Managerial Economics
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Lecture - 10
Theory of Demand (Contd…)

In continuation to our last session on theory of demand where we discussed about demand and supply and market equilibrium, today we will start our session on, this again demand supply market equilibrium, particularly how the equilibrium changes, when there is a change in the demand and supply, or when there is a simultaneous change in the demand and supply. And then later part of the session we will introduce the concept of elasticity of demand which is in the second part of this module theory of demand. And we will cover different type of price, different type of elasticity of demand, like price elasticity of demand, income elasticity of demand and cross price elasticity of demand.

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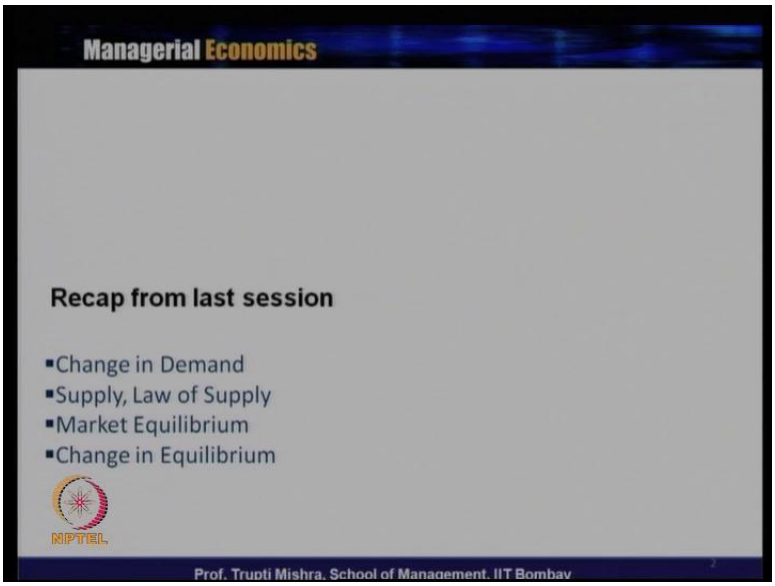

So, to start with, let us have a quick recap, what we did in the last session, or what we covered in the last session. We discussed about the change in the demands. So, change in demand either due to change in the price, or due to change in the non-price determinants. Then we introduced the second market forces that is supply. Then we covered the law of supply. And taking the demand forces and market forces, we analyzed the condition of market equilibrium; and how the market equilibrium changes when there is a change in the demand or change in the supply.

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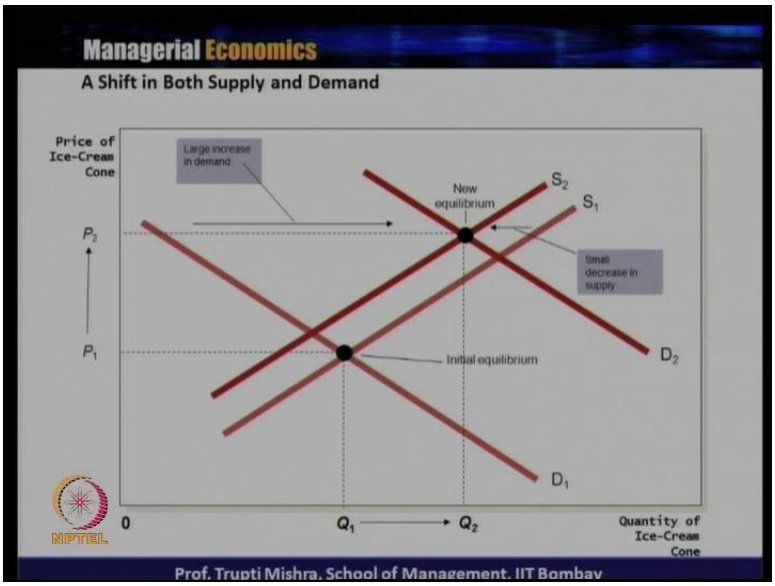

So, today we are going to look at, what happens when there is a simultaneous shift in the both the demand, both the market forces that is demand and supply forces. So, the previous class, if you remember, we discussed about change in the demand or change in the supply. So, we will say the, we will check in this case, when there is a shift in both supply and demand, what happens to the equilibrium price? And, what happens to the equilibrium quantity? So, if you look at, initially the demand curve is D 1, supply curve is S 1; the equilibrium quantity is Q 1 and equilibrium price is P 1.

In the y axis, we are considering the price of ice cream cone, ice cream cone is the goods over here; and in the x axis, we are considering the quantity of ice cream cone. So, if you look at, when there is a change in the demand, the demand curve moves from D 1 to D 2; and when there is a change in the supply, there is a, its movement from S 1 to S 2. So, in this case, there is a increase in the demand, that leads the demand curve from D 1 to D 2; and there is a decrease in the supply that leads the demand curve from S 1 to S 2. Corresponding to the new level of demand and new level of supply, that is D 2 and S 2 ,we get the new equilibrium price as P 2, the point corresponding to y axis; and we get the new quantity as Q 2, the point corresponding to x axis.

Now, if you look at here, the increase in the demand is greater than the decrease in the supply. So, demand and supply both are changing, both are changing in the opposite direction; demand is increasing, supply is decreasing, and that leads to a scenario where

at the new equilibrium, there is both increase in the price and increase in the quantity. So, we can say that, when there is a increase in the demand and decrease in the supply, the equilibrium price and quantity, both increases. But point to remember here is that, increase in the demand is more than decrease in the supply.

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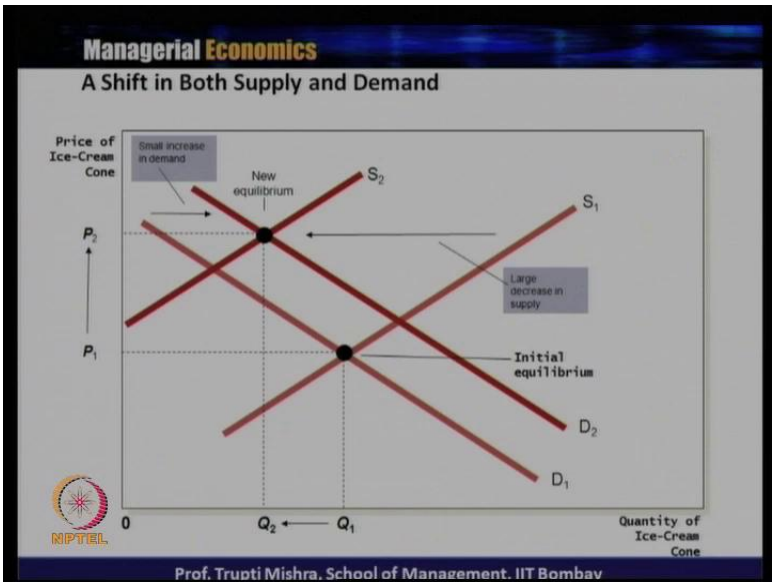

Similarly, if you take a case where, there is a change in the supply, and also there is a change in the demand. So, if you look at here, there is a increase in the demand from D 1 to D 2, and decrease in the supply is from S 1 to S 2. Initially equilibrium is, initial equilibrium price is P 1, initial equilibrium quantity is Q 1 . Increases, in the demand, the leads the demand curve from D 1 to D 2; decrease in the supply leads the, decrease in the supply from S 1 to S 2; that leads to increase in the price, equilibrium price from P 1 to P 2, P 2 corresponding to the new equilibrium between S 2 at the supply curve, and D 2 is the demand curve.

However, in this case if you look at, there is a decrease in the quantity demanded, even if there is a increase in the demand. The reason what we can site over here is that the decrease in the supply is greater than, increase in the demand, and that leads to the fact that with a new equilibrium, new equilibrium point, the equilibrium quantity is decreasing from Q 1 to Q 2. So, when supply is decreasing, demand is increasing; and the decrease in the supply is greater than increase in the demand. In this case, at the point

of new equilibrium, equilibrium price increases; however, there is a decrease in the quantity demanded.

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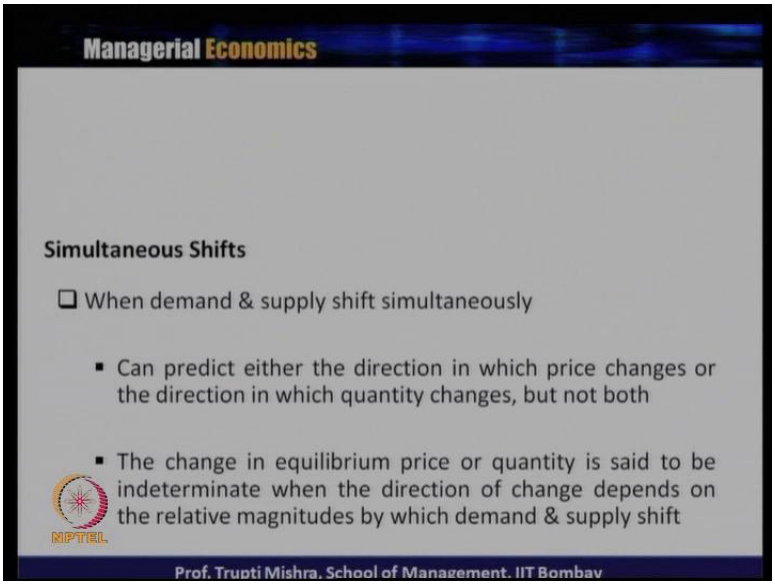

So, this is two cases, these are the two cases, what we discussed in the, when there is a simultaneous shift in the, both the demand and supply. So, how we are going to summarize this? Either in what direction the price changes, or in what direction, the quantity changes. But we cannot predict the direction for both the price and quantity, when there is a simultaneous shift in the demand and supply. So, to simplify this, how we can put it? We can say that, when there is a both decrease or increase in demand and supply, in that case, we can only predict, what will be the change in the quantity, when the demand and supply moves in this direction; or what will be the change in the price, when the demand and supply, moves in a particular direction.

So, the change in the equilibrium price or quantity said to be in determinant, when the direction of change depends on the relative magnitude by which demand and supply shift. So, we cannot say, if demand increases supply decreases, price has to be this, or price has to be that; till the time that increase in the demand or increase in supply is not uniform. Since there is a change in relative magnitude by which the demand is decreasing, or the supply is increasing, it happens that the equilibrium price and equilibrium quantity becomes in determinant.

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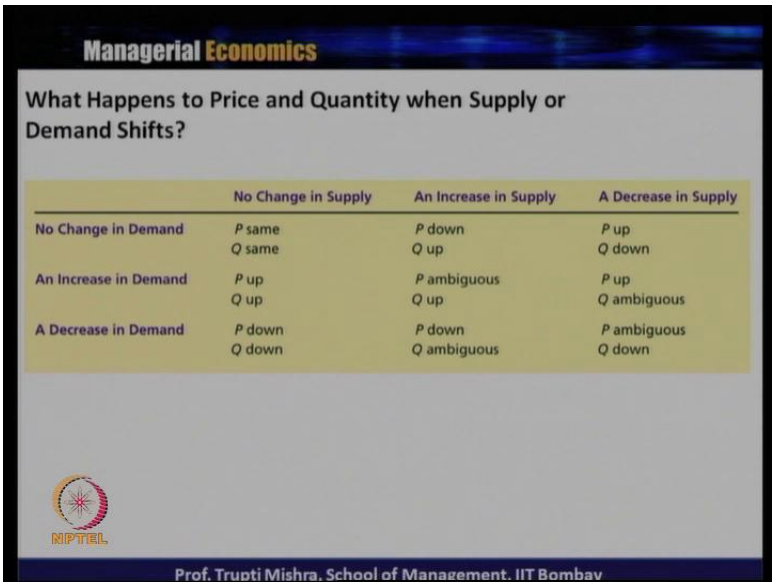

So, quickly if we can summarize that, what happens to price and quantity when supply or demand shift. And with this particular table if you look at, we have summarized all the scenario, where the , when there is a change in the demand, either in the increasing direction or decreasing direction, or when there is a change in the supply, either increasing or decreasing, what happens to price and quantity? So, price is refer here as P and quantity refer here as Q. So, if you look at the first column and first row, there is no change in the demand, the first box, there is no change in the demand, no change in the supply, P remains same, Q remains same.

Then coming to the second row, again the first box has come increase in demand, no change in the supply; price is increases and quantity also increases. If decrease in the demand and no change in the supply, price is decreasing, quantity is also decreasing. There is no change in the demand, but there is a increase in the supply, that leads to increase in, decrease in the P and increase in the Q. But if you look at interestingly the middle box, which, where, where we are going to analyse, what happens when there is a increase in the supply, also increase in the demand. In this case, we can only predict the, equilibrium price and equilibrium quantity, we cannot predict both. And this case, it has happened that P remain ambiguous and Q is increasing. And similarly when there is a increase in the supply and decrease in the demand, P decreases and Q remain ambiguous.

Similarly, if you come to the third row, and here there is no change in the demand, decrease in supply, P is increasing, Q is decreasing. But when there is a simultaneous change in the both, demand and supply, if you look at the last row second box, there is a decrease in the supply and increase in the demand, we can only decide, we can only predict, what will happen to P here, and P is increasing and there is a ambiguity regarding the change in the Q. That happens in the last box, the last row last column when there is a decrease in the supply and increase in demand that leads to ambiguity for the, change of P, but the Q generally decreases.

So, to summarize this, we can say that, when there is a, when there is both demand and supply changing, either we can predict about P that is the price, or we can predict the quantity. And the other variable, that is ambiguity regarding the other variable, we cannot predict both, in which direction they are going to change. But when there is only change in one market forces, either demand or supply, we can predict about both the price and quantity, in which direction they are going to move. So, till now, we discussed about, if you remember this, this, when we started this module theory of demand, we started our discussion on, like, what is the need for the market, typically the market forces, what is the need? And if you look at the requirement or the mechanism, how the market was, that depends up on the demand forces and supply forces. That is the main justification when we introduced the concept for demand forces and the supply forces.

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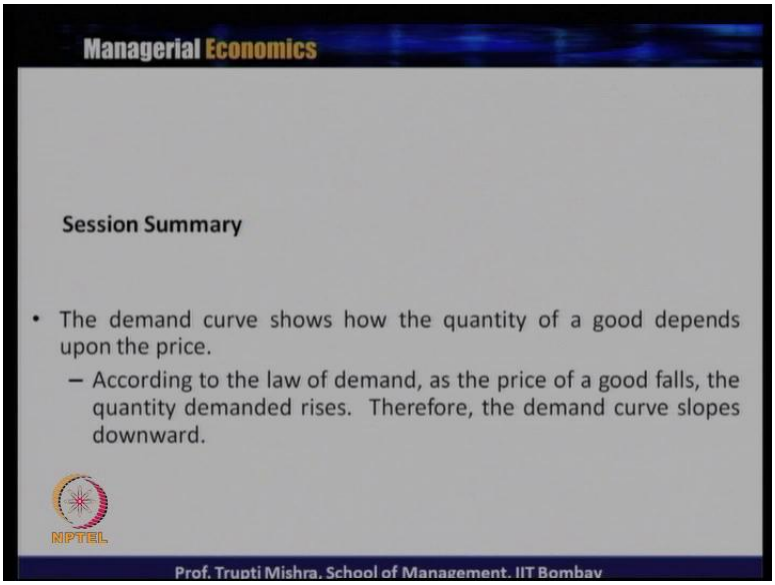

So, if we quickly summarize, what we discussed in the last two sessions, typically on market demand, market supply, and market equilibrium. And the first point is, demand curve shows, how the quantity of good depends upon the price. According to law of demand, the price of good decreases, the quantity demand increases, and that is the reason demand curve slope S downward. Or, in other word we can say, other things remaining constant, there is a inverse relationship between the price and quantity demanded, that is the reason the slope of the demand curve is negative.

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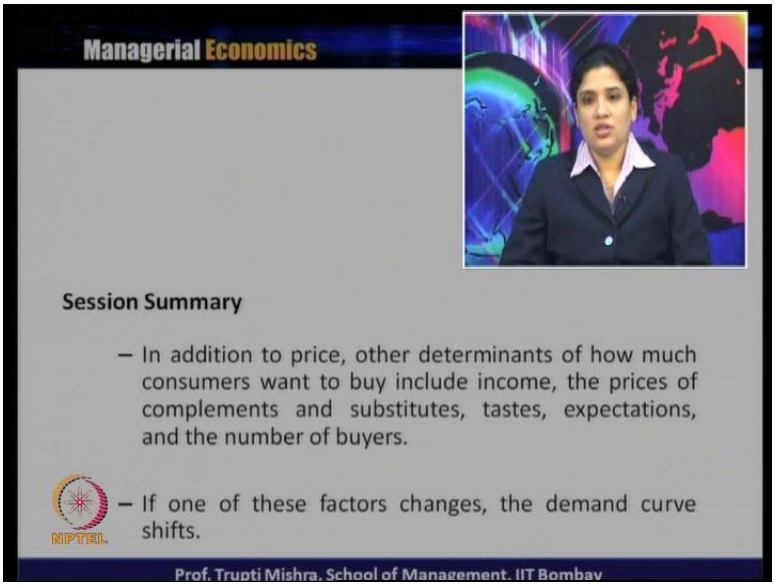

In addition to price, there are other factors also which influence the demand, like income of the consumer, the prices of complements and substitutes, the taste and preference of the consumer, expectations, and the number of buyers in the market. And whenever there is a change in any of these factors, apart from price, the demand curve shift. But whenever there is a change in demand due to change in the price, the change in the demand curve is reflected only from movement from one point to another point in the demand curve.

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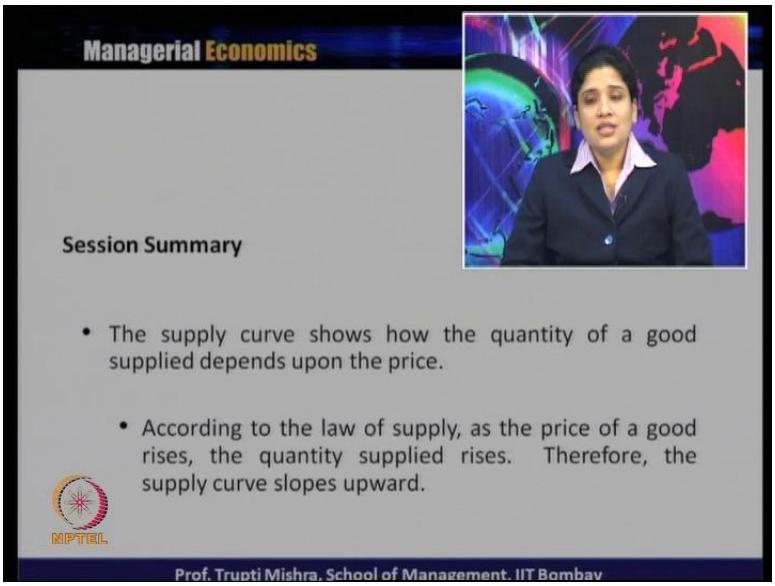

Then we introduced the concept of supply curve, supply. Supply curve shows how the quantity of good supplied depends upon the price. And according to law of supply, the price of the product and quantity supply the product, they are positively related; and that is the reason, the slope is positive and supply curve is one upward sloping.

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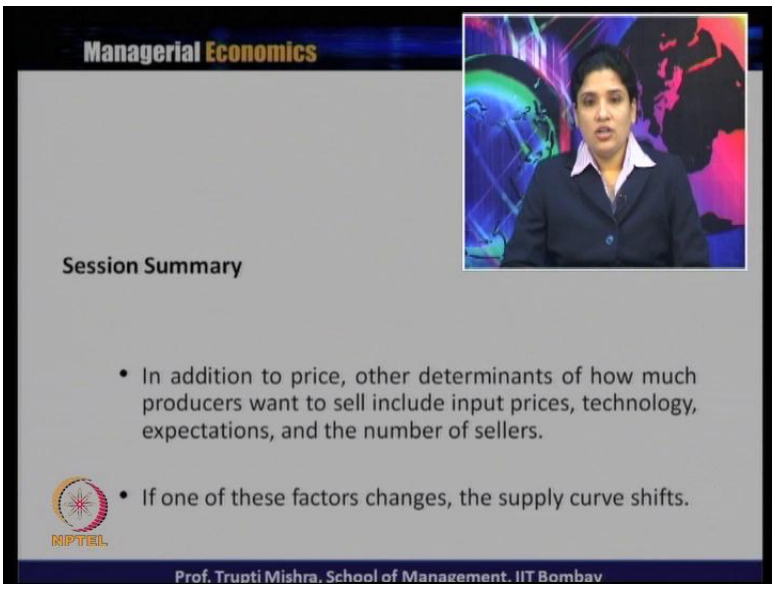

Then, in this case also, apart from price, there is some other determinants which influence, which influence the supply, like the input price, the technology, or the technological advances, the expectation of future price of the product, and the number of

sellers those are operating in the market, these are other factor that influence, influence the supply. And whenever there is a change in the price, again it gets reflected in the supply curve through the movement from one point to another point in the supply curve. However, if there is a change in the other factor and that leads to change in the supply, generally the supply curve shift to the right, if it is a case of increase; or shift to the left, if it is a case of decrease.

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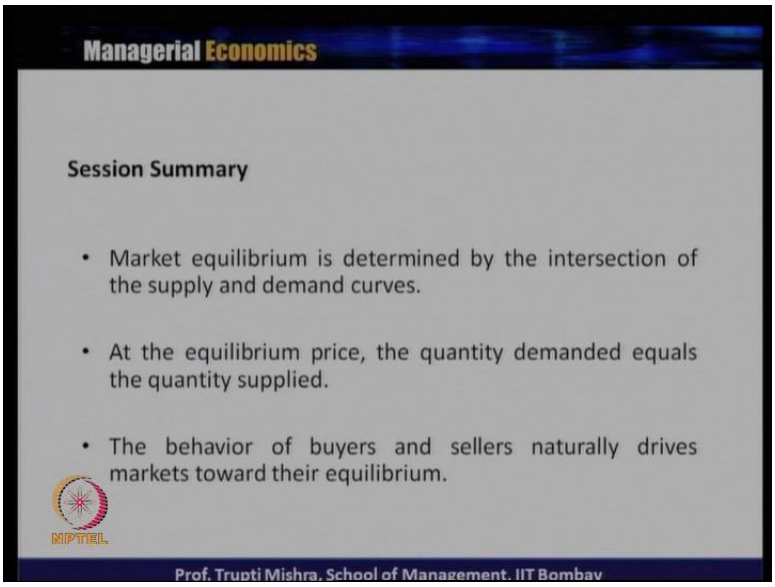

Then we identified the condition for market equilibrium. And if you remember, the market equilibrium is determined by the intersection of the demand curve and the supply curve. At the equilibrium price, or the so called market clearing price, the quantity demanded of the market is exactly equal to the quantity supplied. And, even if there is a mismatch, at any point of time if the demand is more than supply that leads to shortage; and if the supply is more than demand that leads to surplus, and even if in such scenario, the behavior of the buyers and sellers, it naturally drives the market towards their equilibrium, in term of price and change in the quantity demanded.

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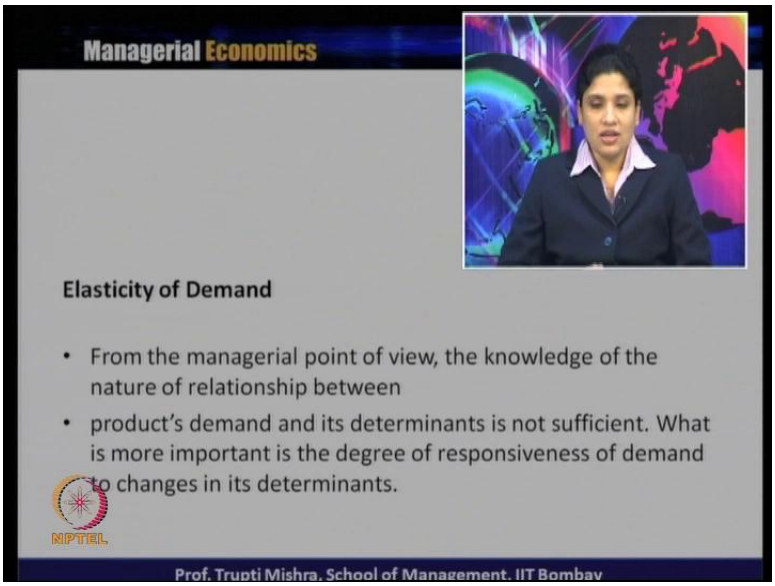

Then we will come to the second part of this module that is theory of demand. The second part of this module is, elasticity of demand. If you look at, till now what we have explained? We have explained that, there is a negative relationship between the price and quantity demanded. So, when price increases, quantity demanded decreases; when price decreases quantity demanded increases. But elasticity of demand is, bring something, bring something more in depth the relationship between the price and quantity demanded. It measures, by what quantity or by which, by which magnitude, the demand changes when there is a change in the price.

So, if you look at from the managerial point of view so, the knowledge of, nature of relationship between the products demand and determinant is not sufficient. It is not about only the demand and its determinant, what is more important is the degree of responsiveness of demand or the change in the determinant.

If I take an example that, if 2 percent change in the price, leads to 6 percent change in the quantity demanded, this is through the elasticity of demand. But in general, what is the relationship between demand and price; when the price increases, demand decreases. But in case of elasticity of demand, we also check, what is the responsiveness of the consumer due to, for the change in the price. If it is increases by 2 percent, suppose the price increases by 2 percent, what should be the, or what is the exact change in the quantity demanded, whether 2 percent, whether it is less than 2 percent, whether it is

more than 2 percent that generally we check in the, that generally we get to know through the elasticity of demand.

So, as we mentioned may be, before a couple of minutes that, what is more important is? What is the degree of responsiveness of demand, due to change in its determinant; whether it is price, whether it is income, whether the price of the other products. When there is a change in all these factor, what is the degree of responsiveness of the quantity demanded. So, that we will check today, in through the price elasticity of demand, income elasticity of demand, and cross price elasticity of demand.

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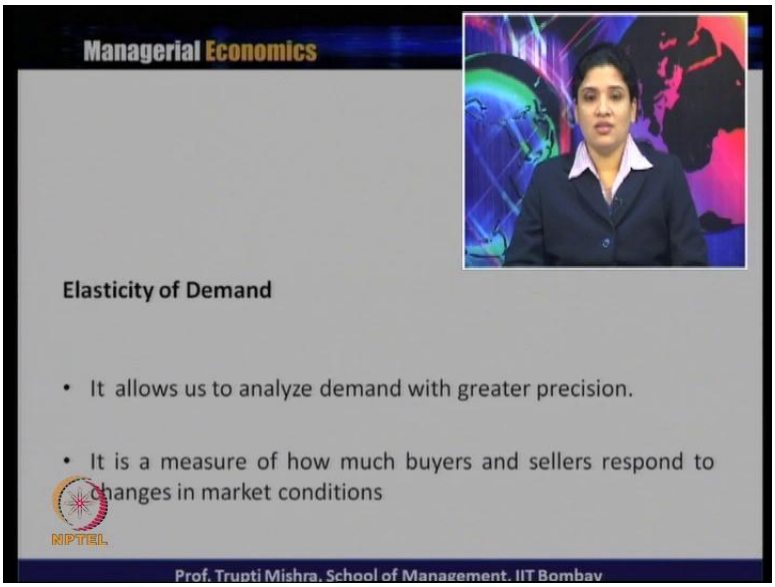

So, as we mentioned, elasticity of demand, generally allows us to analyze the demand in greater precision. And it is a measure of, how much buyers and sellers, respond to change in the market condition. If there is a change in the price, what happens to the buyers behavior? What happens to the sellers behaviors? If there is a change in the income, what happens to the buyers behavior? What happens to the seller behaviors? If there is a change in the, may be the future price of the product, whether it is a substitute goods, whether it is a related goods, or whether it is complementary goods, how they are change in the buying behavior of the buyer and selling behavior of the seller.

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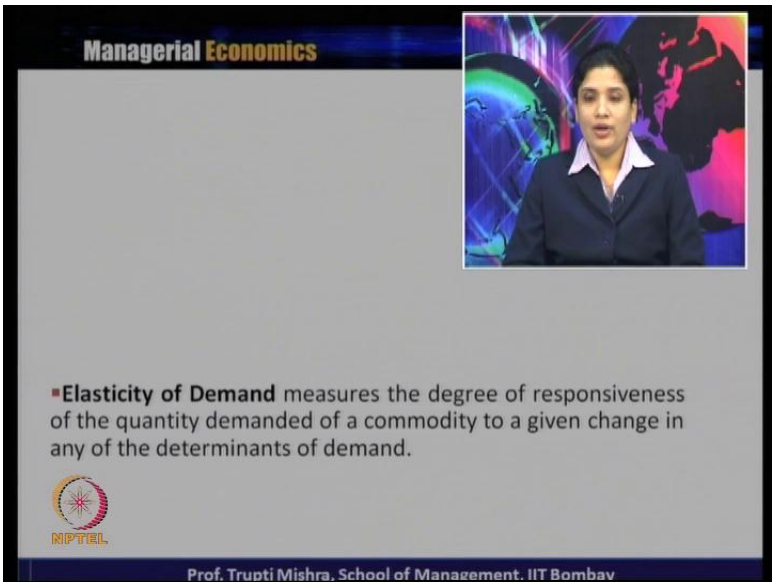

So, elasticity of demand, it measures the degree of responsiveness of the quantity demanded of a commodity, to a given change of any of the determinants of the demand. So, as we mentioned that there are number of determinants of demand; and when there is a change in the any of the determinant, what is the degree of responsiveness of the quantity demanded of a commodity; whether it increases, whether it decreases; if it increases, by which measurement, by which percentage, by which proportion; if it increases again by which proportion. So, elasticity of demand generally measures, the degree of responsiveness of the quantity demanded of a commodity, to a given change in any of the determinants of the demanded.

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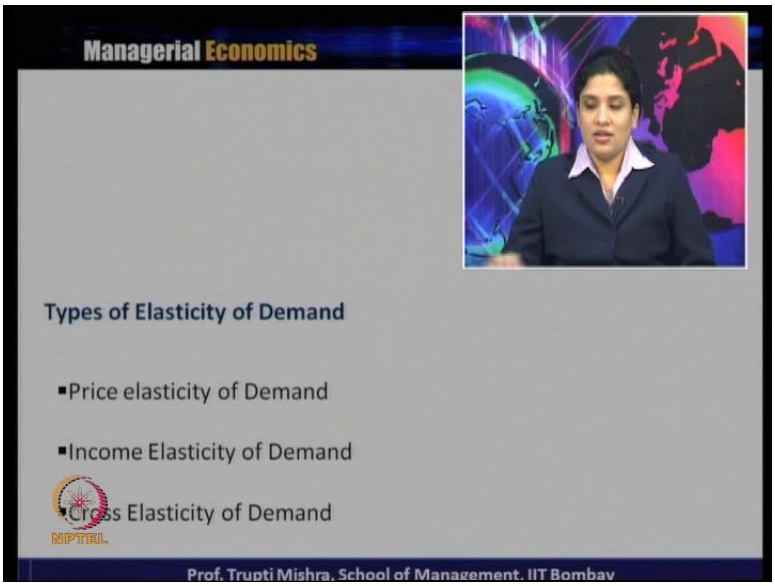

There are three types of elasticity of demand: one is price elasticity of demand, second one is the income elasticity of demand, and third one is cross price elasticity of demand. We will start our discussion with the first kind of price, first kind of elasticity of demand that is price elasticity of demand.

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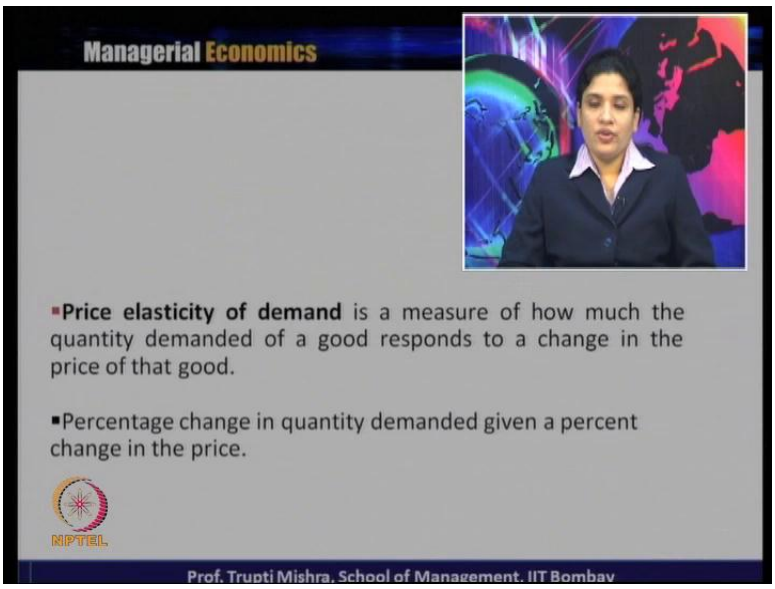

So, price elasticity of demand is a measure of, how much quantity demanded of a good responds to a change in the price of that good. All other things remaining constant; there is Ceteri Paribus; there is no change in any other variable, what is the change in the

quantity demanded, when there is a change in the price. Generally price elasticity of demand measures there. So, this we can say, generally the percentage change in the quantity demanded, given a percentage change in the price.

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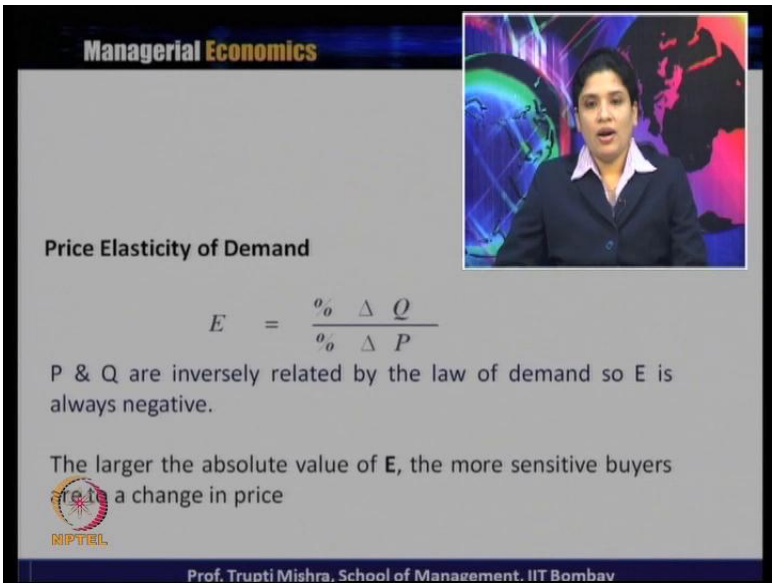

So, as we said this the percentage change in the quantity demanded and percentage change in the price. E we can identify as the elasticity of demand , we can take E as the short form of elasticity of demand. The percentage change in the Q that is del Q, change in Q and percentage change in the P, that, that gives us the price elasticity of demand. Here Q is the quantity demanded, P is the price. So, P is the dependent variable, Q is the independent variable; because the change in the Q is happening, because of change in the P. As we know, price and quantity demanded, they are inversely related, that is through our law of demand. So, if there is, if both the variables they inversely related; obviously, when there is a change in the one variable on a positive direction, the other variable change in the negative direction.

For example if P increases, if 2 percent increase in P, leads to may be 2 percent decrease in the quantity demanded, or may be 1 percent decrease in the quantity demanded, or 6 percent decrease in the quantity demanded. So, that is the reason the value of elasticity is always negative for the price elasticity of demand, if the quantity demanded for the product, in question will become a normal goods . So, the larger the absolute value of E more sensitive buyers are to change in price. So, more is the elasticity, the buyer , it is

known as more is the sensitive buyers because, they are reacting to the change in the price, small change in the price, and accordingly their buying behavior is getting changed. So, larger the absolute value of P, more sensitive buyer, so to change in the price.

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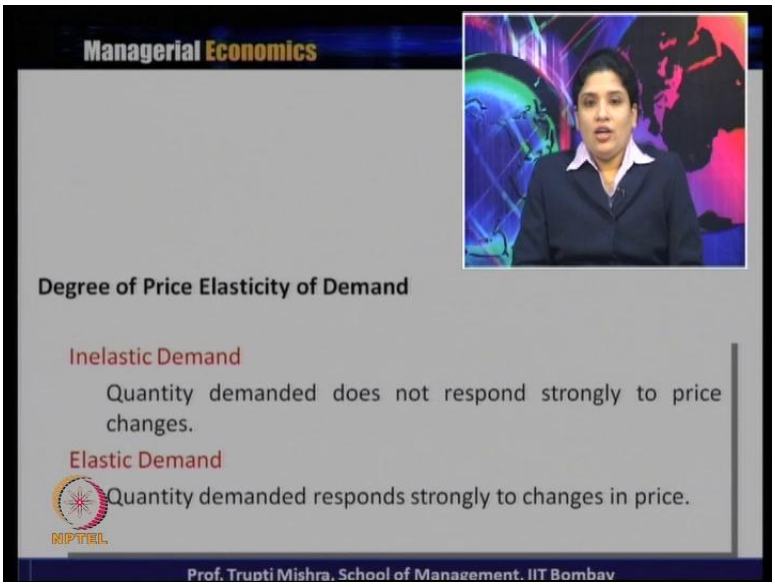

Now we will see, what are the different degree of price elasticity of demand. Two extreme: one is in elastic demand, second one is elastic demand. In elastic demand is one, where quantity demand does not responds strongly to the price changes. So, even if there is change in the price, still quantity demanded is not changing much as compared to change in price. And which situation generally it happens? If whatever the product, if it is necessity product, suppose if you take a case of a medicine, or whatever food you require for your basic survival, in this case, even if the price changes still you are not going to change whatever the quantity demanded you are consuming for the product. You cannot change the doses of medicine, if there is a change in the price. You cannot change whatever your intake, food intake in the day, if there is a increase in the price. So, in this case, the demand is inelastic because, the responsiveness of the buyers to change in the price is generally less, or generally low.

Elastic demand, quantity demanded responds strongly to the change in the price. And in which case it is happened? When you, may be you can postpone the product, or may be there are number of other products available in the market of the similar type, the

substitute goods are more in the market, so, in this case the quantity demanded responds strongly to the change in the price. Like, if you are taking a, taking a example of a cloth, if it is shirt, if it is a, any other accessory, you know the, whatever available in the market is more safer. If you do not have a brand loyalty, if you are not particular of a typical brand, in this case in the typical range you will get, many more choices. So, if you are going to a shop and if there is a increase in the price, you always look for the alternates.

So, even if there is a small change in the price, may be it is 5 percent, may be it is 10 percent, still you look for the alternates available and you move your buying behavior from that product to the other product. That is the reason if you look at, when there are number of substitutes are more, the demand is more elastic in the market.

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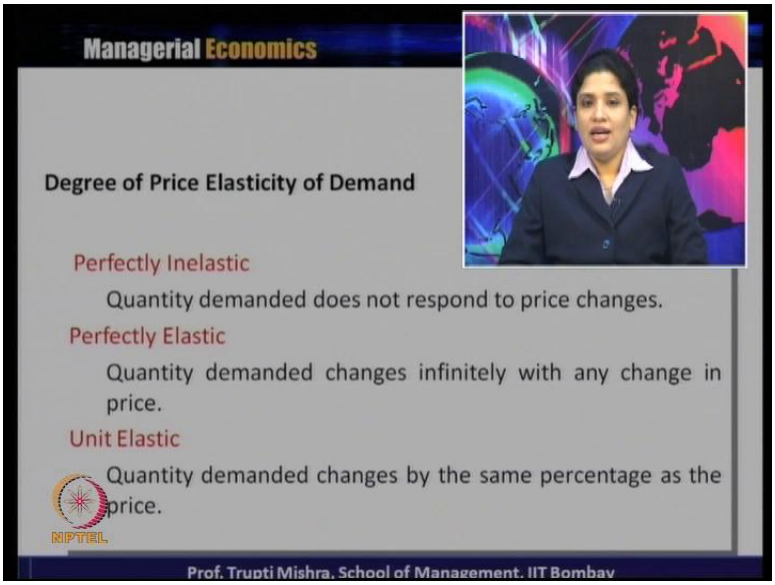

When degree of price elasticity of demand, in this case again we will see, perfectly in elastic and perfectly elastic. So, perfectly inelastic is one, where quantity demanded with respond to price change, and perfectly elastic is quantity demanded change is perfectly with any change in the price. So, in this case if you look at, one is perfectly in elastic, there is not a small change in the quantity demanded, even if there is a change in the price; and if it is a perfectly elastic, any small change in the price, there is a greater change in the quantity demanded. So, previous example, when we are saying that it is a case of a medicine or if it is a case of a food intake for the in elastic, you will always say

what is the less range food available, if price is going on a higher side. But in case of a perfectly in elastic, you are not going to change, even if there is a change in the price.

Similarly, perfectly example is one, any small change in the price, since the options available in the market are more, you always move your, you will always change your buying behavior and that is the reason the responsiveness to the change in price, in case of a perfectly elastic demand is much more, as compared to any other scenario. The fifth one, what is the degree of price elasticity demand is the unit elastic? And what is unit elastic? Quantity demand changes by the same percentage as the price. So, if you look at this kind of elasticity of demand, when in case of unit elasticity, may be it is very difficult to get an example for this in real life.

Because in this case what it happens that, if there is a 2 percent increase in the price that always leads to 2 percent decrease in the quantity demanded. But if you look at, may be it is a bit difficult to find this type of evidence in the real world, because it never changes exactly, two percent increase in price that never leads to two percent decrease in the quantity demanded. So, unit elasticity is one, where there is a percentage change in the quantity demanded is exactly equal to the percentage change in the price.

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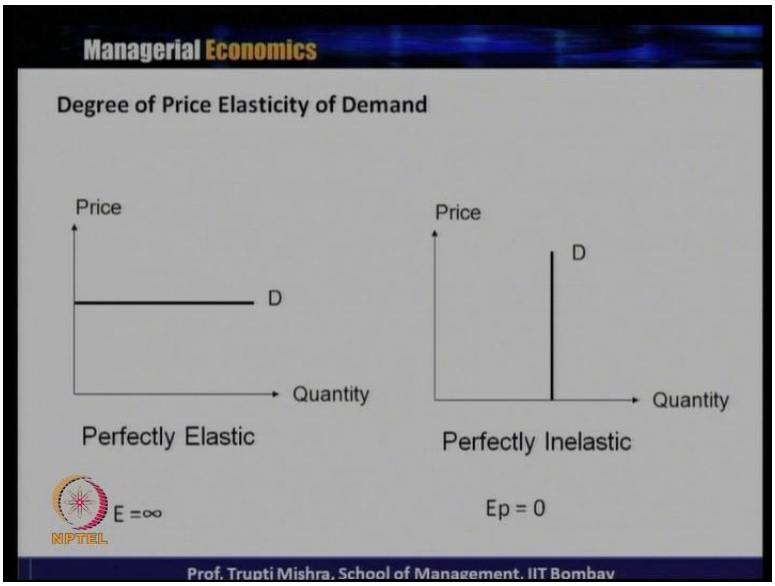

Then we will see graphically, the different type of elasticity of demand, typically the different degree of price elasticity of demand. So, in the first case if you look at, is the case of a perfectly elastic, and in this case the value of elasticity or elasticity of demand

is equal to infinite. Because what, even if there is, may be the, even if there is no change in the price, even if there is small change in the price, it goes on infinitely the change in the quantity demanded. So, price, we are considering here if you look at, the first graph, price we are considering here in the y axis, quantity again on the x axis, and demand curve is horizontal, parallel to x axis, it means quantity changing, even if its price remain fixed or very small change in the price. That leads to a situation of perfectly elastic where elasticity takes the value which is equal to infinite.

Similarly if you look at the second graph, here again price is taken on the y axis and quantity is taken on the x axis. It is a case of your perfectly inelastic, demand curve is vertical to y axis, and here the elasticity if the value takes equal to 0. And why it takes a value of 0? Because, even if there is a change in the price, look at the demand, the demand remains constant. So, it is a kind of like, life survival demand where if you look at, whatever the change in the price are not going to change in the demand.

The buyers are not going to change their buying pattern or the buying behavior. That is the reason their demand curve, quantity demanded curve remain constant whatever the change in the price, and if you look at, they are different level of price, the price is increasing, decreasing, but still there is no change in the quantity demanded.

So, two extreme: one when there is a small change in the price or there is absolutely insignificant change in the price leads to, may be more change in the quantity demanded, the buyer is more responsive to change in price, and this is a case of perfectly elastic. Second case is one, where even if the price is changing the buyers are not at all responsive to change in the quantity demanded, and this is the case of a perfectly inelastic. In the first case the value of elasticity of demand is infinite, in the second case the value of price elasticity of demand is 0.

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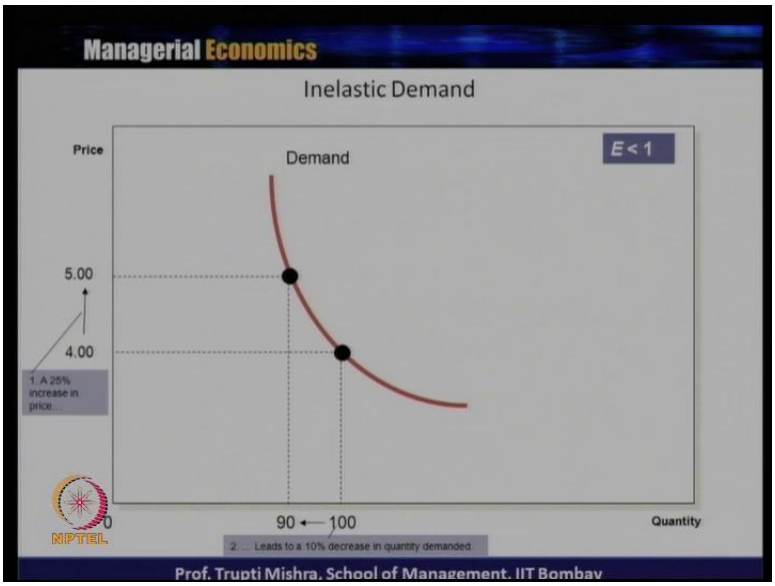

Then we will come to the case of inelasticity demand and we also interchangeably use this type of degree of price elasticity of demand as relatively inelastic, where E takes a value which is less than 1. So, elasticity of demand which takes the value of which is less than 1. So, it is the case of a inelastic demand, inelastic demand, where the demand curve, what we take is a non-linear demand curve, it is in a curve format. So, initially if you look at, the price is 4 rupees and the quantity demanded is 100 units. If there is a increase in the price, from 4 rupees to 5 rupees, what is the increase in price? There is a, what is the percentage increase in price? The percentage increase in the price is 25 percent, price increases from 4 rupees to 5 rupees.

What happens to quantity demanded? Quantity demanded decreases from 100 units to 90 units. So, in this case, what is the decrease in the quantity demanded? 10 percent decrease in the quantity demanded. 25 percent increase in the price leads to 10 percent decrease in the quantity demanded. So, percentage change in the price is greater than percentage change in the quantity demanded or in other word the percentage change in the quantity demanded is less than the percentage change in the price, and that is the reason this is the case of a relatively in elastic, because the buyers, they are less response to the change in the price and which takes the value of elasticity which is less than 1.

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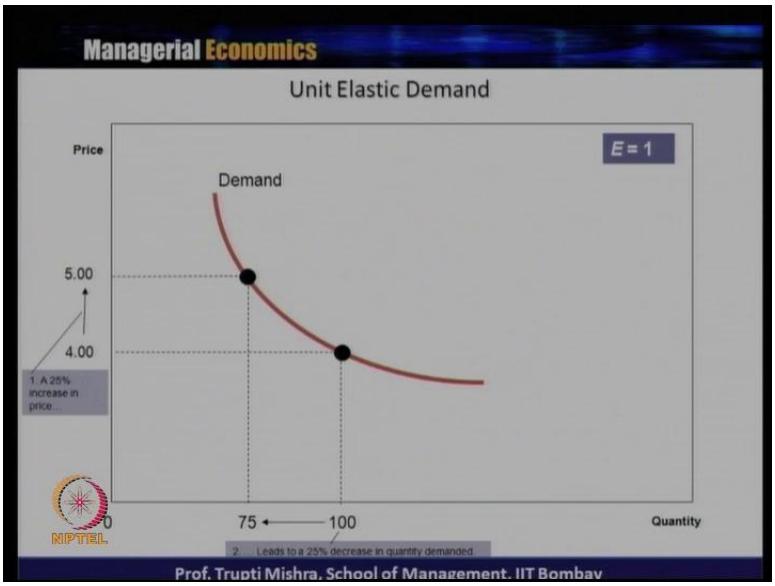

Then it is the case of your unit elastic demand. And in case of your unit elastic demand again we take the same example. If the price increases from 4 rupees to 5 rupees the quantity demanded decreases from 100 rupees to, 100 units to 75 units. So, in this case, what is the percentage increase in price? The percentage increase in price is 25 percent; what is the percentage decrease in the quantity demanded? The percentage decrease in the quantity demanded is 25 percent. So, 25 percent increase in price, leads to 5 percent decrease in the quantity demanded. So, the proportionate change in the quantity demanded is just equal to proportionate change in the price, and that is the reason this is the evident of unit elasticity of demand where elasticity of demand takes a value which is equal to 1.

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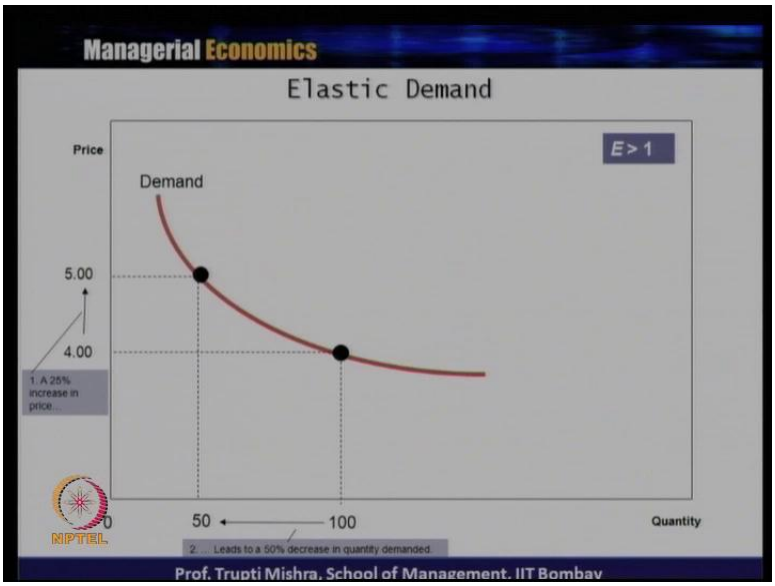

Then we will take the case of elastic demand, that is relative elastic demand. In this case, when the price increases from 4 rupees to 5 rupees, the quantity demanded decreases from 100 units to 50 units. The increase in price is 25 percent, the decrease in price is, decrease in quantity demanded is 50 percent. The percentage change in the price is less than the percentage change in the quantity demanded. It means, the 50 percent change in the quantity demanded is due to 25 percent change in the price. And the buyers, they are more insensitive to change in the price, that is the reason the elasticity of demand takes the value which is greater than 1.

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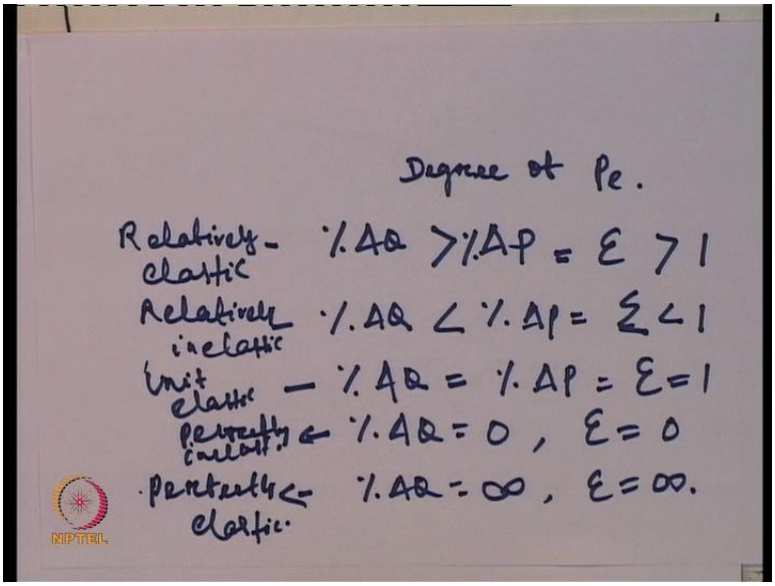

So, if you look at, if you can summarize all the these degree of price elasticity of demand, it is generally, there are five degree, degree of price elasticity of demand. and change in the quantity demanded, proportionate change in the quantity demanded is greater than proportionate change in the price. This is the case of relatively elastic and E takes the value which is greater than 1. The proportionate change in quantity is less than proportionate change in the price, this is the case of your relatively inelastic where E takes the value less than 1.

When proportionate change in the Q is equal to proportionate change in the P, in this case E takes the value which is equal to 1. And proportionate change in the Q is basically 0, in this case elasticity is equal to 0. And proportionate change in the Q is infinite, this is the case, elasticity is equal to infinite. So, this we are considering as relatively elastic; this is relatively inelastic; this is unit elastic; this is the case perfectly inelastic; and this is perfectly elastic. Okay. So, these are 5 degrees of price elasticity of demand, that generally the basis for this is on, the basis of, what is the proportionate change in the quantity demanded due to proportionate change in the price. 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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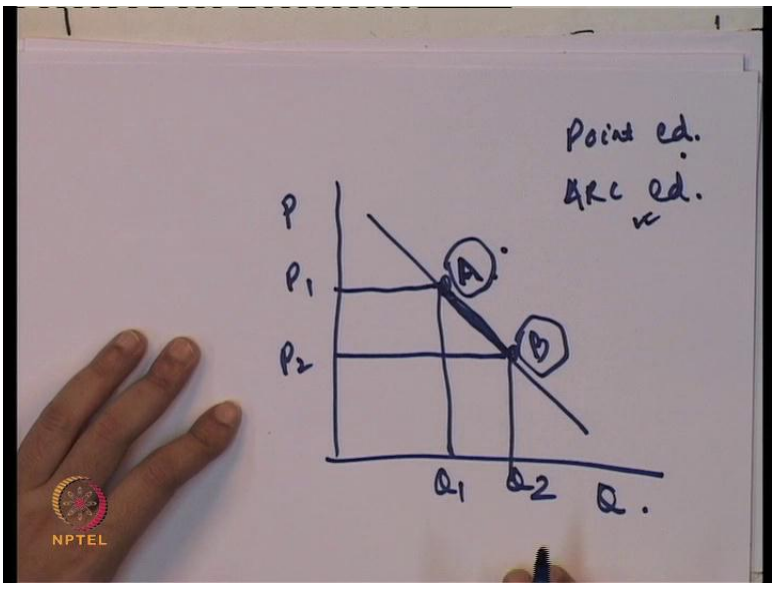

So, if you are taking a linear demand curve, here we take a price, here you take as the quantity demanded. Each point of the demand curve, it gives us the different quantity of price and quantity combination. So, this is P 1, this is P 2, this is Q 1, this is Q 2. Suppose it is point A, this is point 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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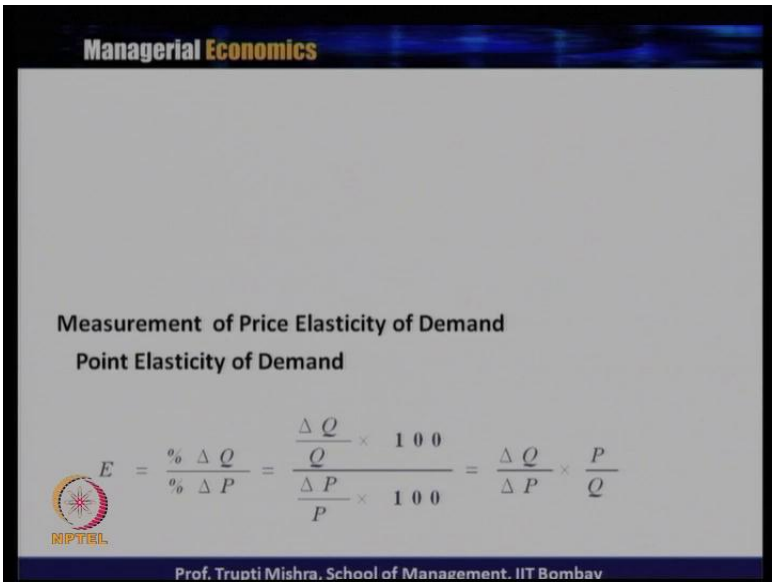

Let us see, what are formulas to compute this point elasticity of demand and the arc elasticity of demand. So, in case of measurement of price elasticity of demand, they follow the same formula again that elasticity is the percentage change in the Q and the percentage change in the price. And if you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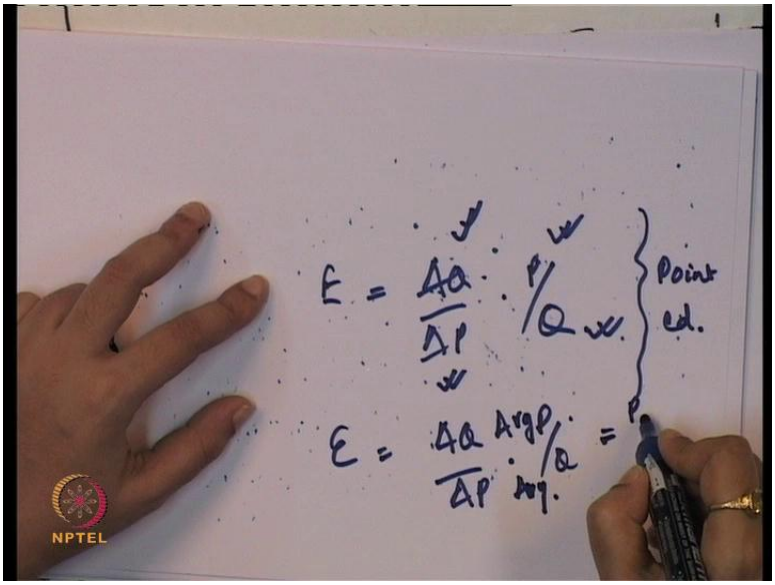

If you simplify this we get a formula, where you say that E is equal to del Q del P, by, multiplied by P by Q. So, this is change in the quantity demanded, this is change in the price; this is the original price, this is the original quantity demanded. This is the formula we use, when we calculate the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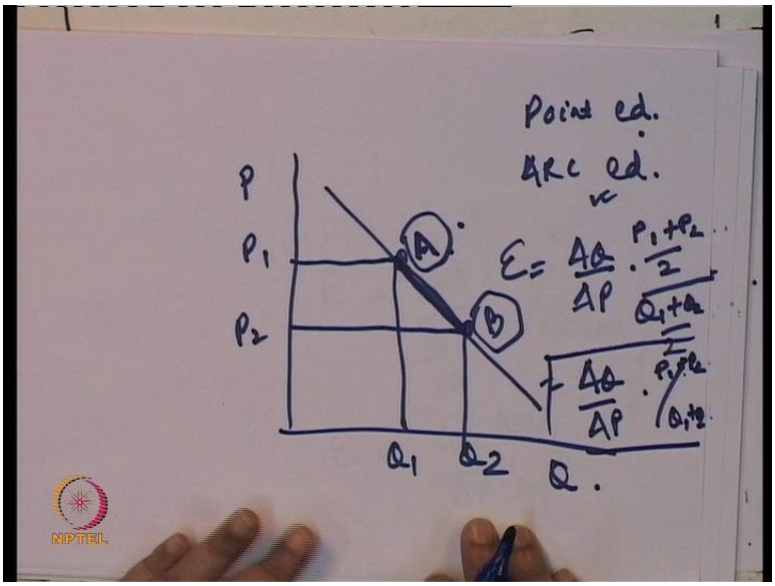

So, this is like, if you look at in the previous graph. So, if you are calculating between A and B In this case, to calculate the elasticity of demand we require, del Q by del P, multiplied by P 1 plus P 2 by 2 and Q 1 plus Q 2 by 2 . Because since we are calculating in a segment, we need to take, we 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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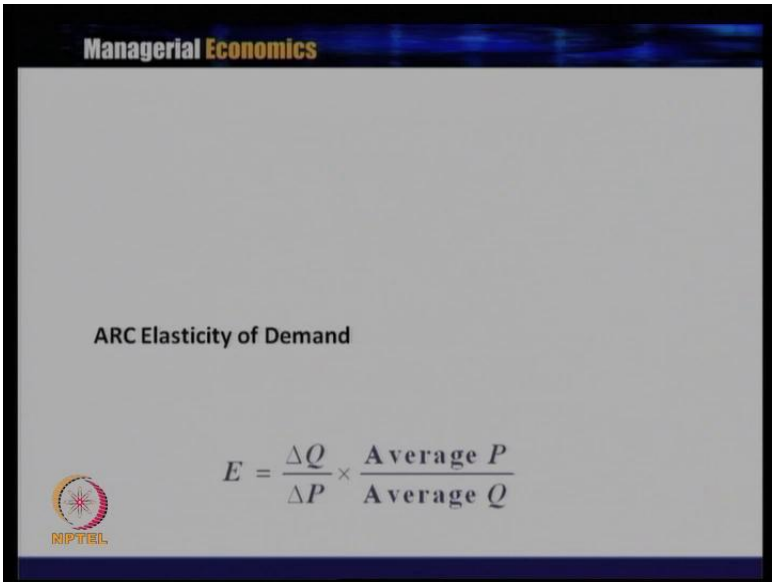

So, as you see in this slide also, this is arc elasticity of demand del Q by del P. And that leads, that is multiplied by average of P and Q. So, average P, Q is like, average price between two points and average Q between two points in which segment, generally you are measuring the arc elasticity of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

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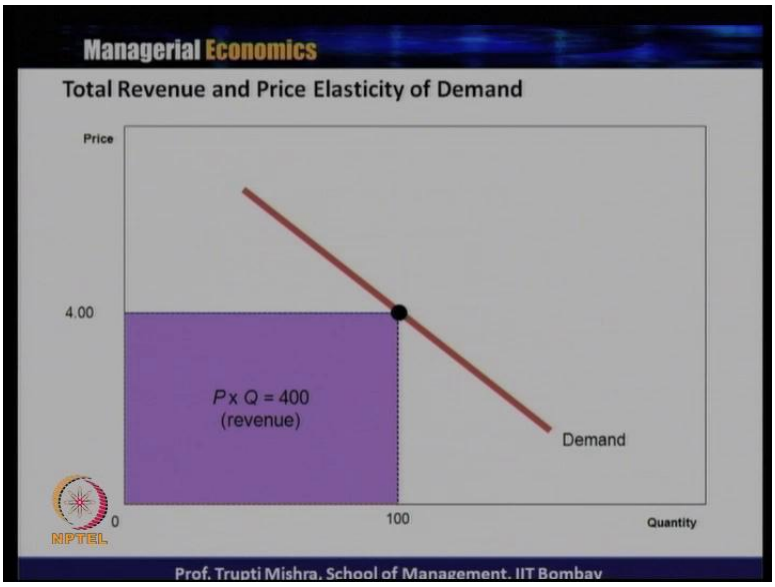

Now, we will see, how the total revenue changes in case of elastic demand and inelastic demand. Here we have taken a case of demand curve, linear demand curve, and how we generally find out the revenue. Revenue is the area under the curve that is price and quantity. So, if you are taking a specific point 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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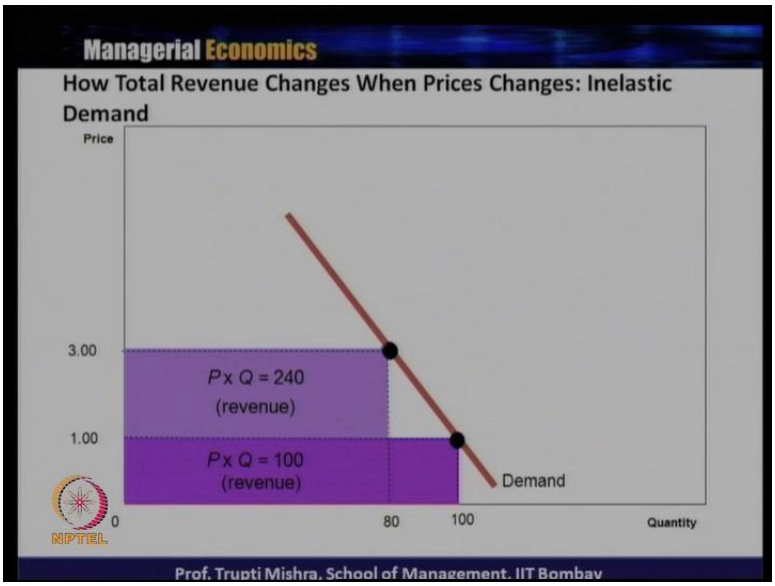

Now, we will see, how the total revenue changes when the price changes, in case of an elastic demand. In case of an elastic demand, the demand curve is more steeper, but in case of elastic demand, the demand curve is more flatter. So, in case of inelastic demand, as you see, in the first point, price 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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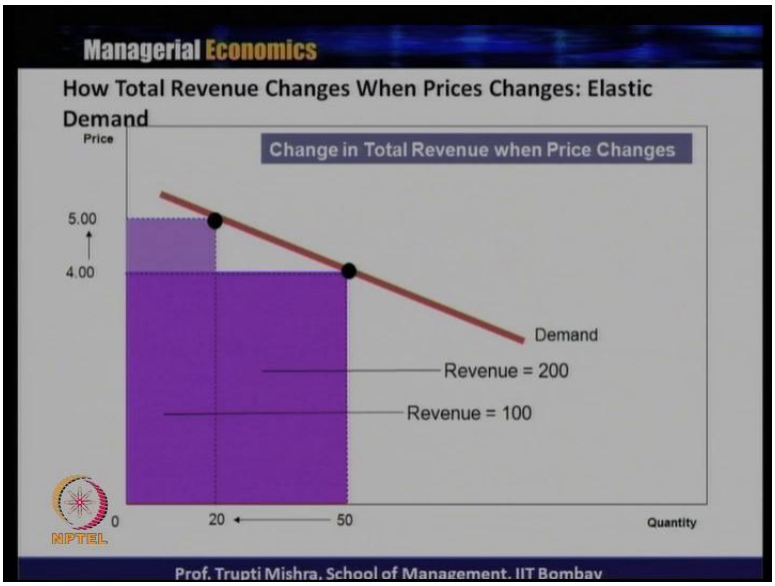

Next we will check, how it happens in case of the elastic demand. How the total revenue changes, when there is a change in the price. So, if you look at here, look at the graph, the demand curve is flatter because this is the case of your elastic demand. Initially the price is, may be 4 rupees and the quantity demanded is 50 units. So, this is, revenue two is100 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 and 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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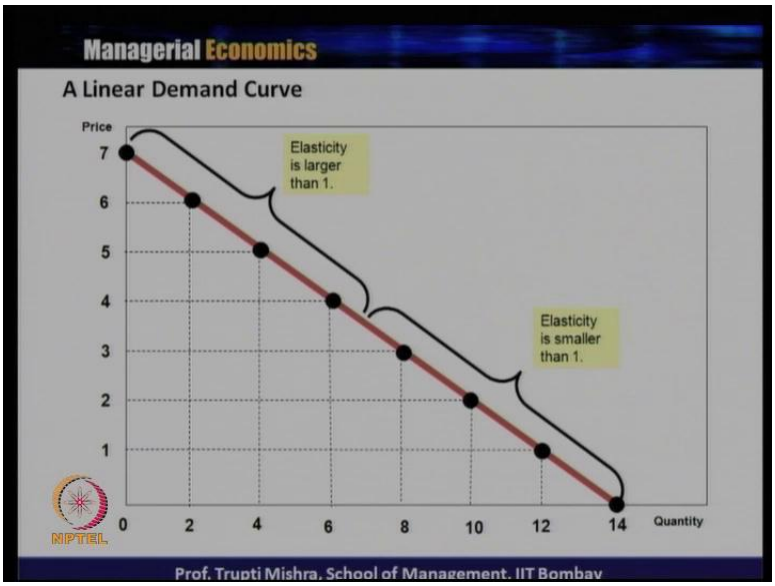

So, this is the case of a linear demand curve, at the different point of the linear demand curve, the elasticity of the demand takes a different value.

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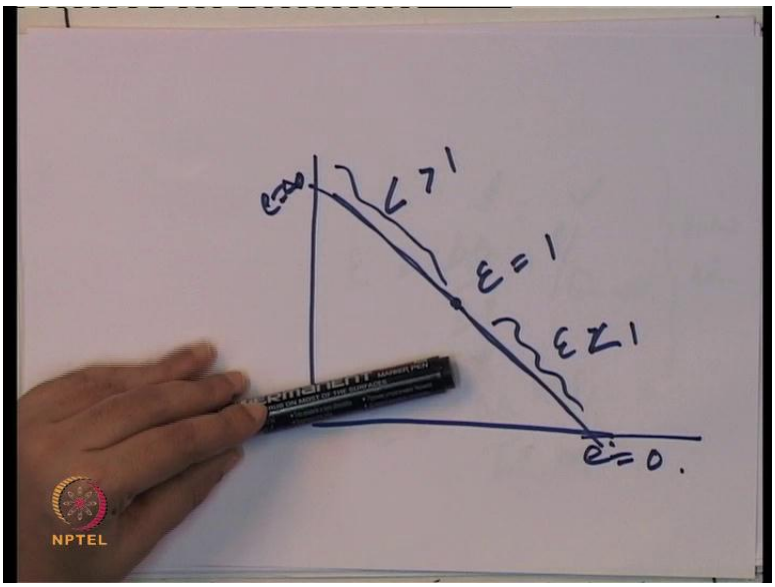

So, if look at in the linear demand curve, at this segment elasticity is less than 1; at this segment elasticity is greater than 1; and at the mid point the elasticity is equal to 1 . So, this is the elastic segment of the demand curve, and this is the in elastic segment of the demand curve. In this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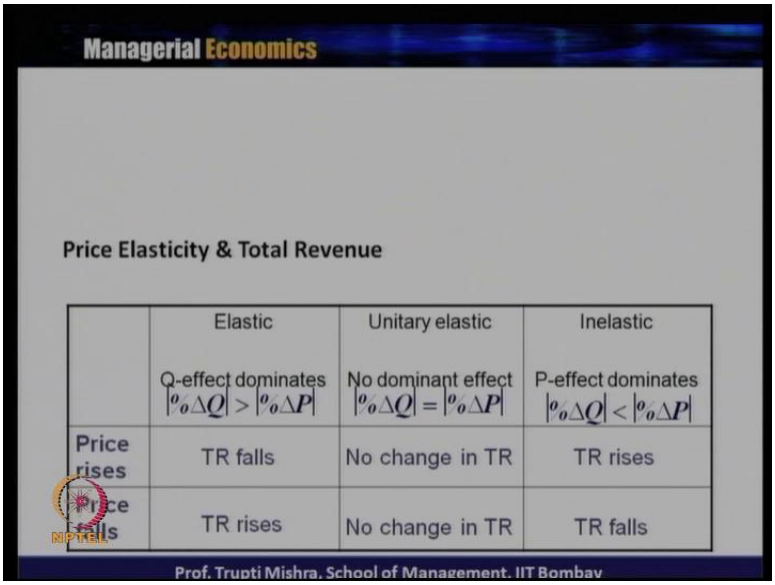

Now, if you summarize, the relationship between the price elasticity and total revenue, what happens? There is a increase in the price, there is a decrease in the price. If you look at the table then, elastic, the first column talks about elastic, elastic demand. The second column is unitary elastic 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 in significant 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 lead to more 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 in elastic generally the total revenue decreases.

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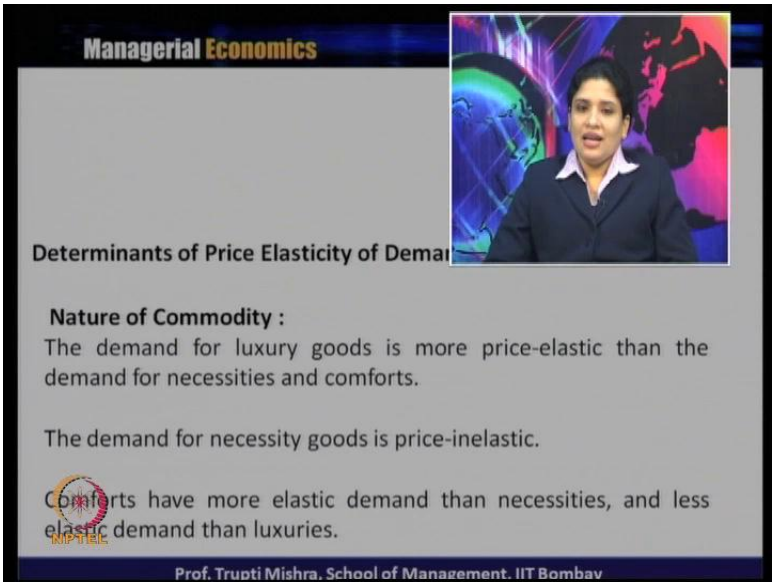

Now we will see what are the determinants of the price elasticity of demand? Because till now, we know that, price elasticity of demand, the value is dependent on the, by what percentage the quantity demanded changing, due to change in the price, or how much the consumer responsive to the change in the 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 are now, 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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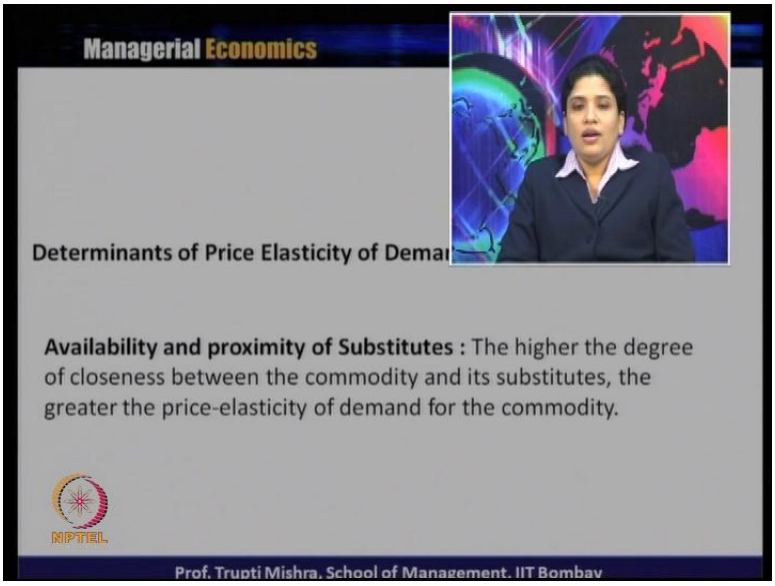

The second determinants of price elasticity of demand is availability and proximity of the substitute. I think we have already introduced the concept of substitute goods, like tea, coffee, or may be petrol, diesel; these are the substitute goods because you can consume one, it gives the same level of 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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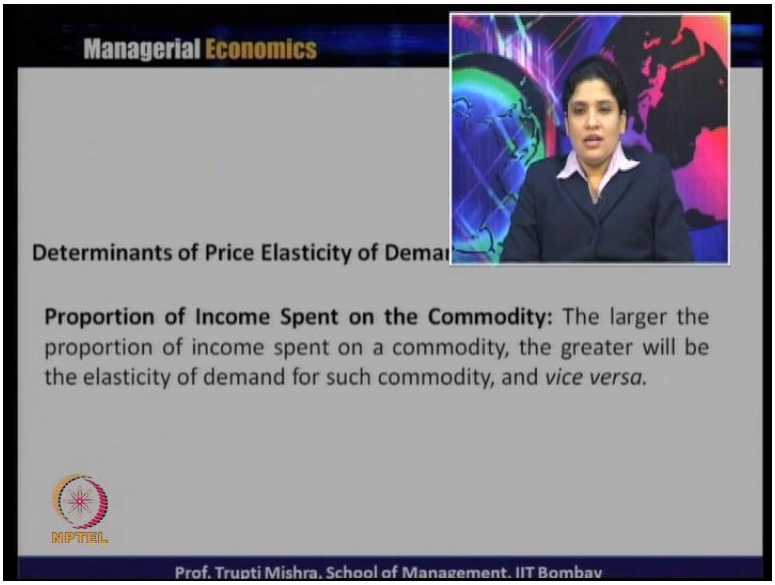

Then the third determinant of price elasticity of demand is the, what is the proportion of income spent on the commodity or goods by the, the consumer. The larger the proportion of income spent on the commodity, the greater will be the elasticity of demand for such commodity and vice versa. So, if you 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 now you will not prefer to change or may be 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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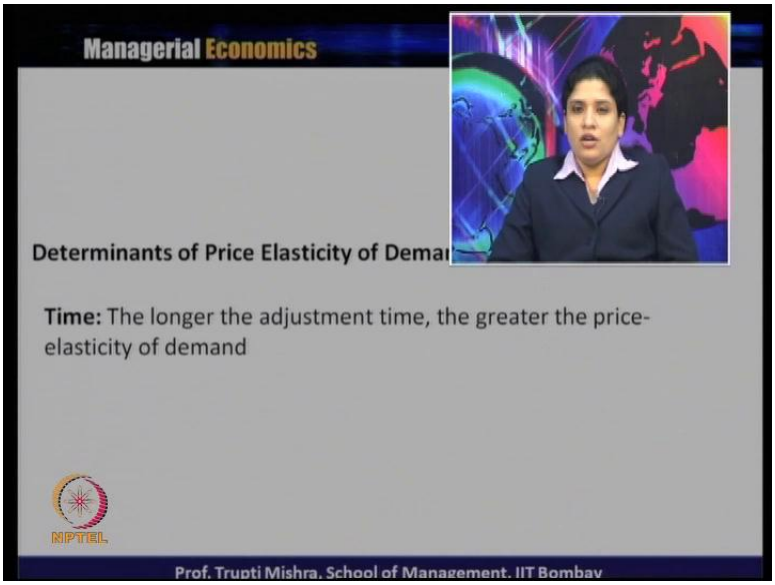

Similarly time, it plays a greater role when it comes to determinants of price elasticity of demand. The longer the adjustment time, the greater is the price elasticity of demand. If you see that, the time is there, immediately there is no, you do not have to make the changes in the quantity demanded,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

You know that the price level, you take the example of l p g, the price of l p g 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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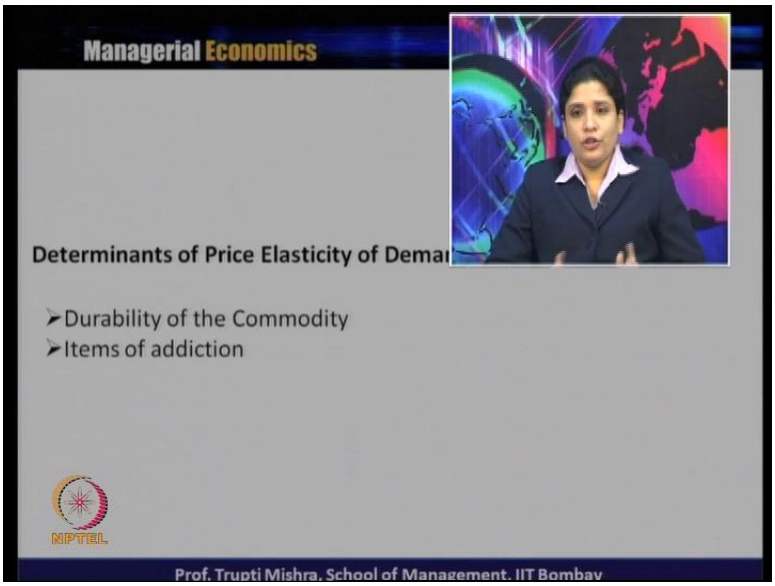

Then there two more determinants of price elasticity of demand, that is durability of the commodity and item of addiction. If it is a item of addiction, whatever the change in the price, the consumer is not going to change the quantity demanded, because someone is addicted to that. And in this case that 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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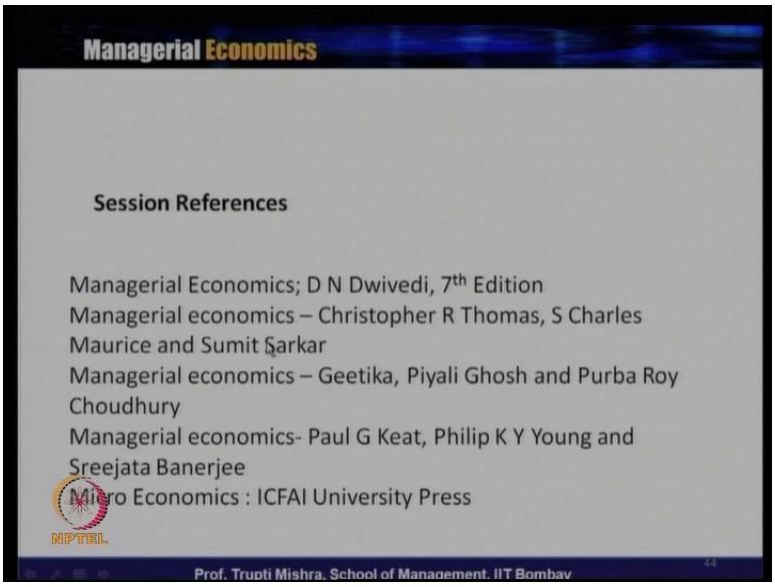

So, these are the session references for this typical chapter. And we will continue our discussion in the elasticity of demand again on the next session.