Managerial Economics
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Lecture - 19

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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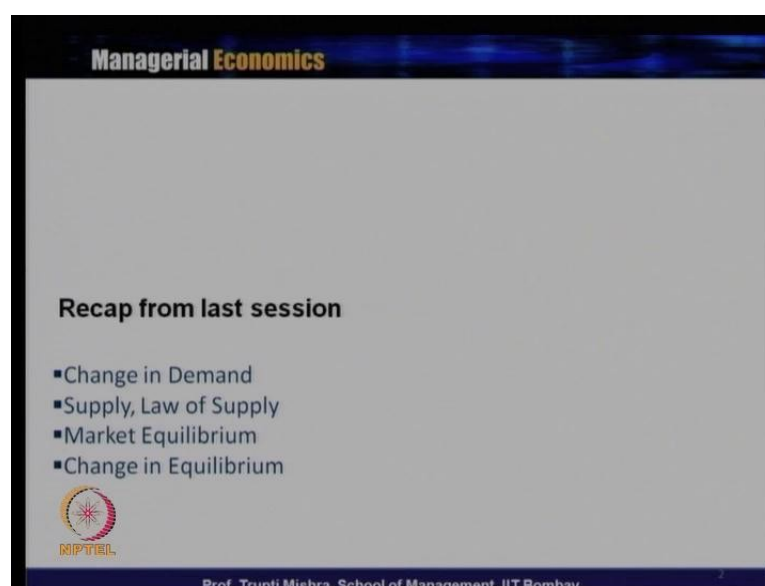
So, to start with, let us have a quick recap, what we did in the last session, or what we covered in the last session. We discussed about the change in the demands. So, change in demand either due to change in the price, or due to change in the non-price determinants. Then we introduced the second market 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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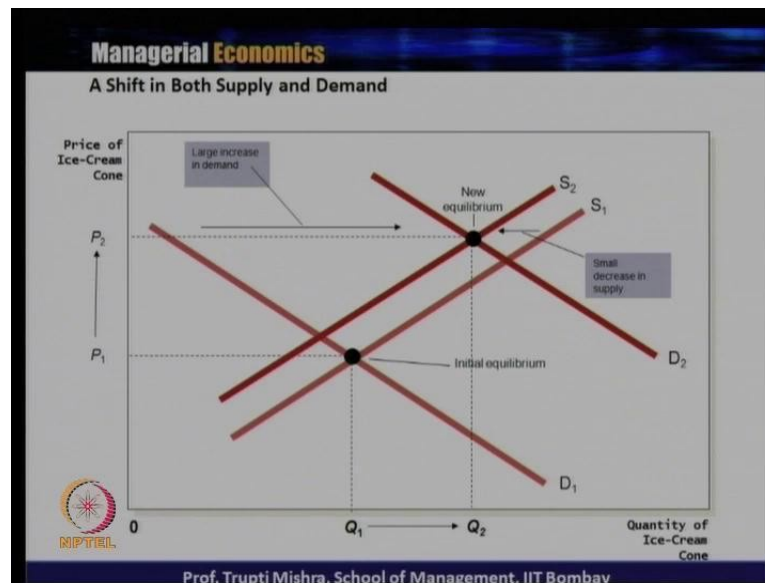
So, today we are going to look at, what happens when there is a simultaneous shift in the both the demand, both the market forces that is demand and supply forces. So, the previous class, if you remember, we discussed about change in the demand or change in the supply. So, we will say the, we will check 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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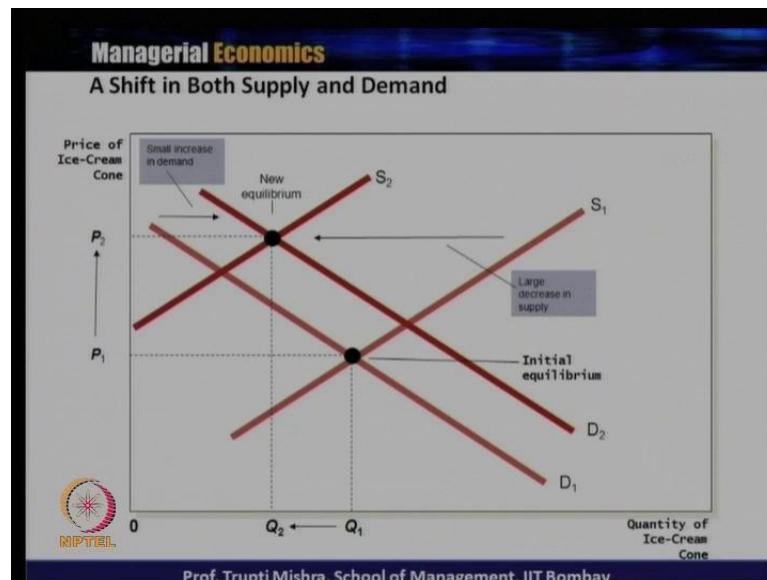
Similarly, if you take a case where, there is a change in the supply, and also there is a change in the demand. So, if you look at here, there is a increase in the demand from D 1 to D 2, and decrease in the supply is from S 1 to S 2. Initially equilibrium is, initial equilibrium price is P 1, initial 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.

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 decrease 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, that 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. It 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 analyze, 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 in 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 about 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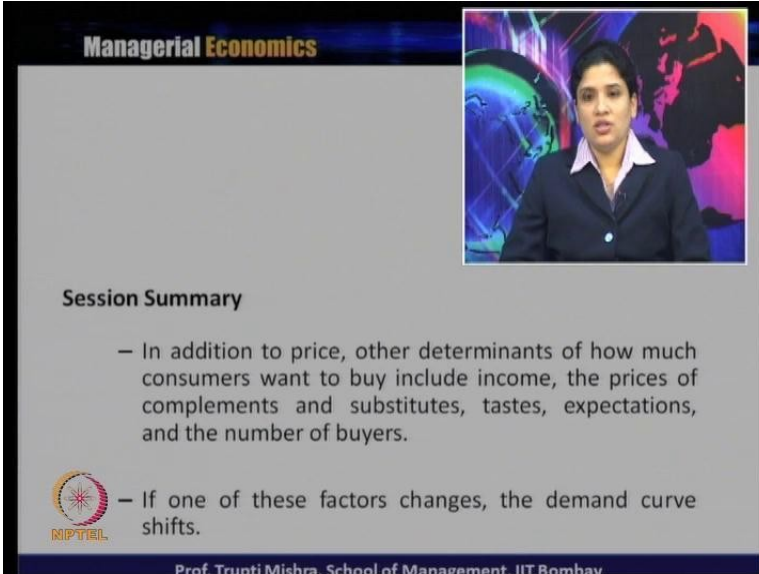, demand curve shows, how the quantity of good depends upon the price. According to law of demand, the price of good decreases, the quantity demand increases, and that is the reason demand curve slope S downward. Or, in other word we can say, other things remaining constant, there is a inverse relationship between the price and quantity demanded, that is the reason the slope of the demand curve is negative.
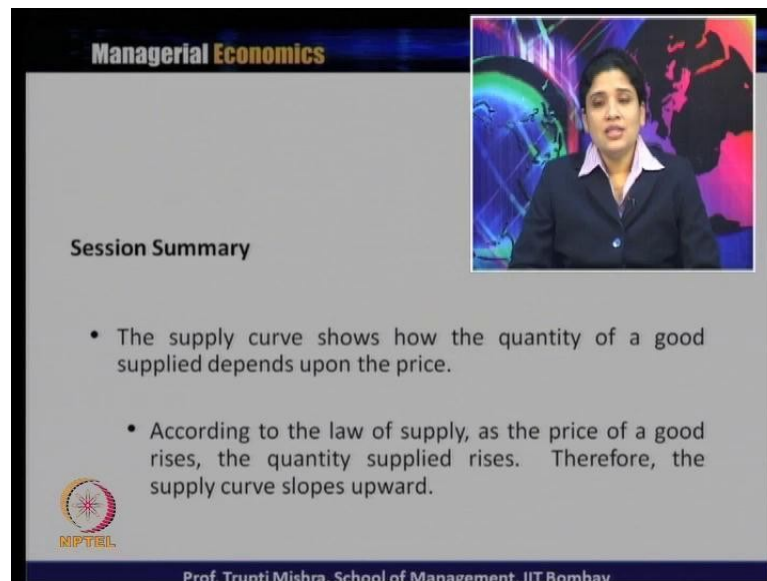
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In addition to price, there are few other factors also which influence the demand, like income of the consumer, the prices of complements and substitutes, the taste and preference of the consumer, expectations, and the number of buyers in the market. 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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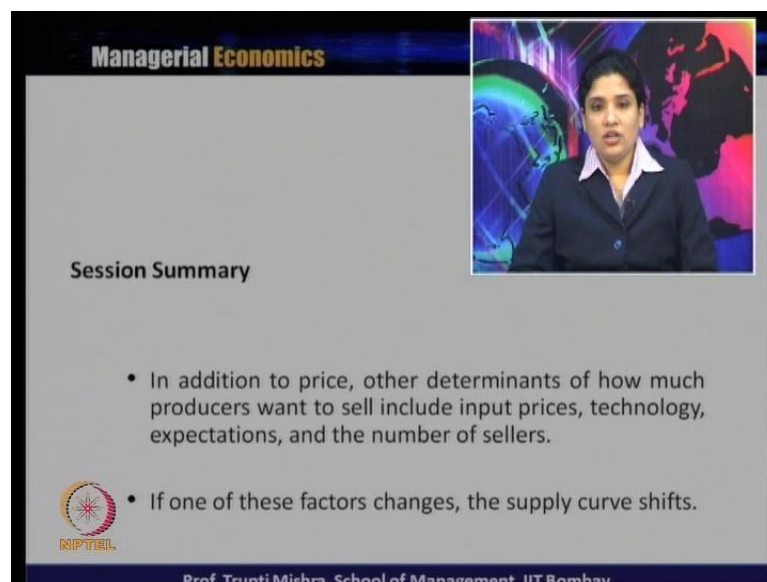Then we introduced the concept of supply curve, supply. Supply curve shows how the quantity of good supplied depends upon the price. And according to law of supply, the price of the product and quantity supply of the product, they are positively related; and that is the reason, the slope is positive 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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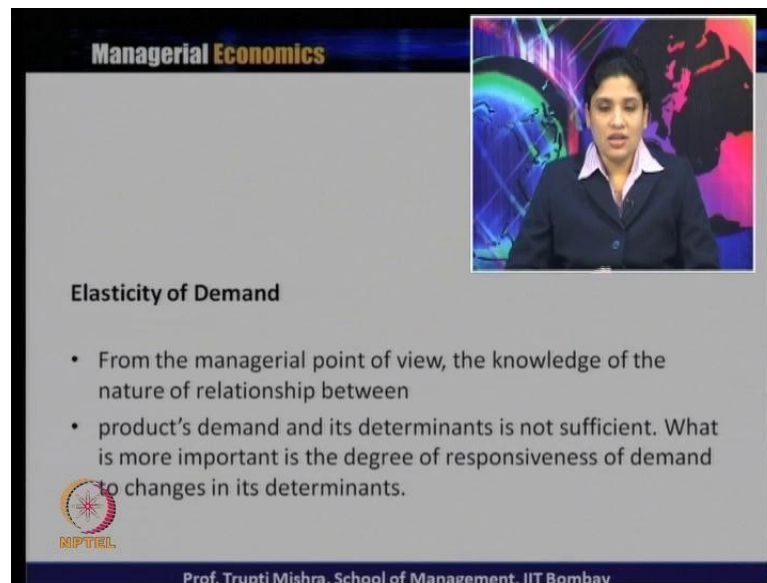Then we identified the condition for market equilibrium. And if you remember, the market equilibrium is determined by the intersection of the demand curve and the supply curve. At the equilibrium price, or the so called market clearing price, the quantity demanded of the market is exactly equal to the 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 change in price and change in the quantity demanded.
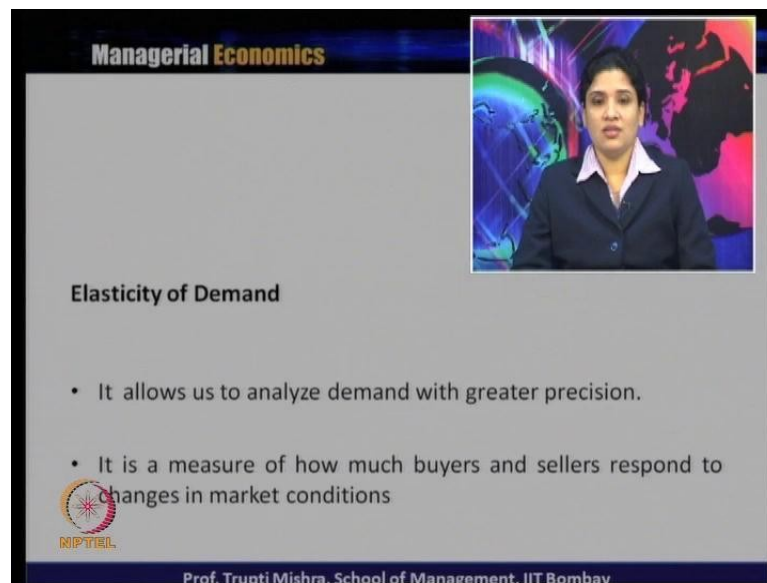
Then we will come to the second part of this module that is theory of demand. The second part of this module is, elasticity of demand. If you look at, till now what we have explained? We have explained that, there is a negative relationship between the price and quantity demanded. So, when price increases, 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.

So like, 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; ok, 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. that we will check today, in through the price elasticity of demand, income elasticity of demand, and cross price elasticity of demand.
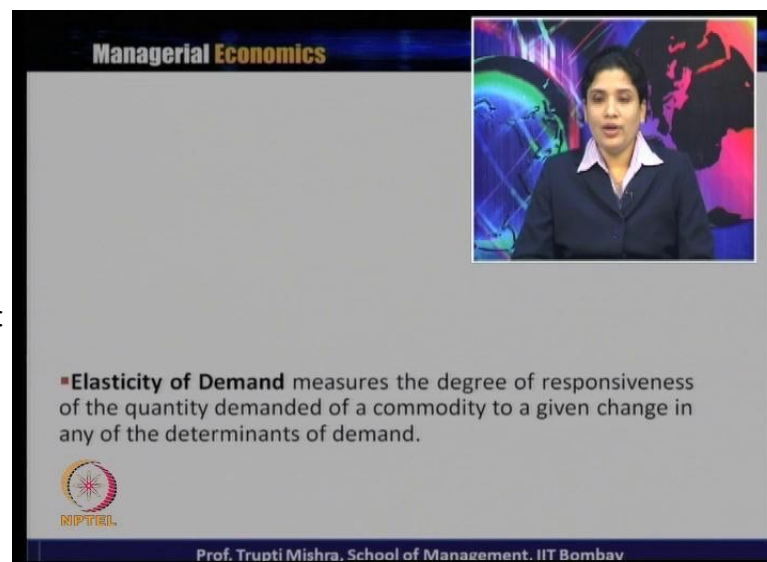
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So, as we mentioned, elasticity of demand, generally allows us to analyze the demand in greater precision. And it is a measure of, how much buyers and sellers, respond to change in the market condition. If there is a change in the price, what happens 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 decreases 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.
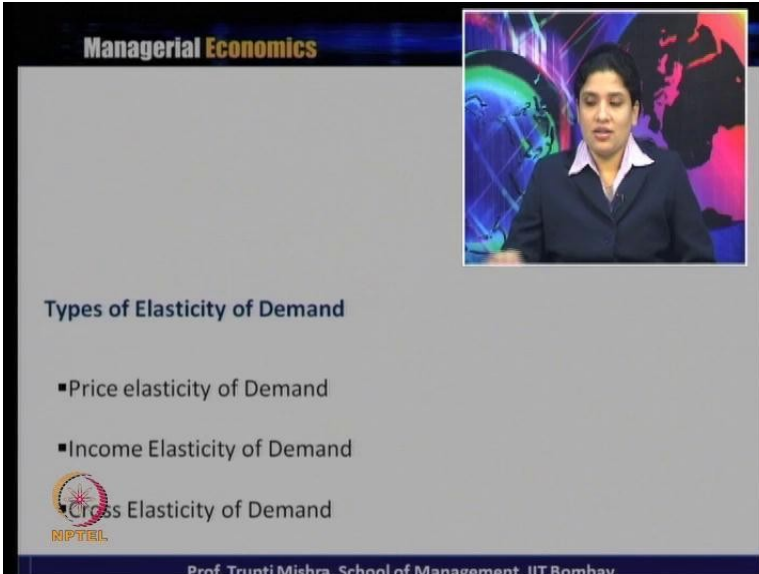
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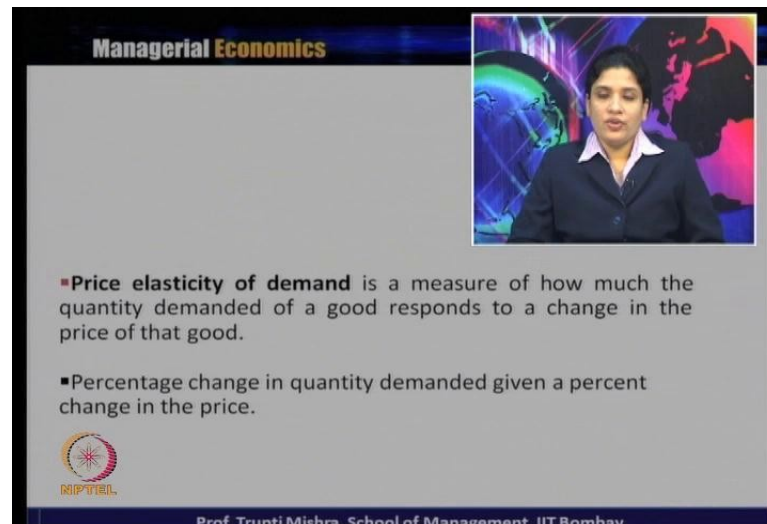There are three types of elasticity of demand: one is price elasticity of demand, second one is the income elasticity of demand, and third one is cross price elasticity of demand. We will start our discussion with the first kind of price, first kind of elasticity of demand that is price elasticity of 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 Ceteris 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, has 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 inelastic demand, second one is elastic demand. Inelastic 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.

Then degree of price elasticity of demand, in this case again we will see, perfectly inelastic and perfectly elastic. So, perfectly inelastic is one, where quantity demanded does not respond to price change, and perfectly elastic is quantity demanded changes infinitely with any change in the price. So, in this case if you look at, one is perfectly inelastic, 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 inelastic, 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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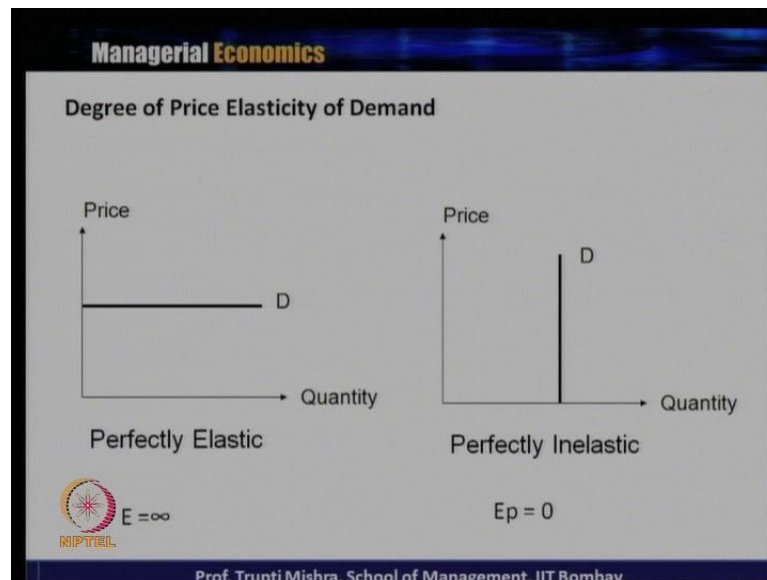
Then we will see graphically, the different type of elasticity of demand, typically the different degree of price elasticity of demand. So, in the first case if you look at, is the case of a perfectly elastic, and in this case the value of elasticity or elasticity of demand is equal to infinite. Because 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 drugs 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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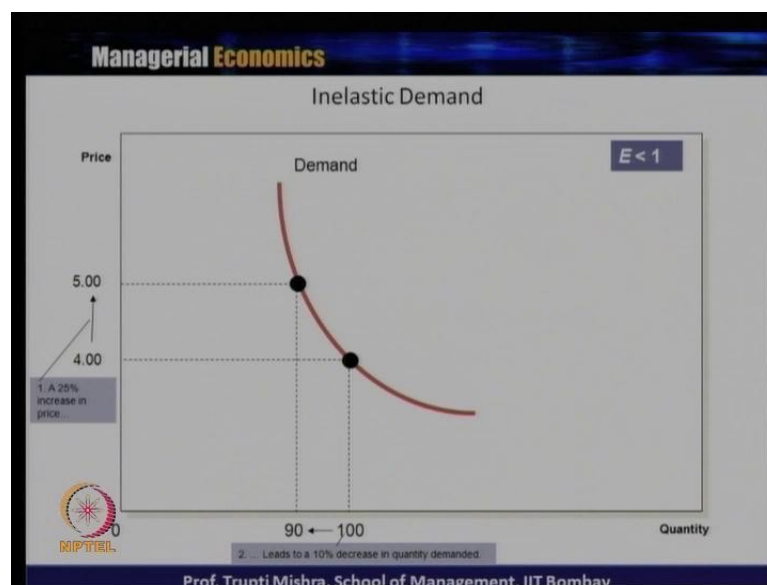
Then we will come to the case of inelasticity demand and we also interchangeably use this type of degree of price elasticity of demand as relatively inelastic, where E takes a value which is less than 1. So, elasticity of demand which takes the value of which is less than 1. So, it is the case of a inelastic 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.
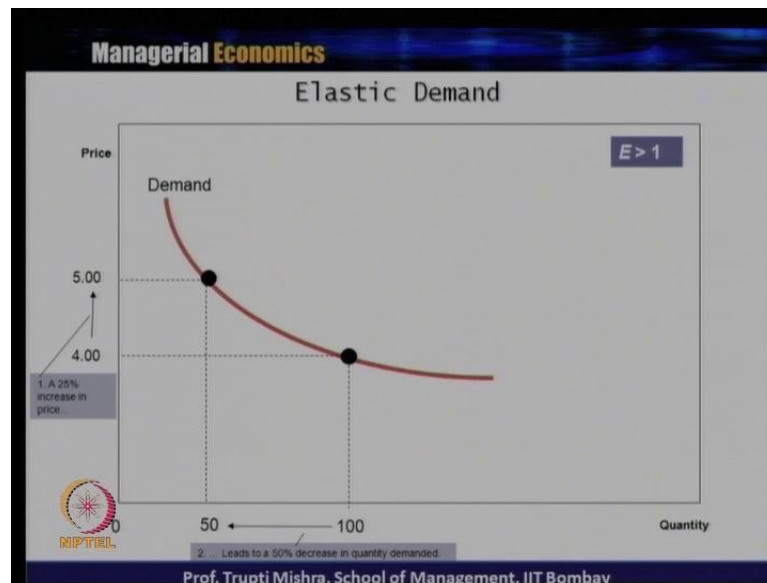
What happens to quantity demanded? Quantity demanded decreases from 100 units to 90 units. So, in this case, what is the decrease in the quantity demanded? 10 percent decrease in the quantity demanded. 25 percent increase in the price leads to 10 percent decrease in the quantity demanded. So, percentage 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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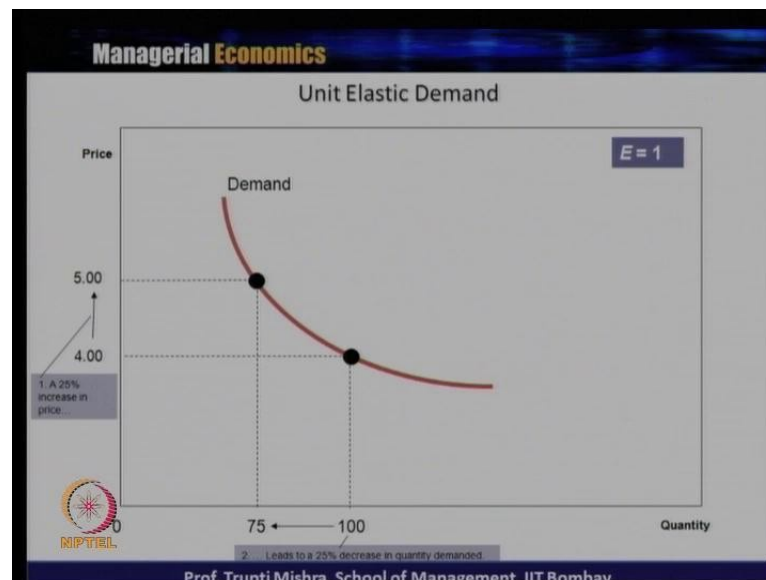
Then it is the case of your unit elastic demand. And in case of your unit elastic demand again we take the same example. If the price increases from 4 rupees to 5 rupees the quantity demanded decreases from 100 rupees to, 100 units to 75 units. So, in this case, what is the percentage increase in price? 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 25 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 sensitive 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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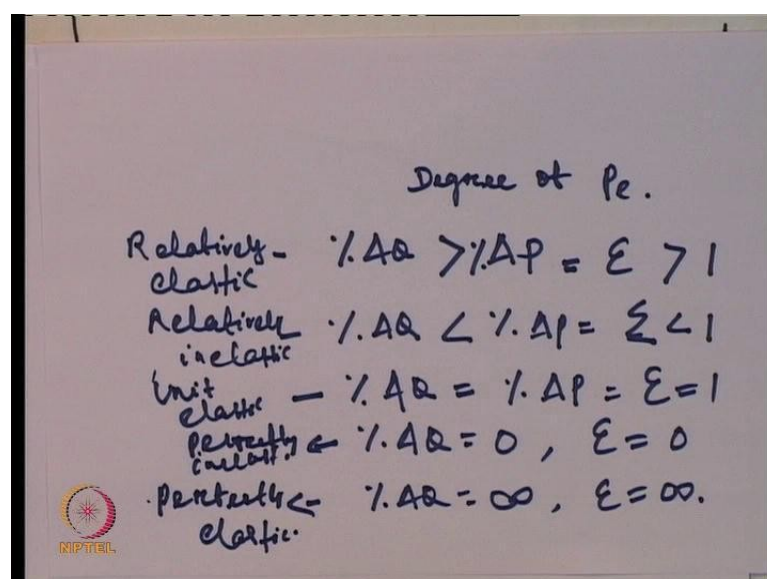
So, if you look at, if you can summarize all the these degree of price elasticity of demand, it is generally, there are five degree, degree of price elasticity of demand. when change in the quantity demanded, proportionate change in the quantity demanded is greater than proportionate change in the price. 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 okay.