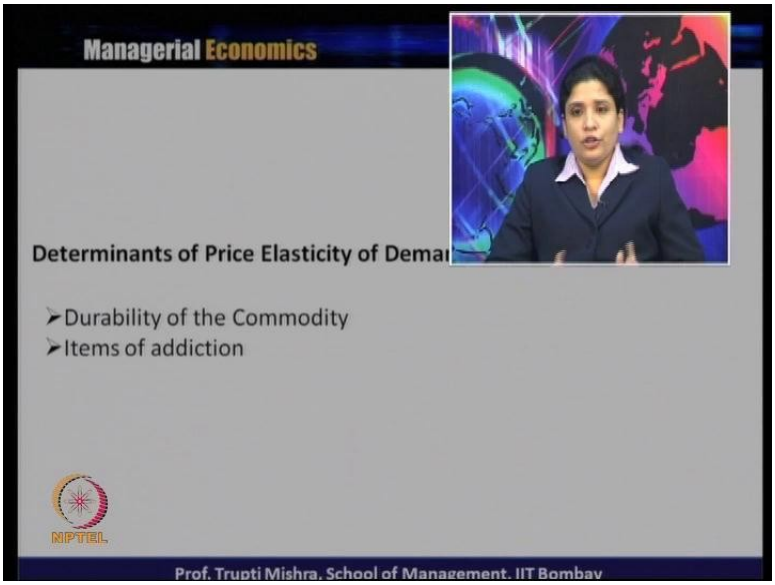

Then there two more determinants of price elasticity of demand, that is durability of the commodity and item of addiction. If it is a item of addiction, whatever the change in the price, the consumer is not going to change the quantity demanded, because someone is addicted to that. And in this case that demand is inelastic, but if you look at, if it, in this case we can consider the goods in question cannot be a normal goods. So, that is the reason, the demand has to be inelastic.

And when it comes to durability of the commodity like, if when you are buying a durable good or when you are buying a non durable good, it will be more sensitive to the price change for the durable goods because you know that you are going to use it for the longer time period. But it will be less sensitive to the change in the price of the non durable good, because you know, if you are buying something in 5 rupees today, tomorrow also if you are

going to, you are just using it, and tomorrow again you are going to do a phrase consumption or phase buying.

So, that is the reason you are not changing, not reacting much to the non durable good, but you are reacting most to the durable goods. Because you are doing it in a one time investment and there is a life time you are not changing very frequently. So, it is the proportion of income spent on the commodity, what is the nature of the goods, what is the substitute available in the market, whatever the time period for a adjustment, durability of the commodity, item of addiction, these are the, some of the factors which generally influence the value of the price elasticity of demand.

Apart from this also there is one more, factor is there, like what is usability of the goods? Like if you took the case of your analogy, right, electricity. Electricity you use for cooking, you use for lighting, you use for your comfort goods, you use for your laptops, you use for various reasons. So, when there is a change in the price of electricity, people, they will be more sensitive because the consumption is more because it is for the multi usage. So, in this case the, what is the usage of the commodity? That also plays a greater role in identifying the value of price elasticity of demand, because greater is the value of or greater is the usage, greater is the value of price elasticity of demand; and greater is the large, the demand is more elastic as compared to the other goods.

So, today's session we decided, we started our price elasticity of demand, like what is elasticity of demand? What is price elasticity of demand? Specifically on the, what happens to quantity demanded when there is a change in the price. Then we talked about the measurement of price elasticity of demand like point elasticity of demand, arc elasticity of demand, how to measure. In next class we are going to do some exercises like, how to find out the value of price elasticity of demand, using the point elasticity method and the arc elasticity method. And we will discuss few other type elasticity of demand like income elasticity of demand and cross price elasticity of demand.

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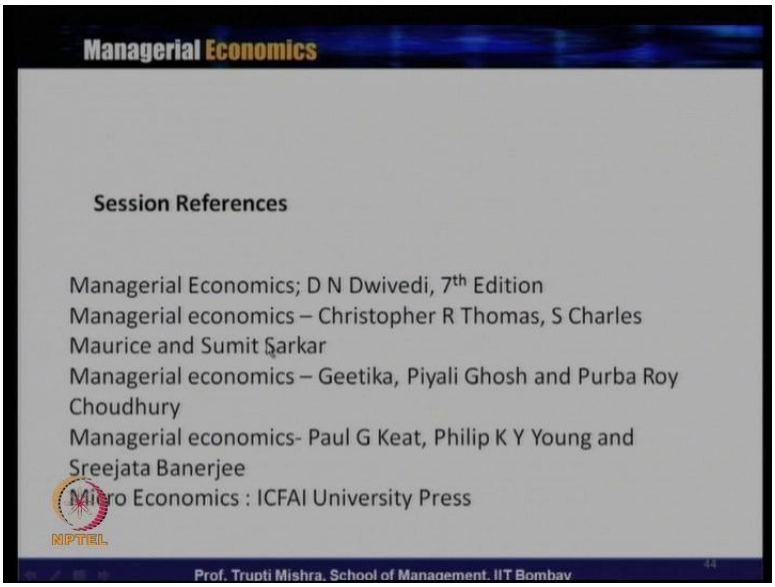

So, these are the session references for this typical chapter. And we will continue our discussion in the elasticity of demand again on the next session.