Managerial Economics
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Lecture - 68
Oligopoly (Contd…)

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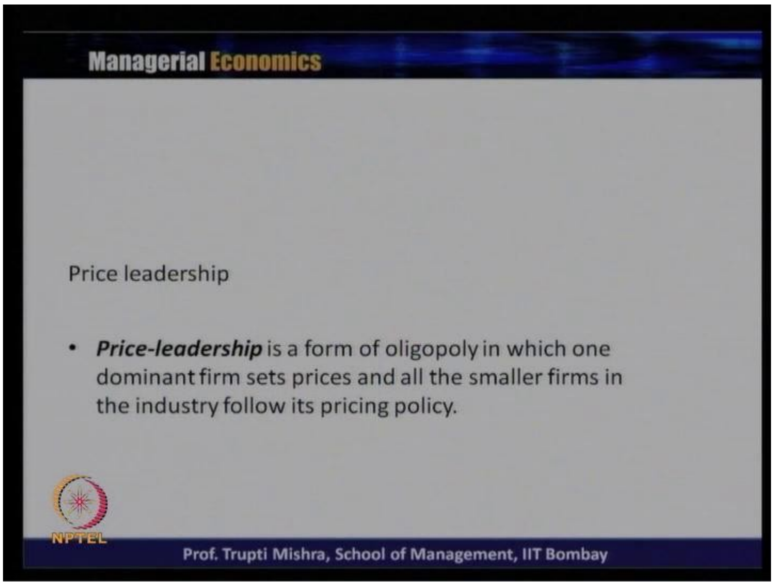

Then, we will go to the next kind of price leadership model, and the next kind of price leadership leader leadership model is where the price is set by the dominant firm. So, in this case, the price leadership typically, in this form of Oligopoly, here one dominant firm sets price and all the smaller firm in the industry follow its pricing policy. So, one firm is going to typically the dominant firm; they are going to decide the price and other firms they are going to follow it.

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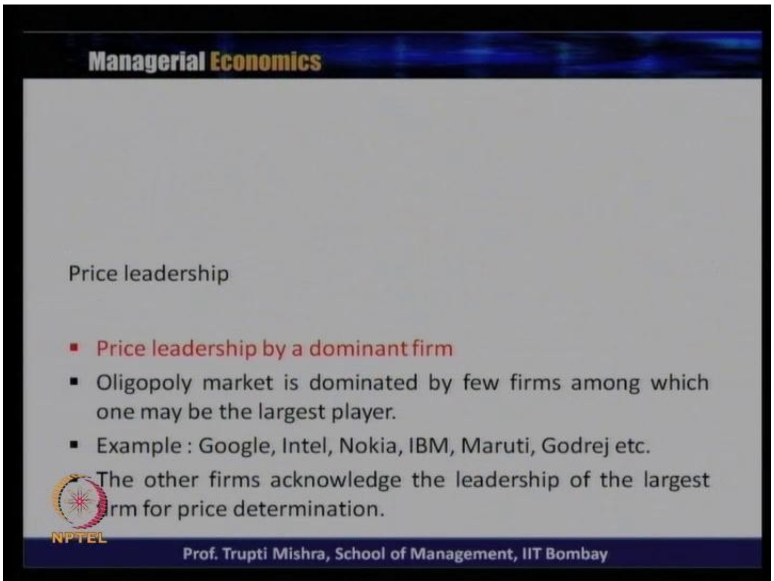

Now, before going into the detail that what is the outcome or how the price output of the other firms get affected, we will understand what is the meaning of a dominant firm, how the firm become emerge as a dominant leader, and what is that rate when they become the dominant firm in the market. So, if you look at the first feature of Oligopoly, we say that even if there are large number of firms in the Oligopoly, at least few of them have to lead the market or few of them have to dominate the market; like at least two of them should have the having the market largest market share in the typical market.

So, Oligopoly market is dominated by few firms among the one way; one may be the larger player; at least one or two have to be the larger player. So, if you take the example, when you talk about a search engine Google has the largest market share; when you talk about a chip, Intel has the largest market share; when you talk about a mobile phone, Nokia has the largest market share; when you talk about the PC segment, IBM has the IBM has the largest market player; when you talk about, at least before the liberalization, when you talk about the car industry, Maruti was having the highest market share; when you talk about a steel furniture, Godrej is having the larger player.

So, in all these segments, if you look at there are many firms, but when it comes to the larger player, they are the larger player in their own segment and that is why they emerge as a dominant firm because they are having a largest market share as compared to the other firms those who are having a smaller market share.

The other firms here, what is the basic or what is the success of this dominant firm depends on how the other firms acknowledge the leadership of the largest firm for the price determination. So, when it comes to dominant firm, even if they are the large, they have the largest market share, they are the large firm in the market, the other firms should accept them as the large firm or the other firms should acknowledge. When they are when they are giving the or when they are fixing up the price, the other firms should follow it and in other way we can say that the other firms have to accept this firm as the large market share. Then only they will follow the price whatever decided by the dominant firm.

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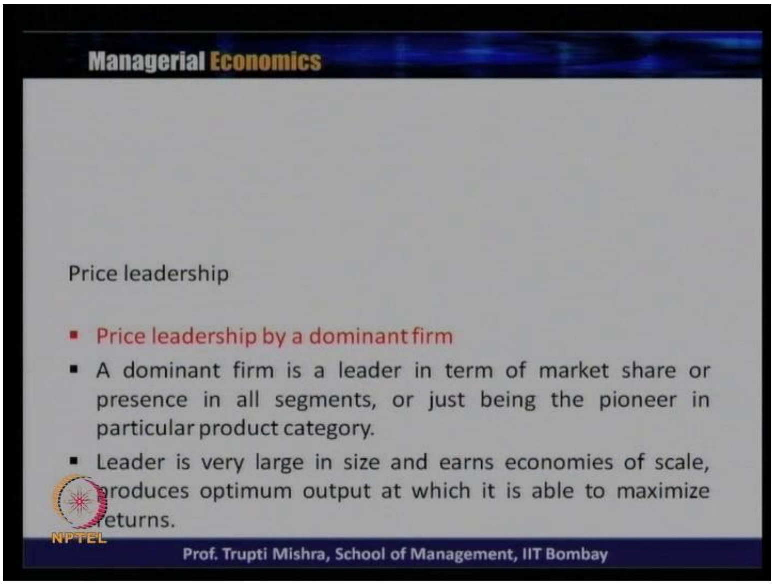

So, dominant firm is a leader in term of market share or presence in all segments, or just being the pioneer in the particular product agency, product category. So, dominant firm may be the leader in term of the market share; either they are having a maximum market share or their presence in all the segments, or just being a pioneer in the particular product category. In all these three, when they are having all these three characteristics or one of these three characteristics, they can be the dominant firm.

So, this dominant firm is very or if they are getting into leader, they has to be very large in size on economy of scale, produce optimum output at which he is able to maximize the return. So, this price leaders or the dominant firm has to be very large in size and they have to earn economy of scale. Then only they can consider as the dominant firm because they are having a large market share and they are getting the profit and they should produce at the optimum output. They should not produce at a output level where which leave some excess capacity for the firm.

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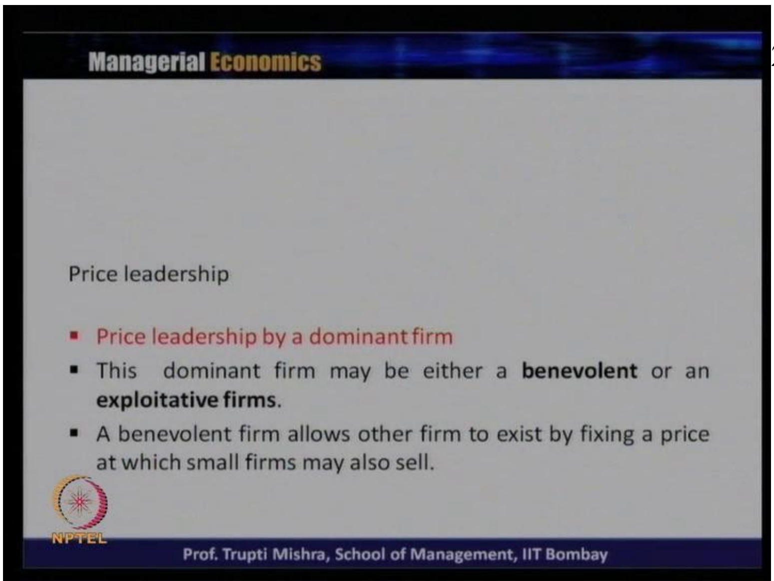

When it comes to a trade of the dominant firm, the dominant firm can be either benevolent or they can be the exploitive firm; either they can be benevolent for the other firms in the market or they can be the exploitive in firm in the market. Now, who are the, who is a benevolent firm or who are benevolent firm?

The benevolent firm allows other firms to exist by fixing up a price at which small firm may also sell. So, when it if the dominant or the market leader is the benevolent firm, their trade says that if they are fixing up a price, they fix at that level where even the small firm can also survive. So, they generally fix up the price which is above the marginal cost of the small firms. Then only that will, that will actually lead the small firm to survive in the market or that price leads the firms to get some amount of the profit; specifically, the small firms in the market to get some amount of the profit.

Now, how the firms, they become a benevolent firm? Because all the dominant firms, they are not the benevolent firm; some firms, they are they some benevolent, some dominants firm are there. They generally they exploit other firms taking the q from there; the dominant firm are taking the q that they are the large firm in the market.

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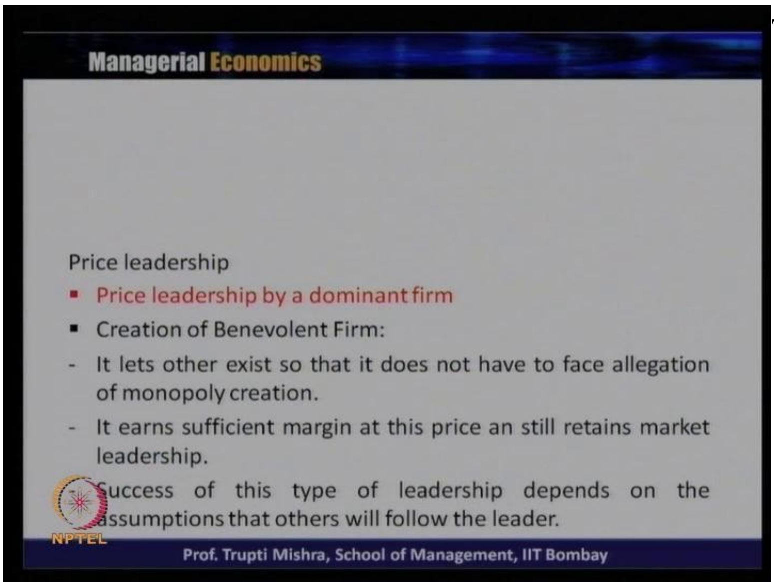

Now, what situation leads to this creation of this benevolent firm? It lets other exist. So, it does not have to face allegation of the monopoly creation. So, if someone is having a 90 percent share, rather than getting into the allegation that they are trying to monopolize, they become nice to the other small firms and they allow them to survive. In that way, they also avoid the allegation of the monopoly creation and they become emerge as a benevolent leader because they allow the small firm to stay in the market.

So, one way, to get a get away from the allegation of the monopolization or the monopoly creation, they become the benevolent firm. Second, it earn sufficient margin at the price and still remain market leadership. So, whatever the price they are charging, they earn maximum or the sufficient margin at this price and still retain the market leadership. And success of this type of leadership depends on the assumption that the other will follow the leader.

So, when it comes to this price leadership by a dominant firm, obviously, if you look at from the angle of small firm also, they cannot compete directly with the large firm. So, in that case, the only option is available to them that they are following the leader and if they are following the leader, may be the out of good will, if the dominant firm is a benevolent firm, they will at least think about the small firm and they will fix up a witch, which is lower than the which is lower than their standard and with that price at least the small firms getting some amount of the profit.

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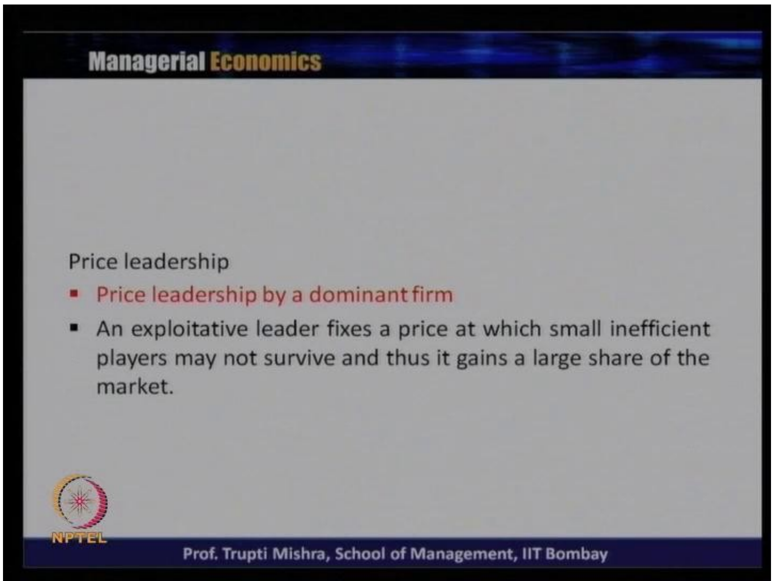

Then, the other category of dominant firm is the firm who exploits the small firms in the market. And how they how do they exploit the small firm in the market? They fix a price at which small inefficient player may not survive and thus it gains large share of the market. So, in this case, the firm set up a price to exploit the small firm and what they do? They set a price in such a level where the small firm or the firm, those who are not doing well in the large period, they are going to get out of this market or they will get the they will get the exit out of this market.

So, in this case, the price whatever given by the firm, that will not suite the small inefficient player in the market; they will be out of the market and in this case the dominant firm become more dominant because they also get the share of the small firm those who have already exit out of this market.

So, we will see the graphical explanation and algebraic explanation of this dominant firm; generally, graphically how we get the demand curve of the dominant firm, how the supply curve gets extracted from the supply curve for the rest of the firm and we will see how generally the small firms is; whether its suitable for them? Till how long the small firm will be there in the market, at what stage generally they go to, go out of this market.

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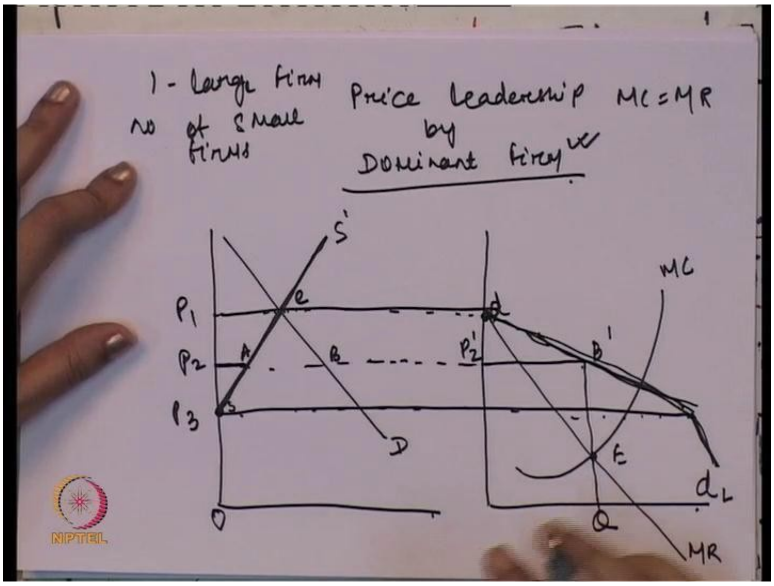

So, we will get a demand curve. This is the market demand curve; then we will get a supply curve and correspondingly we will get the price, and this is the demand curve of the large firm; this is the price. Then, we will find out this is the marginal revenue curve. Then we will get the marginal cost. Corresponding to marginal revenue and marginal cost, we will get the price. That is why, the dominant firm that is P_2; this is P_3; this is P_1; this is e; this we can call as P_2; this is our d, d_1, and here we can call it as b 1; here we can call it as e; this is our q; this is our o.

So, let us understand this graph now. This s is if you look at, suppose we understand that there is one large firm and number of small firms; so this supply curve. If you look at this s, you can call this ss'; this is the aggregate supply curve of the small firms. This is not the aggregate; this is here. The supply of the dominant firm is not added. This is the aggregate supply curve of only the number of small firms that is there in the market.

And how we get this ss'? This is the horizontal summation of the marginal cost curve of all the small firms. This demand curve is the market demand curve where we have also added the demand for the dominant firm product. The difference between the horizontal difference between the demand curve and supply curve, if you look at, that will give us the demand between that will give us the demand by the dominant firm.

So, if you look at that,; through that we get the demand function that is dd_L; that is the demand function for the large firm or the demand function of the dominant firm. So, the horizontal distance between the supply curve and the supply curve of the small firms and the market demand curve, that gives us the demand curve of the dominant firm. So, then if you look at, the logic is very simple. Total demand is this much; this is the total supply of the small firms. So, whatever is the gap between the market demand and the supply of the small firms, from there generally emerge the demand curve for the large firm because the rest of the demand has to be given from the dominant firm.

Now, price falls below: At any point of time, if the price falls below P_1 which is the market price decided on the basis of the supply curve of small one and the market demand. If price falls below P_1, generally the demand curve for the large firm increases because this this is the market demand. This is the demand curve for the large firm. If price falls below this, the demand curve for this dominant firm increases because once price decreases, demand is more than the supply and that leaves the scope for the more demand for the dominant firm.

Now, how we get the price P_2? We get the price P_2 following the marginal cost and marginal revenue rule. So, doing this, we get this price P_2 and at this price P_2, the total demand is P_2B and small firms supply only the amount. Here if you look at, this is the P_2A. So, here we can call it this is the B. So, at this price, if the price fixed by marginal cost marginal revenue rule that is by the dominant firm because price has to be set by dominant firm. This is the marginal revenue curve of the dominant firm; this is the marginal cost function of the dominant firm. Taking this, the price is decided by the dominant firm.

If the price is decided by the dominant firm, at this price small firm just supply this much because this is the supply curve for the small firm. And the large firm, they supply, what does the large firm supply? Large firms, they supply AB. So, in this case, if you look at, this is the this has to be given for the demand for the dominant firm, and in this case, this is what they are going to supply. This is the demand for the dominant firm and this is what they are going to supply.

If the price is P_3, up to this if you look at the supply given by the small firm is 0 and at this point, now this is entirely the demand for the large firm because the supply is not going to get by the small firm. So, the entire demand gets satisfied from the small firm the large firm because small firm is not supplying anything when price is P_3. Any price below this P_3, supply curve for the small firm is not existing because this is the price beyond which the small firm is not going to supply in the market or small firm small firm is not going to sell in the market.

So, that is the reason if you look at, when the price is given by the dominant firm, when the price leadership is by the dominant firm, the amount what they supply, is getting supplied by the small firm, is less and the amount which is getting supplied by the large firm is more. So, that is how the dominant firm, if they are deciding the price, they are supplying more and the small firm is supplying less.

So, now, we will see numerically, whether the share gets more by the large firm when they set the price and less by the small firm because they are just following the price or its gets equal share or gets at least a proportionate share. So, to summarize this, how we can say, this is typically dominant firm? There is a market demand and the demand comes to all the firms in the market, and we get the supply curve for the small firms on where we do not consider the supply curve for the dominant firm. So, the gap between the supply given by the small firms and the market total market demand for the product, that is generally the demand curve for the dominant firm.

So, we identify the demand curve; from there we find out the marginal revenue curve; we get the marginal cost curve; this is the marginal cost curve. On that basis, we set the price. When the price is set by the dominant firm, this is the amount of supply that comes from the dominant firm and this is the amount of supply that comes from the small firm. And correspondingly, at any point of time, if the dominant firm would like to, if the dominant firm is going to exploit this number of small firms, they will reduce the price. And if they are reducing the price from P_2 to P_3, small firm is not supplying any more product in the market or they are not taking care of the demand, market demand. And what they will do? They will go out of this market and the large market or the dominant market, they will get all the share of the total market and they become the monopoly leader.

In this case, if you look at, if it is a benevolent firm, they will not go beyond P_2. They will give at least small portion of the market to be shared by the small firms, but if they are, if the firm, if the dominant firm is not benevolent, rather they are exploit in nature, so they will prefer to charge the price P_3 which is much below P_2 because at this price, the small firm will become inefficient; they will not able to survive; they will go out of the market and the entire market share will go to the large firm. So, here the trait of this dominant leader comes; whether they are in in a way to exploit the small firms or they are the benevolent leader because they you can make the difference that, in this case this price leadership will lead to the monopoly situation or it will not lead to a monopoly situation.

Then, we will just take a numerical or algebraic solution to this dominant firm leader in order to understand that how the share gets divided between the dominant firm and the small firms.

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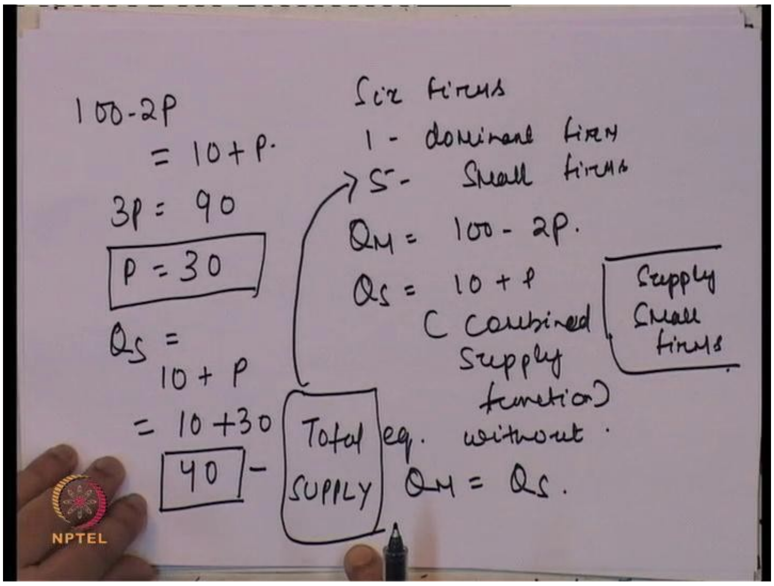

So, we will assume that there are six firms in the market. So, one is dominant firm and rest five is small firms. So, this is the total market demand that is $100-2P$ and Q_s is the supply of the small firms; supply function of the small firms excluding the large firm. So, $Q_s=10+P$. This is the combined supply function to find the equilibrium output or equilibrium without the dominant firm demand; that is Q_s to be equal to Q_s has to be equal to the supply. And if you take Q_M is equal to $Q_M=100-2P$ and $Q_s=10+P$, we get $3P=90$ and P is equal to 30. So, equilibrium price without the supply of the dominant firm, we get p is equal to 30.

And what will be the supply here? If you put the value of the P here, then it is $Q_s=10+P$. So, that comes to $Q_s=10+30=40$ which is equal to 40. How do we interpret this 40 now? This is this 40; it is the total supply, comes from this five small firms. So, once we know the market demand, once we know the total supply, we can find out what is the demand for the dominant firm; so total supply is 40 units.

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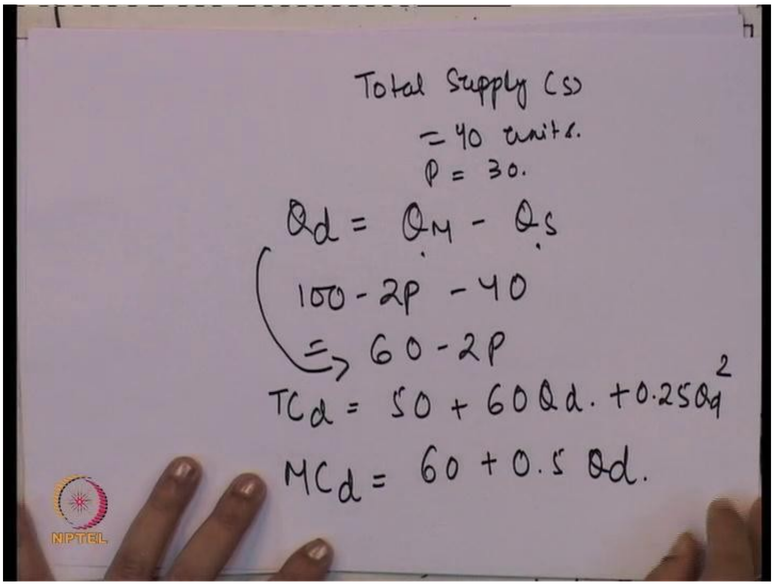

Now, we will find out what is the market demand and that difference will gives give will give us what is the demand for the dominant firm. So, total supply is by the small firm is equal to 40 units and price is equal to 30 units. Now, this is the demand function for the dominant firm. So, this is $Q_d = Q_M - Q_s$; Q_M is the total market demand; Q_s is the supply of the small firm; So, $Q_M - Q_s$; so this is $100 - 2P - 40$; so $60 - 2P$; that is the demand function for the dominant firm. So, total cost for dominant dominant firm is given; that is $TC_d = 50 + 60Q_d + 0.25Q_d^2$. This is the total cost function. From here, we can find out the marginal cost function for the dominant firm. So, that will come as $MC_d = 60 + 0.5Q_d$.

From the demand function, we will try to find out the total revenue function. From total revenue function, we will find out the marginal revenue function. Just now we calculated the marginal cost function. So, we will follow the profit maximizing rule, the marginal cost marginal revenue rule in order to find out the price.

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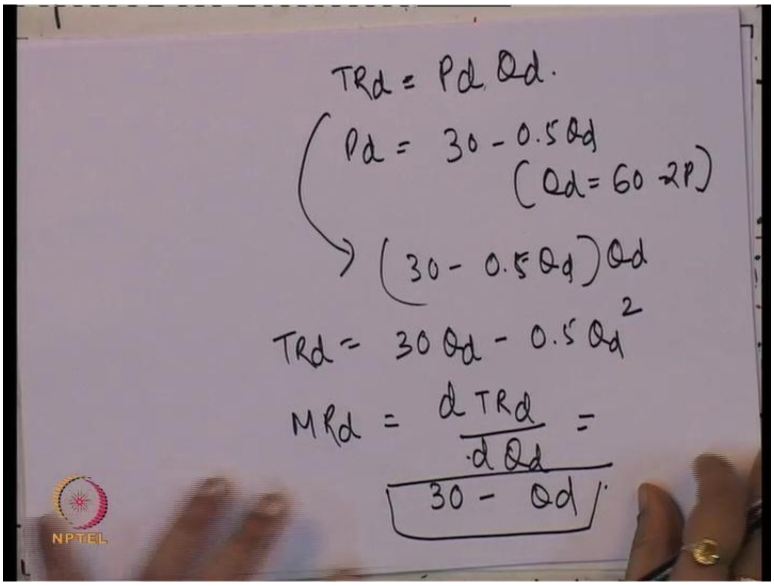

So, to find this, we will find now total revenue for demand function. For this we need we need the price, this demand function for the dominated firm, and also the price for the dominated firm. So, how to find out this price of d? This is $P_d = 30 - 0.5Q_d$ and how we got this because our $Q_d = 60 - 2P$. Then we will find this total revenue is equal to now $TR_d = (30 - 0.5Q_d)Q_d$. So, that comes to $TR_d = 30Q_d - 0.5Q_d^2$e. This is the total revenue for dominated firm.

Then, we will find out the marginal revenue of dominated firm; that is derivative of total revenue with respect to $MR_d = \frac{d(TR_d)}{dQ_d} = 30 - Q_d$. This is the marginal revenue for d. So, we have marginal cost function; what we got previously. Now, we have the marginal revenue function. To find the price and quantity, we will take the marginal cost and marginal revenue rule.

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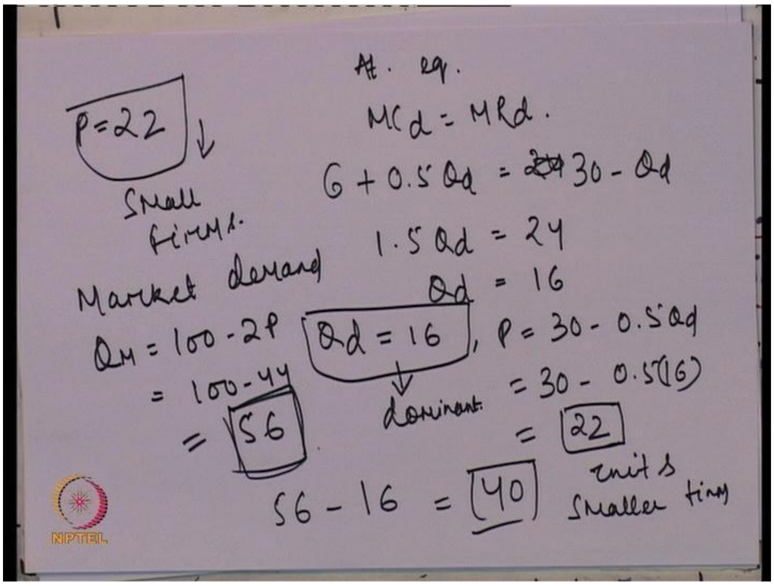

So, at profit maximizing equilibrium, marginal cost of d has to be equal to the marginal revenue of d. So, $MC_d = MR_d, 6+0.5Q_d=30-Q_d$. Then simplifying simplifying this, we can get $1.5Q_d=24Q_d, Q_d=16$. So, this is the demand that is quantity that has to be produced by dominant firm. This is the price. Price is again $P_d=30-0.5Q_d$. So, this will gives $P_d=30-0.5(16)$. So, this comes to 22. So, price is 22; quantity demanded is 16.

Now, this price, this price 22 has to be accepted by the small firm because this is the price leadership model where there is the dominant firm has to be has to set the price and small firms, simply they have to follow this. So, taking this price, now what will be the market demand? That is Q_M; So, $Q_M=100-2P$. So, that comes to 100 minus 44; that comes to 56; this is our total market demand.

What is the market demand for the dominant firm? The market demand for the dominant firm is 16 and this is the total market demand. So rest, this 56 minus 16; 40 unit has to be supplied by the smaller firm. So, if you try to analyse from here, price is 22 that is followed by small firms and if the total market demand if you look at, it is 56; out of this, if not even less than one-third is supplied by the less than one-third is supplied by the dominant firm and rest is supplied by the smaller firm.

So, maybe we can say that this is a kind of price leadership or the dominant leader is such that at least it is benevolent in nature because the firm is setting a price such that, at least more than two-third is getting supplied by the five smaller firm and the dominant firm itself its supplying only less than one-third of the total market demand. So, at least from the result if you want to analyse and if you want to read between the line, at least you can say that the price is set by the dominant firm which is benevolent in nature because it is just supplying less than one-third of the total market demand and rest all is supplied by the smaller firms.

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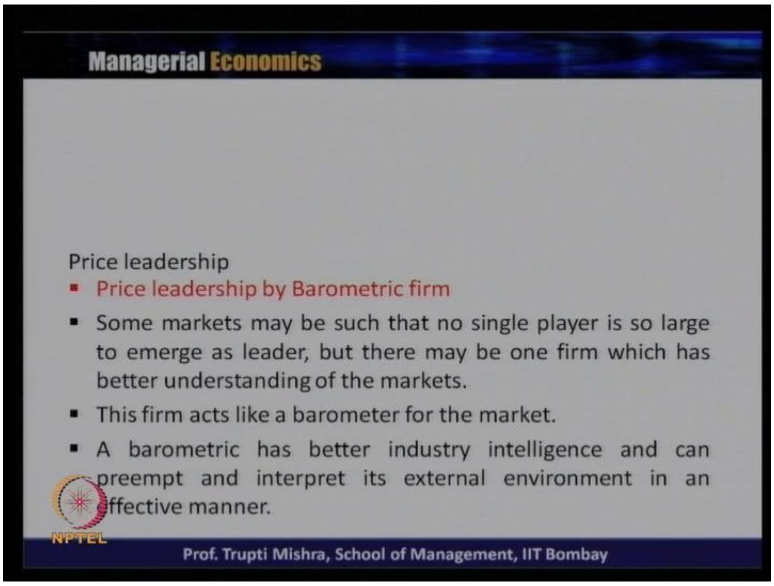

So, in case of low cost firm, generally the low cost firm set the price; other firms follow it. In case of dominant firm, dominant firm set the price; others they will follow it. And the third category of the price leadership is if you look at it it is the kind of more subjective in nature, when we will find that there is no clear case of a low cost firm or no clear case of a dominant firm in that case what model to be followed and in this case the model follow is price leadership by the barometric firm. And here, why the need comes from the barometric firm because there is no clear cut clear cut emergence of a dominant firm or clear cut emergence of a low cost firm.

So, there is evidence in the some market that there is no single player is so large to emerge as a leader, but there may be one firm which has better understanding of the market. So, the firm may not be large in nature; they are not operating in the large scale of operation, but when it comes to making a leader whether to make that firm as the leader, they are considered to be the leader because at least they have a better understanding of the market.

So, this firm acts like a barometer for the firms and why they are known as the barometer firm or the how why they are considered as the barometer of the market? Because they have the better industry intelligence and can prompt and they interpret the external environment in an effective manner. So, suppose there is a change in the Government policy, suppose there is a crisis, suppose there is an event which has some influence on the price and quantity combination or the demand of the market, so in this case, generally the barometric firm, they get into a situation where they are they are the best judge; they are the best firm to judge the event and lead the price output decision on that manner. So, they are considered as the barometric firm and the barometric firm should act as the leader.

They should decide the price and the other firms they have to simply follow this. So, either the so three kinds of models or three kind of arrangement in case of a price leadership model; either the price has to be set by the low cost firm or the price has to be set up by the dominant firm or the price has to be set up by the barometric firm.

So, in last couple of sessions, we discussed about Oligopoly market structure identifying two different kind of models: one is collusive model; another is the non-collusive model. Non-collusive model, where the Oligopoly's firm they compete with each other and in case of collusive model, they generally collude together to maximize the profit and also reduce uncertainty and in the way, if we look to look at that, at least get some amount of the profit from the collusion.

Next session, we will see that how game theory generally helps or game theory as a tool helps the firms to or game theory as a tool helps the analysis to analyse the firm's behaviour or the group behaviour in the Oligopoly market or typically how the economics of cooperation what comes from the group behaviour of the Oligopoly firm; generally whether its competition or whether its collusion, both are considered as the group behaviour. And next class, we will see game theory as a mathematical tool; how it helps to identify both the economy of cooperation, whether its competition or whether it is collusion.