**Managerial Economics**
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**Lecture - 74**
**Game Theory Product Pricing**

Then we will start a new topic that is on product pricing.

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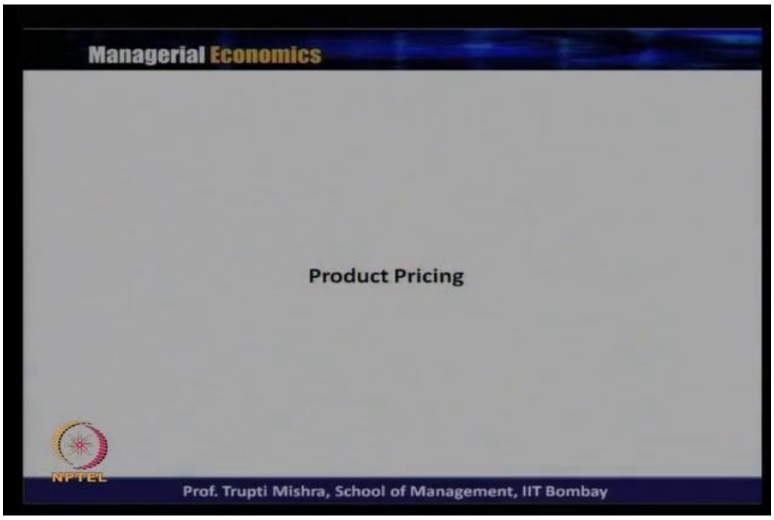


Because till now we have the understanding that price is decided on the basis of the demand and supply. But there are this is the main basis of demand and supply but there are many other consideration is taken when we decide the price of the product. So, our next topic will be on product pricing. And, before deciding the product pricing we will also talk about the kind of price discrimination. And, then we will go what is the type of product pricing and what is the basis of the product pricing. So, what is the meaning of price? If you look at this is the market price this is the value of the product but what price for the seller? What price for the buyer?

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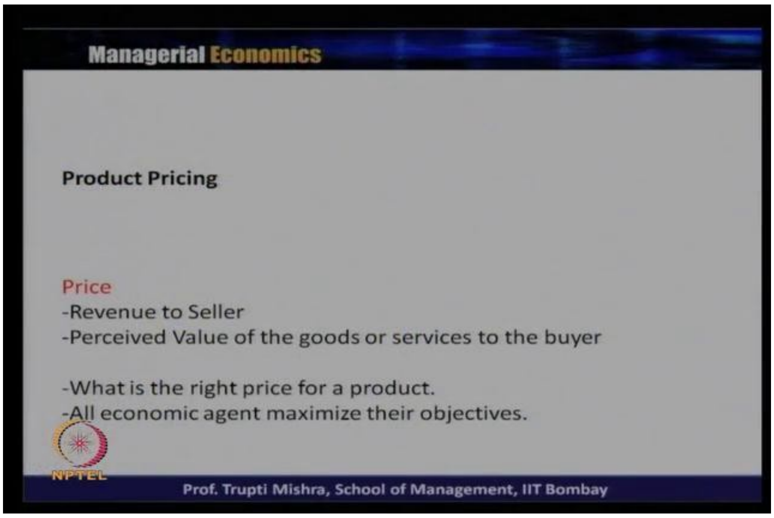


So, if you go in depth it is the price is basically the revenue to the seller because in the end it leads to the revenue to them. And, for the buyer it is the perceived value of goods and services to them. So, the question here is that what is the right price for a product? So, since price leads different meaning to different kind of different economic agent like it is revenue to the seller and perceived value to the buyers. Now, what is the right price of the product? Right price of the product is 1 where all economic agents maximize their objectives.

Now, who are the economic agent here; the buyers. Price is 1 where he maximizes his utility or may may be maximize his consumption. For the seller, when it is maximizing the sales revenue. For the supplier, it is the maximization of the output. And, for a firm it is the maximization of the profit because price to him is to maximize the profit. To the seller maximizing the sales revenue. To the producer maximizes the output; and to the buyer it is maximizing the utility. So, the right price is one which maximize the end objective of all economic agents in the market or the entire economic agent associated with the product.

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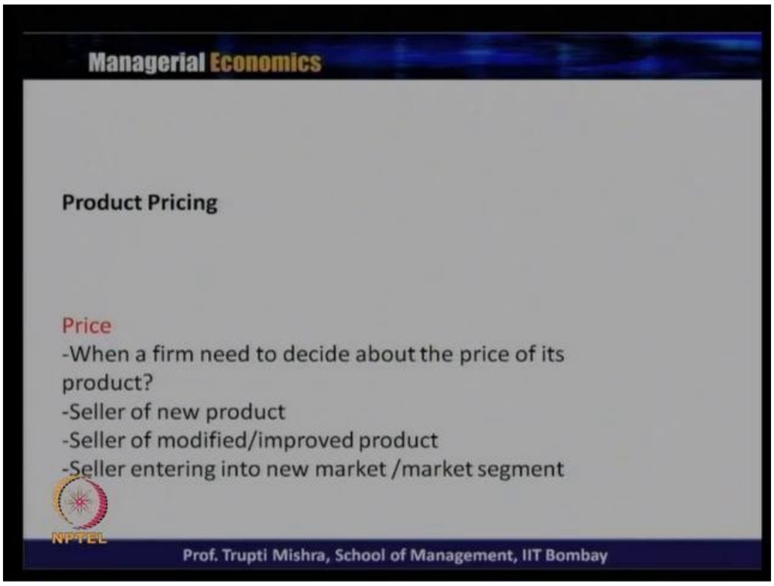


Now, when the firm they need to decide about the price of it is product. When it is not only when there is selling they are selling a new product. Also, they need to decide when they are selling the modified or the improved product or when the seller is entering into the new market or the new market in a typical market segment. So, may be the price has to be decided when the seller is selling a new product or seller is doing some modification or improvement to the initial product or when the seller is entering to the new market or they are entering into the different segment of the existing market.

In all these cases there is a value addition to the product whether it is a new product, whether it is a improvement in the existing product or whether the product is entering into the new segment. Since, in this entire three scenario, there is a value addition to the product. In all these 3 cases the producer need to think or the seller needs to think what should be the right price for the product which will give some amount of the profit. Some amount of the benefit to the entire economic agent in in the line of their end objectives. So, what is the basic determinant of price? We know there are the main determinant of price is demand and supply.

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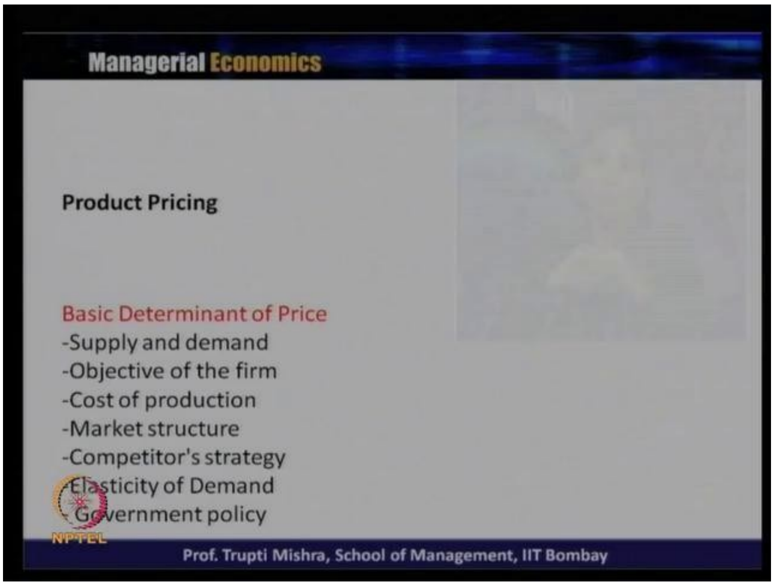


But apart from it it always link the price is always link. What is the objective of the firm? If the objective of the firm is to market increase the market share. Then they are not going to charge a high price they are going to charge a low price whether that they can trap the market. If the objective of the firm is to maximize the profit they will see at that scenario. Whether the high price or the low price which one will suit more for the profit maximization. What is the cost of production? Whether it is a high cost production; whether it is the low cost production. If it is high cost production then the price has to be high. If it is low cost production the price has to be low. Because in high cost production if it is low price it is not going to it is not going to maximize the profit by charging that level of price. What should be; what is the market structure?

If the market structure then the entirely the price is decided by the demand and supply. But if the perfect competitive market structure. If it is monopoly then the monopolist decide because he is the price taker firm in the market. If it is monopolistic again or the oligopolistic again it depends what is the market power or what is the power of them to set the price; on that basis the price will set. What should be the competitor strategy? If the price is going to increase or the price is going to decrease. How the rivals or how the opposite, opposite or the how the opponent is going to react over here. That decides what should be the right kind of price.

Then elasticity of demand. More elastic is the market there is less flexibility in term of change in the price. Less elastic at least you can change the price because the quantity demanded is not going to change simultaneously in that proportion because it is the case of the inelastic demand. Similarly, government policy whether it is a regulated market whether it is a unregulated market. In case of regulated market any increase in the price or whenever the price is being set by the firm. They has to take the consent from the government but in case of unregulated at least it is decided by the agents whoever or it is the firm those who are operating what should be the price.

So, in that context we will discuss about two kind of pricing. One is multiproduct pricing and second is about the price discrimination. On the basis the different grounds we will discuss about two kind of pricing and then we will move into the different types of product pricing.
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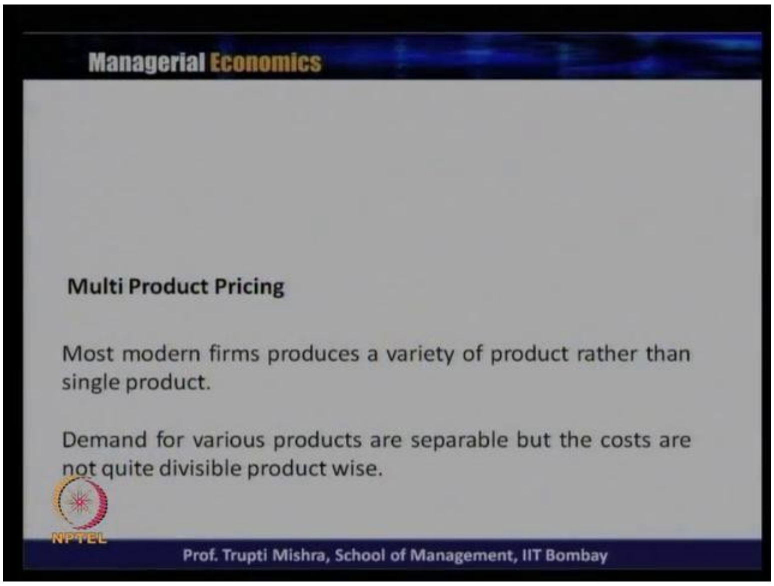


So, we will start with multiproduct pricing. And where multiproduct pricing is relevant. Multiproduct pricing is relevant because most modern firms they produce variety of product rather than single product. And, if you look at you take the case of your p and g proctor and gamble or you take the case of your Hindustan lever. Their product is not single they rather they produce a multiproduct. And in this case if it is a multiproduct how the pricing has to be done. And why the challenge is there for the pricing because demand for the various products are separable but cost are not quite divisible product wise like for the in one assembly line. If the intermediate good is one product and the final good is one product. Obviously it is difficult to make a division that what is the product what is the cost associated with the intermediate product and what is the cost associated with the final product.

And, that is why in case of a multiproduct pricing the demand is separable but the cost is not separable. So, the cost has to be or where the price has to be decided on the basis of the combined cost for both the products. So, in this case we get a separated demand function and there is only one cost function. So, profit maximizing price will be given by a point at which the combined marginal revenue for products equals to the marginal cost or we can say that the marginal revenue of each of this product equal to the combined marginal cost.

So, we will just take a graphical explanation to understand this identification or the deriving the profit maximizing price and output in case of a multiproduct pricing.

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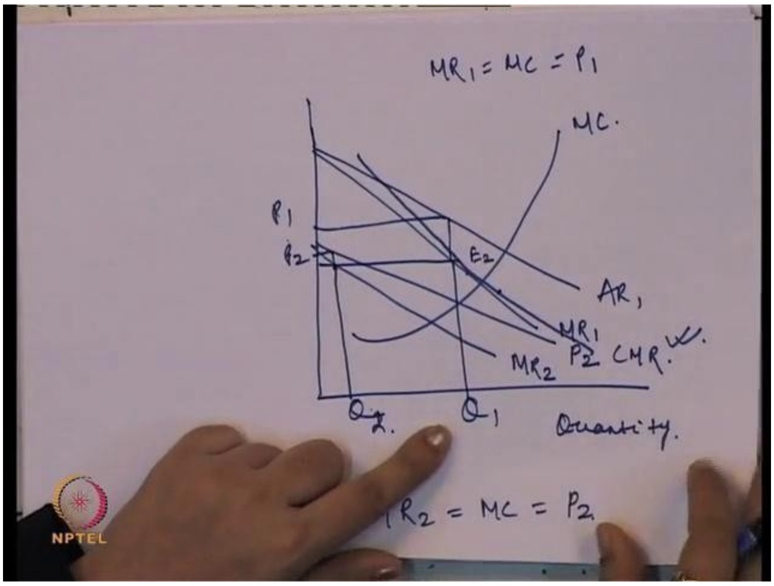


So, we have if it is 2 product then we have 2 demand function and corresponding marginal revenue function. Then we have $P_2, MR_2$ this is the marginal cost. Then we will get a combined marginal revenue curve that is $MR_1$ and $MR_2$. This is CMR and on that basis we will, we will look at the price; and suppose this price is $E_2$. On this basis or this is the point $E_2$; on this basis both the firm they are going to charge the price. So, this is for $P_2$ that is $Q_2$ this is $P_2$. And similarly, $MR_1$ this is price and this is the quantity.

So, in case of if you look at individually you can do it by making it with $MR_1$ with MC and correspondingly we can get price 1 or $MR_2$ is equal to MC and correspondingly we can get price 2. But since this is the case of a multiproduct pricing we have this combined marginal function. On that basis, we are getting 2 price that is the we are getting the point $E_2$. On that basis the price is decided that is $P_2$ for the firm 2 and producing the $P_2$ is for the product 2 and producing $Q_2$ level of output and $P_1$is for product 1 producing $Q_1$ level of output.

Then the second we will see the price discrimination. And, price discrimination if you look at this is a significant feature of the monopolist firm. And, why we call it discrimination? We calls it discrimination because the monopolist charges different prices to the different consumer in different market in different time period exercising their discretion power.

And, that is why this is known as the price discrimination by the monopolist. Now, to put it in a definition what is price discrimination? It is the act of charging different prices to different consumer in order to capture the consumer surplus. So, the motivation is to capture the consumer surplus and they do this the they capture this consumer surplus by charging different prices to the different consumer. Now, what is the basis or what is the pre requisite for this price discrimination in which case monopolist can practice price discrimination.
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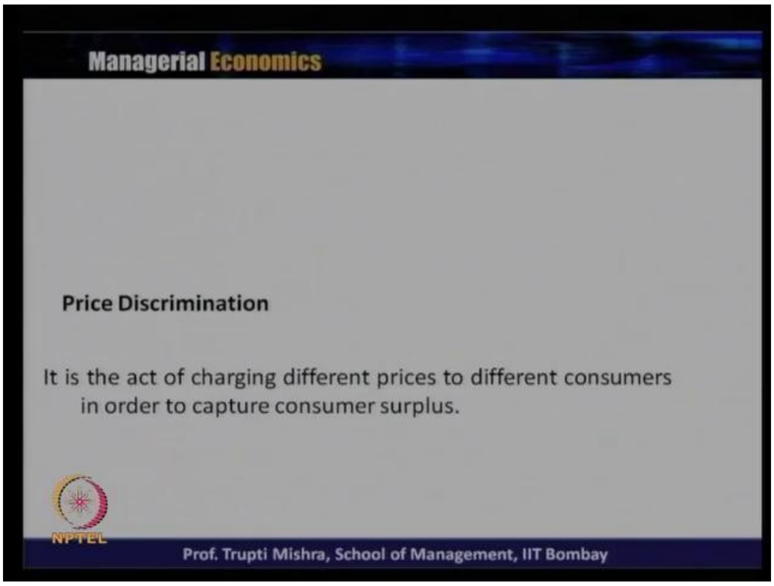


So, the motivation is to capture the consumer surplus and they do this they capture this consumer surplus by charging different prices to the different consumer. Now, what is the basis or what is the pre requisite for this price discrimination, in which case monopolist can practice price discrimination.

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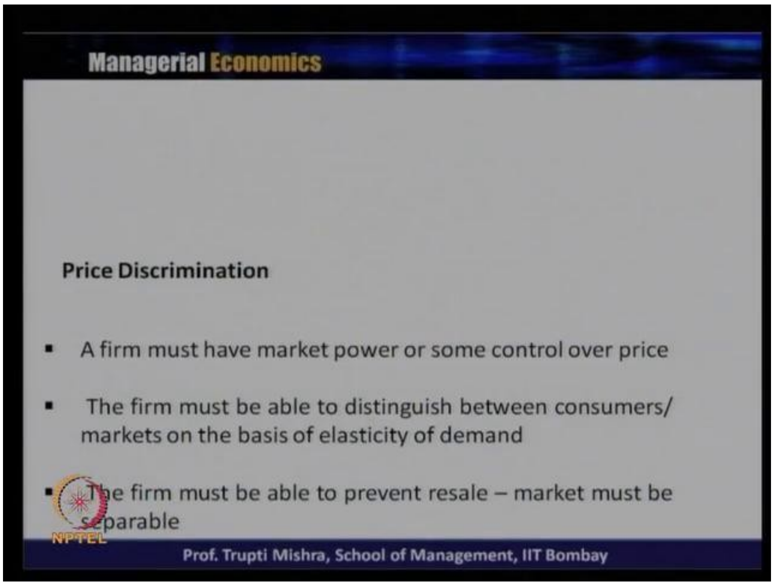


The firm must have the market power and some control over the price that is present in the monopolist market. And, that is why they practice the monopoly they practice the price discrimination. The firm must be able to distinguish between consumers market on the basis of the elasticity of demand. So, there should be division between the consumer. There should be division between the markets on the basis of the elasticity of demand. The firm must be able to prevent resell, market must be separable. It is not that you can buy in the market in you can buy in one market at the lower price and sell it in the other market. So, resell to be controlled otherwise it is not going to be profitable or they cannot practice the price discrimination. So, this price discrimination can be possible owing to consumer peculiarity.

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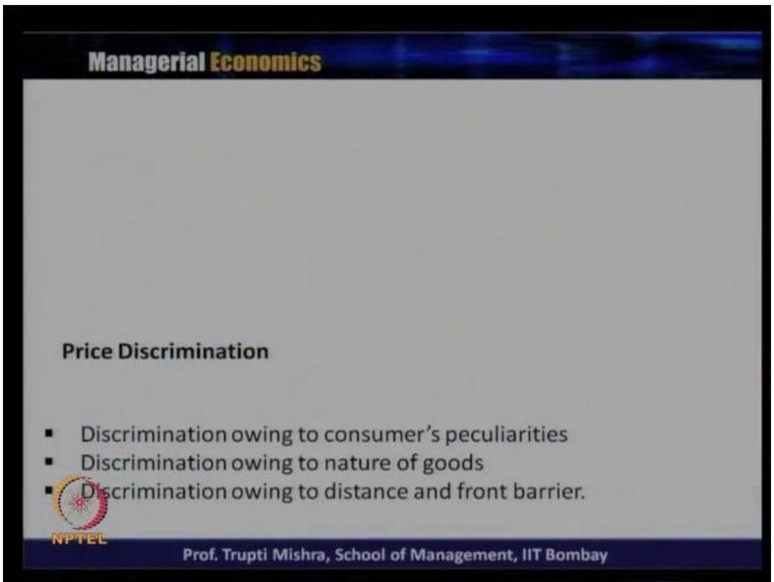

And, how these consumer peculiarities come here. Suppose, in any situation if consumer a is unaware of the fact that he is paying a higher price as compared to b or sometimes the price discrimination is so small it is, it is negligible. And, that is why the monopoly generally do a price discrimination because consumer is just indifferent about the small change in the price small change in the price between 2 market or 2 consumer. In the first case when consumer a is the unaware of the fact that consumer a is paying a lower price. So, on that basis we can discuss about 3 type of price discrimination.

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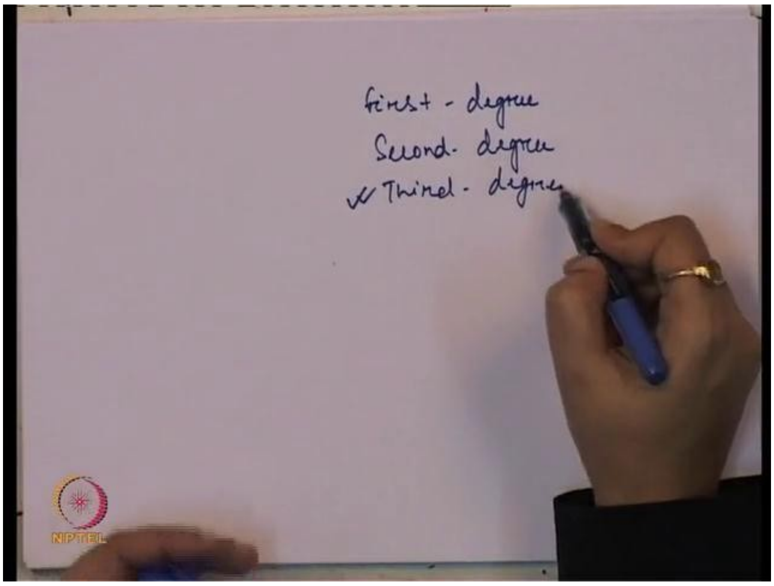


That is first degree, second degree and third degree. So, when we talk about consumer peculiarity. That is more significant in case of may be third degree. And, that is why this consumer peculiarity comes up under the part of the third degree price discrimination. but here one more consumer peculiarity comes here is. When one consumer typically if you remember your wave line effect in case of consumer behavior. When price increases people they think that the product quality has improved and that is why they paid. In this case also how this price discrimination is possible. When the even if the consumer knows that he is paying a higher price but if he feels that he is getting a product which is a higher quality of the other products still the price discrimination is possible.

So, price discrimination is possible when the consumer is not aware of the fact that the other one is paying a lower price or consumer feels that if he is paying a higher price there is a quality attached to it. And, in the third case the the price difference is so minute it is so negligible that generally consumer ignore this. Similarly, the discrimination also owing to the nature of the goods and sometimes the discrimination also owing to the distance and the front barrier. So, these are the pre requisite for the different type of price discrimination. And, as we discussed there are three types of price discrimination.

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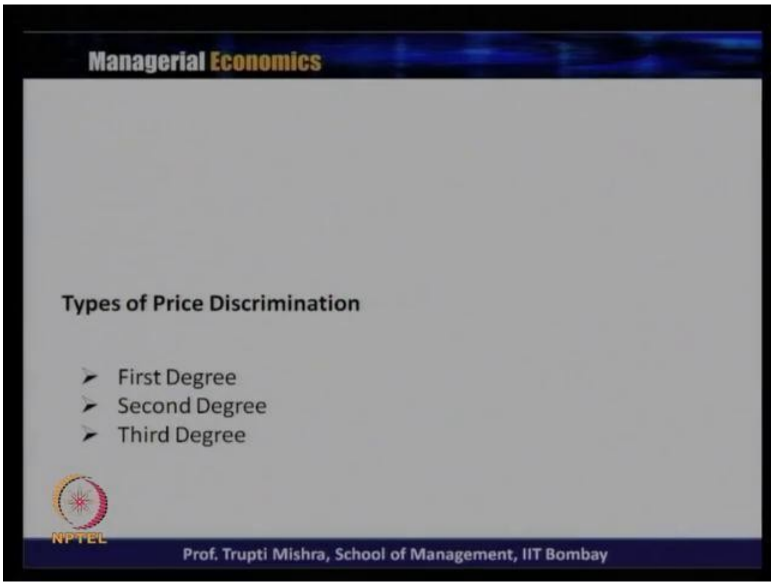


First degree price discrimination, second degree price discrimination and third degree price discrimination. We will start with the discussion with the first degree price discrimination.

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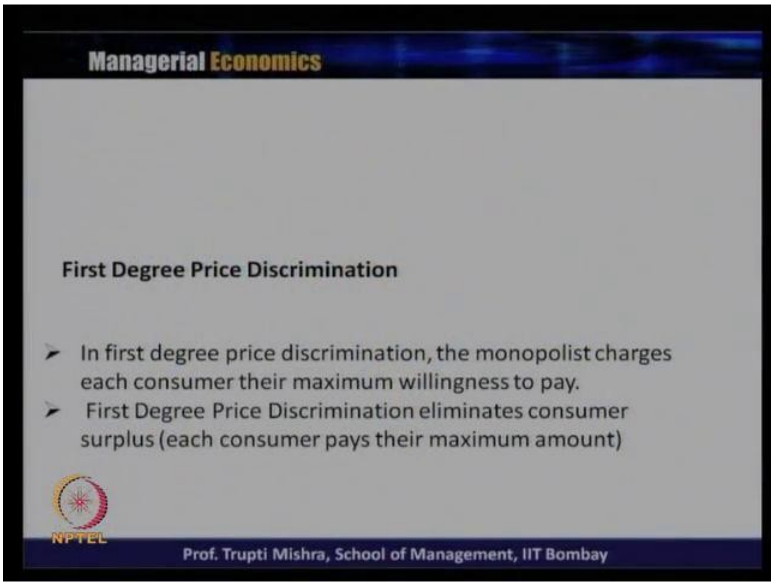

So, in the first degree price discrimination the monopolist charges each consumer their maximum willingness to pay. Whatever they are willing to pay it is they the monopoly generally charges the price which comes under the maximum. And, generally in the first degree price discrimination eliminates consumer surplus because each consumer pays the maximum amount whatever they are willing to pay.

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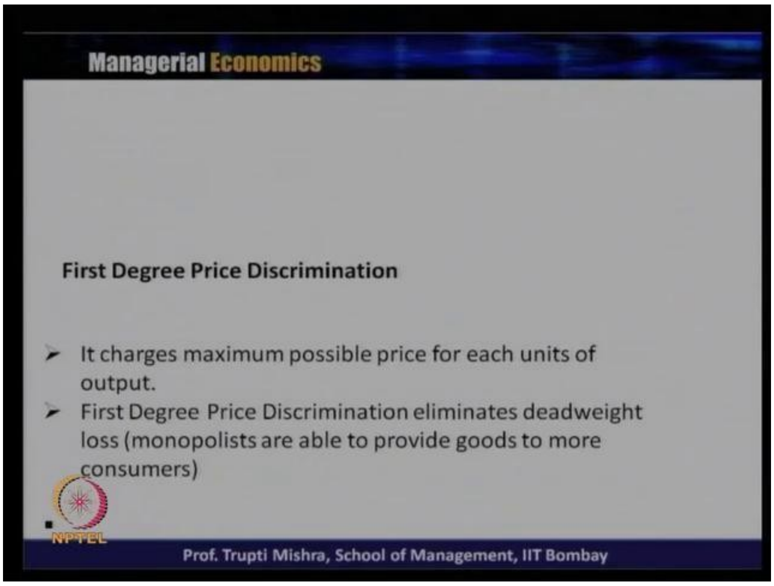


And, also it is charges the maximum possible price for each unit of output. So, first degree price discrimination generally eliminates the deadweight loss because monopolist are able provide goods more to the consumer. So, we will just take the graphical examples to understand what is the how the generally monopolist by practicing the first degree price discrimination take outs all the consumer surplus and also even there is no deadweight loss. Because deadweight loss comes when the price increases and quantity decreases. But here at that price the producer is ready to supply whatever the goods come and that is why there is no deadweight loss. The entire consumer surplus goes into the account of the producer surplus.

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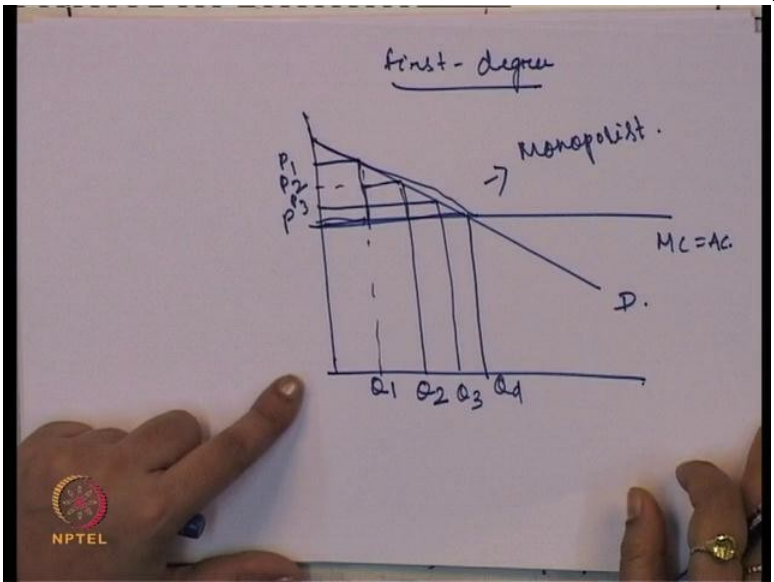

So, if we consider this as equal to MC is equal to AC; this is our demand function. So, how we get the consumer surplus? This is the market price if for this one for $Q_1$ if the consumer is ready to pay this much, the monopolist will charge a price $P_1$ because this is the maximum willingness of the consumer to pay for the amount $Q_1$. Similarly, if for $Q_1$if the consumer is ready to pay $P_2$ the monopolist will charge a price $P_2$. Similarly, for this amount $Q_3$, if the monopoly if the consumer is ready to pay $P_3$ or the willingness to pay $P_3$ generally this is the market price.

So, in this case ideally when the consumer is ready to $P_1$ but the market price is $P_1$ P this is the amount of consumer surplus it gets. If for $Q_2$ if the consumer is ready to $P_2$ but generally he pay only P, which is the market price this is the amount of the consumer surplus. And similarly for $P_3$, but in this case since the monopolist is charging on the basis of willingness to pay the entire consumer surplus is goes to the account of monopolist. And, there is no consumer surplus for the there is no consumer surplus for the typically the consumers those who are buying this products.

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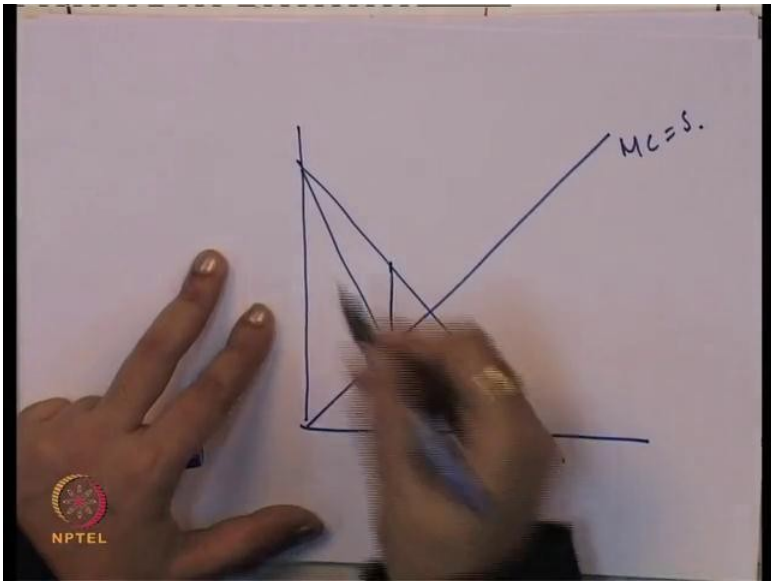


Next we will see so in one case we know that the there is the entire consumer surplus is taken by the monopolist. And, secondly we will see how there is no deadweight loss because the entire deadweight loss is also goes with the consumer surplus. So, in this case we will take this is marginal cost is equal to supply. And, here we get the demand curve. Here we get the marginal revenue curve. On the basis of the marginal revenue and marginal cost this is the price to be followed and this is the monopoly price. On the basis of the demand and supply we can say this is the competitive price. Here this is the competitive output; this is the monopoly output.

Now, what is the here we will say this area is A, this area is B, this area is D, this area is C and this area is E. Now, here if you look at what is the consumer surplus with the monopoly. In the normal market if the monopolist is not practicing the monopolist is not practicing price discrimination.

What is the consumer surplus with the monopoly? That is the area A this is the consumer surplus because the monopolist is not charging the price discrimination. But if and what is the producer surplus here. We are assuming the fact that there is no discrimination at this point of time. The monopolist is not doing the price discrimination. If monopolist is not doing the price discrimination this is the total consumer surplus. And what is the producer surplus? Producer surplus is the area B + D this is the total producer surplus. Now, consumer surplus is A, producer surplus is B + D. What is the deadweight loss because if both consumer surplus is producer surplus is there. This is not the competitive price. This is the monopolist price. There is some amount of the deadweight loss. And, what is the deadweight loss? Deadweight loss is C + E.

All these consumer surplus, producer surplus, deadweight loss assuming the fact that this is a monopoly market structure where the price discrimination is not being practiced. Now, if the first degree price discrimination is going to practiced. If the first degree price discrimination is going to practiced. Now, we will see whether there is consumer surplus at all. If entire and second is whether there is a deadweight loss or not. So, looking at this now if you say, if there is discrimination now. Now what is the discrimination?

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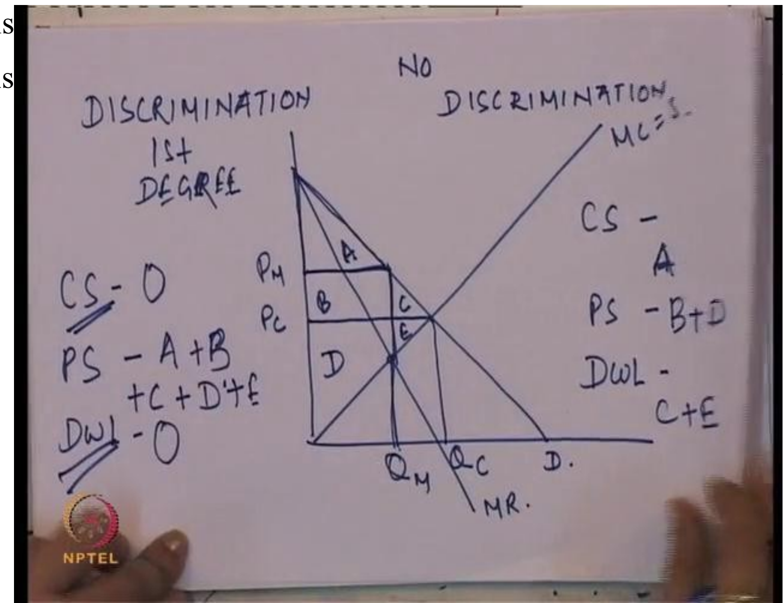

Discrimination is first degree. If the discrimination is first degree; we will see what is consumer surplus, what is producer surplus and what is deadweight loss. So, consumer surplus with first degree it has to be 0 because the monopoly will charge a price on the basis of the willingness to pay that is 0. And, what is the producer surplus, deadweight loss is also 0 because the entire amount.

Suppose there is this price is this much if they are going on going on charge the price which is a maximum willingness to pay. And, this is the $P_c$ on that basis $Q_c$ has come. Now, this is the deadweight loss if the quantity demanded decreases because of increase in the price. But since monopoly has the capacity to produce the supply whatever may be the price this C+E. What is deadweight loss? This also goes into the account of the producer surplus. And, that is why we get the producer surplus which is A + B + C + D + E there is no deadweight loss and there is no consumer surplus.

So, in case of first degree price discrimination the monopolist charge a price on the basis of the maximum willingness to pay for the maximum willingness to pay of the consumer and in that case they capture entire consumer surplus. And, even there is no deadweight loss because the entire surplus goes into the producer surplus. So, this is the highest kind of degree of price discrimination, but if you look at also in the practice it is difficult to follow because you need to know what is the willingness of the consumer of the different group in the different market. Then we will talk about the second degree price discrimination. And, what is the focus of the second degree price discrimination or what is the practice being followed in case of the second degree price discrimination.

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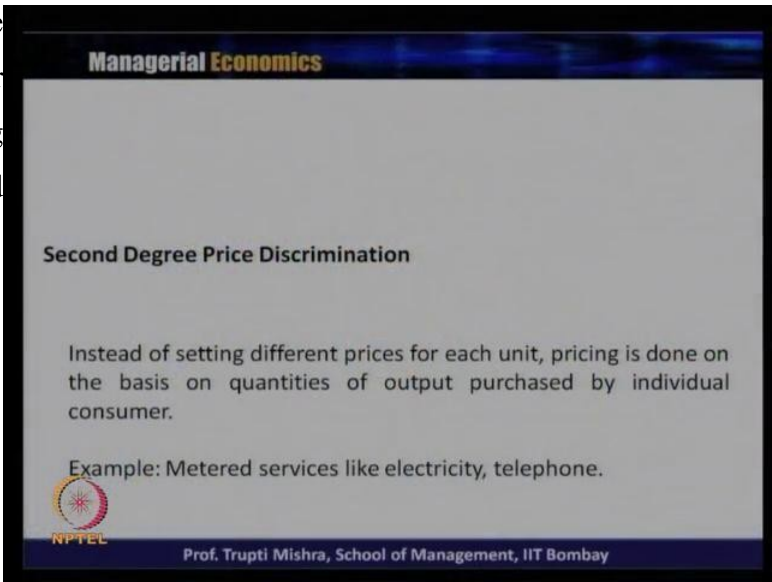

Here instead of setting the different prices for each unit, pricing is done on the basis of the quantities of output purchased by the individual consumer. So, here the discrimination is on not on the basis of the price rather it is on the basis of the quantity.

And, typical example of the second degree price discrimination is metered services like electricity and telephone because if you know the first few calls typically in a landline. If you look at the first few calls or even for the mobile services also you will find may be 200 minutes is free or 20 calls are free or at least 10 SMS are free that comes with the plan. And, if you go beyond then you charge a different; you get a you have to pay different price.

Similarly, in case of electricity also 0 to 200 there is one tariff rate. 200 rates to 500 rate there is one more tariff rate, 500 to 700 there is one more tariff rate. So, if you look at the charges are different on the charges are different on the basis of the different in the difference in the usage. So, if it is the usage is between this unit to this unit this has to be the price. So, here the discrimination is not on the basis of the price rather the discrimination on the basis of usage or the discrimination on the basis of the quantity

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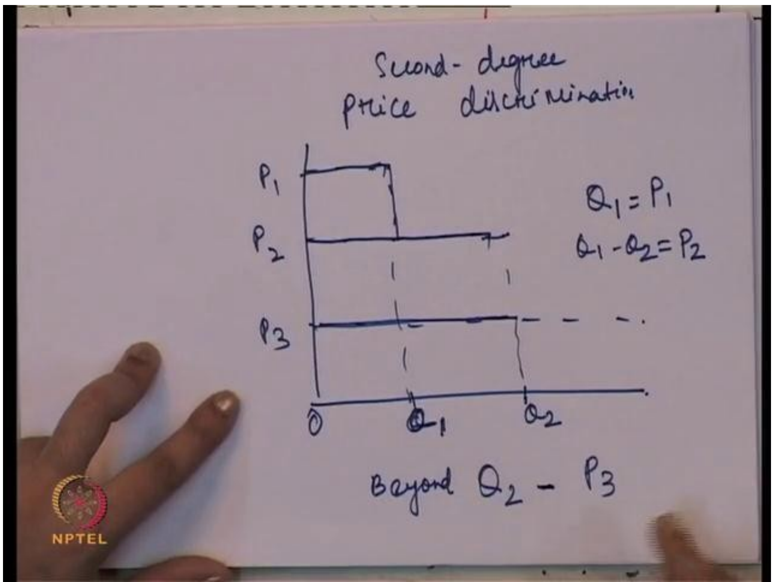

So, we will take the graphical explanation to the second degree price discrimination. So, suppose we take this as $Q_1$we take this as $Q_2$. So, here we get a price that is $P_1$ then we get a price $P_2$, then we get a price $P_3$. So, for here if you look at for $Q_1$ from 0 to $Q_1$ the price being followed is $P_1$.From $Q_1$to $Q_2$ the price being followed is $P_2$ and beyond this $Q_2$ any level of output beyond this beyond $Q_2$ we followed a price that is $P_3$. So, here it is not on the basis of $P_1$ we are identifying $Q_1$ or $P_2$. We are identifying $Q_2$ rather on the basis of up to 0 to $Q_1$ amount of output price has to be $P_1$ $Q_1$ to $Q_2$ price has to be $P_2$ and $Q_2$, beyond $Q_2$ price has to be $P_3$. So, the price discrimination here is on the basis of the here is on the basis of the quantity rather than the price. Then we will talk about the third degree price discrimination, which is more common and commonly practiced in the market structure.

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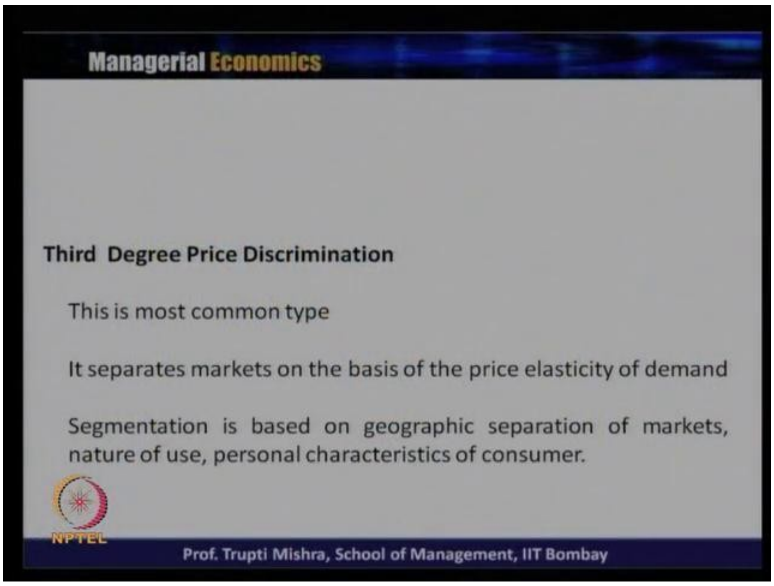


And, it separates the market on the basis of the price elasticity of demand. And here the segmentation is based on geographic separation of markets, nature of use and personal characteristic of the consumer. So the market is, market is divided on the basis of the elasticity of demand like less elastic market, more elastic market. And, on that basis price is generally being followed. And, secondly the segmentation is on the basis of the sometimes the geographic separation like if you look at the typically books it is Indian edition, foreign edition, international edition. What is the nature of use on the basis of the personal characteristic of also consumer.

So, on that basis if you look at the we will get 2 kind of market and in the 2kind of market the monopolist will charge a different price. And, how they will charge different prices because in the elastic market any small change in the price will lead to a greater change in the quantity demanded. So, they will always charge a lower price to get more change in the quantity demanded in the elastic market. And, there the profit maximization a policy is to less price more quantity demanded.

And, in case of the inelastic market they will charge a higher price because the consumer they are less responsive to change in the price. So, even if the monopolist is charging a higher price still there is no much decrease in the quantity demanded. So, they will always charge a higher price in case of the inelastic demand. And, lower price in case of a elastic demand to make this price discrimination is more effective or make more profitable. So, we will check this how this third degree price discrimination can be followed.

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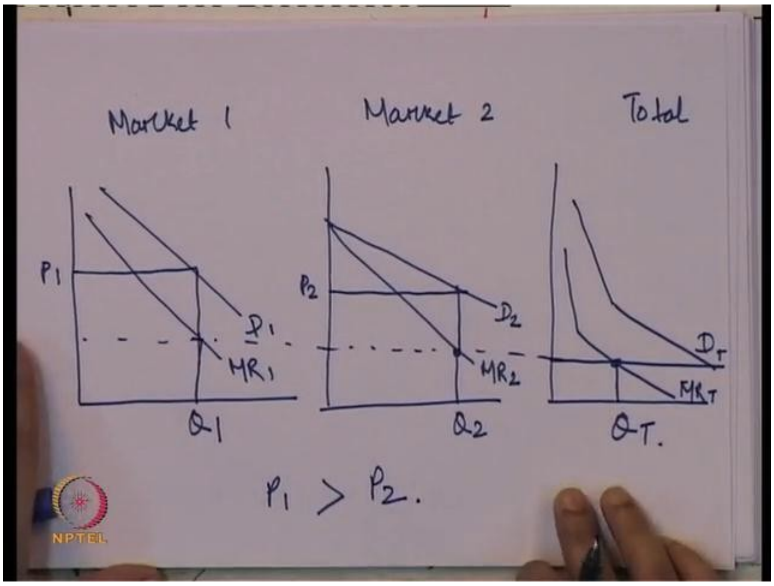


So, here this is market 1, so $D_1$ marginal revenue one. This is market 2; and this is the total market. Now, here it is the inelastic market. We can check this from the shape of the demand curve, taking together we get a demand curve and also get a marginal revenue curve. So, this is demand curve for t, this is marginal revenue of curve for t that is the total. And here this we get the as the on the basis of the marginal cost; we get this is the total output of the total sale or the total output of the market.

Now, how this has to be getting divided between both the markets? So, correspondingly we will take the marginal cost from here. Taking the marginal revenue and marginal cost, the price is decided in the second market that is $P_2$. And taking the same cost function, we will decide the price in case of the first market; that is $P_1$. So, by following this $P_1$ in the market 1 $Q_1$ has to be produced. And here $Q_2$ has to produced or to be sold. So, $Q_1$has to be sold in market 1. $Q_2$ has to be sold in the market 2. The price of 1 is higher than price of 2, because this is the case of the inelastic market; and this is the case of the elastic market.

So, in case of the third degree price discrimination the monopolist charges different prices on the different market. And, markets are segmented on the basis the elasticity of demand. So, if it is more elastic generally the firm charges a lower price. And, if it is high elastic then the firm charges a higher price. Then we will take a numerical to understand this price discrimination. How these prices are being discriminated? On the basis of the price were discriminated on the basis of the third degree price discrimination when market is differentiated on the basis of the elasticity of demand.

Now, what the monopolist they get out of this third degree price discrimination. In the first case they are capturing the consumer surplus in case of the first degree price discrimination. In the second case it is the meter service so on the basis of the usage they are trying to charge a higher price and on that basis they are getting the profit. In case of third degree then generally they are segregated on the basis of the elasticity of demand.

And, they knows that the when the market is elastic they can charge a lower price because the consumer they are more sensitive in the elastic market. And, that is why if you are charging a higher price there will be significant reduction in the quantity demanded. That is why they charge a lower price in case of an elastic market. And, they charge a higher price in the inelastic market because if they are charging a higher price still there is no much difference in the quantity demanded or no much decrease in the quantity demanded and by that they can maximize the profit.

So, we will continue discussion on price discrimination the typically the third degree price discrimination and international price discrimination in the next session. And, along with that also we will talk about the different types of pricing. How what is the basis of pricing and what are the different type of pricing product pricing in the next session.