Foundation Course in Managerial Economics

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Lecture - 36
Oligopoly - P and Q Outcomes with Example

Hello and welcome back to our discussion on oligopoly. We had introduced the oligopoly market structure. We have talked about the about why the oligopoly market outcome is a little more complicated than monopoly or perfect competition because in the latter 2 cases even in case of monopolistic competition also the firms have to make their own decisions irrespective of what the other firms are doing in the industry or in the market.

So there the output that they are going to produce, the price that they are going to charge and the profit that they are likely to make are solely dependent on their own cost conditions and nothing else. But in case of oligopoly we have seen that the firms since there are only a few firms and entry and exit is difficult so there are only a few firms in the market and lot of market power could be exercised but at the same time the firms are going to look at the price and quantity of its rivals and act accordingly or accordingly they are going to make their decisions of what price to charge and what output to produce. So we have looked at the kinked demand curve where we saw that there is a range where there is the prices are sticky and the output is also sticky.

So that kind of gives a stability to a oligopolistic market structure that for quite a range of marginal cost quite a range between which if the cost fluctuates for any firm it is not going to change its price or output. So that kind of imparts a stability to the oligopolistic market structures where the firms would not like to move away from the price that they are already charging. So now in this module we are going to take an example.

We are really we are going to look at demand curve. We are going to have some cost structure and we are going to see that if a oligopoly firm has a demand curve like this and the cost structure and how is it likely to behave. What could be the price and what could be the output in such a situation where the firm actually takes into account the decision of its rival. So let us look at the example.

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Example

- Two firms: Vodafone and Airtel are service providers in a small town
- Assuming fixed cost = 0 and Marginal Cost = ₹10
- The market demand schedule is given
- They form a Cartel, i.e. firms colluding to decide on the price to charge and quantity to produce
- If they act like a monopoly in unison, for each firm: Q = 30, P = ₹40, profits = ₹900

Now the example that we are considering, there are 2 firms. They are Vodafone and Airtel. They are service providers in a small town. So they are they are the only 2 firms who have network and they provide services in that small town and we are assuming for simplicity a fixed cost equal to 0 and marginal cost equals Rs. 10.

Now the market demand schedule is given. I am going to write down the market demand schedule on the board and then once the market demand schedule is given the firms have so here this is a special case of oligopoly where there are instead of few firms there are actually 2 firms.

So this situation is called duopoly where there are 2 firms. So we are taking a very simple example where there are 2 firms competing for the same market and they have very similar costs and how are they going to share the market between themselves.

So as I said in the previous modules that the firms have 2 choices. The one the first choice for the firm is to cooperate. The first choice is that one of the choices is that the firms could decide that let us work in unison and decide what price to charge and what output to produce. So that will sort of give us some clarity and we need not worry about the other firm.

So this is one option that they could try. The other option is not to cooperate and act independently and try to capture the as much of the market or make as much profit as possible in that market. So let us see what happens if they form a Cartel. Cartel means that is the firms that is firms colluding to decide on the price to charge and quantity to produce. That is what we mean by Cartel and here we will see that in when they act as Cartel they can decide to act as a monopoly. So let me first write down the demand schedule and then from there we can see.

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So, so price and quantity 0, 5, 10, 20, 30, sorry 30, 35, 40, 45. These are the prices that are possible and quantity is say 140, 130, 120, 110, 100, 90, 80, 15, 110, 20, 100, 25, 90, 30, 80. So this is the price schedule and accordingly these are the output schedule. So you can imagine the output to be the number of people they are serving, number of customers, it can be imagined that way.

So this is the price and demand schedule. So let us write down the total revenue in each of these cases is 0, 650, 1200, 1650, 2000, 2250, 2400, 2450, 2400, 2250. So these are the total revenue. Cost is since marginal cost is fixed for every unit of output so this is 1400, this is 1300, then 1200, then 1100, 1000, 900, 800.

So these are the total cost and so profit as is equal to total revenue minus total cost is equal to -1400, -650, 0, 550, 1000, 1350, 1600, 1750, 1800, and 1750. So these are the, this is the cost. This is the revenue, this is cost and this is profit. So from here first would you be able to tell from here what is the what is likely to be the perfectly competitive output and what is likely to be the monopoly output.

So from here one can clearly see so in case of perfect competition what happens in case of competition? In case of perfect competition price is equal to MC and profit is equal to 0. Price is equal to MC and profit is equal to 0. So this basically gives us our competitive output. So this is our competitive output and this is our competitive profit.

So the pink line this is our perfectly competitive output. So if the firms are to behave as competitive firms, if they are to behave as competitive firms and take the price as given so in that in the market what they would do is they would produce the output so that the profit is equal to 0 so that their total revenue is equal to total cost or price is equal to their marginal cost and this is the competitive output.

So what would happen, now we said that the firms will decide to act like a monopoly. What if they collude? Now if the firms collude they are going to say that since monopoly gives us the maximum profit let us get together. We are the only 2 firms in this town. Let us get together, act as a monopoly and we are going to charge the price in such a way that it maximizes our joint profit.

So the total profit is going to be joint and our costs are same so we are just going to split the profit into half between the 2 of us and that is the price that we are going to charge and that is the output that we are going to produce.

So what they do is they make MC is equal to marginal revenue and accordingly from the demand curve they choose that level of price which they are going to decide the output on the basis of marginal cost equals marginal revenue and accordingly and from there they are going to trace back the output the price from the demand diagram from the demand curve and that is the price that they are going to charge.

So that is going to give them the maximum revenue. So monopoly gives them the highest revenue so highest profit. So where is the highest profit in this schedule? The highest profit lies here 1800. I hope you are able to see it. So this is the highest profit that is being earned here, this is the highest profit that is being earned here at a output level of 60 and a price level of 40. So this is the monopoly output.

So had there been only one firm in this market that firm would have produced 60 units of output and charged a price of 40 Rs and gained a profit of 1800 Rs. Now since there are 2 firms in this market they are going to split this amongst themselves. So this is the Cartel situation. This is what they are going to do. So each of the firms is going to produce 30 units of output and they are going to charge a charge a price of 40 Rs and accordingly they are each of the firms is now going to get a so in case of Cartel each firm earns profit is equal to 900 Rs.

So each firm earns a profit equal to 900 Rs so the total profit in the market is 1800 Rs. So that is what they are going to do and this is what we see in the slide also. In the slide if they act like a

monopoly in unison for each firm output is equal to 30 and price is equal to 40 Rs. So profit is equal to 900 Rs for each of the firms.

Now next thing to think about is each of the firm wants to maximize its profit. It has its own self-interest in mind. So what happens so the next the firm is he going to stop at producing 30 units? Is he going to stop at producing 30 units?

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Let us see what happens when one of the firms say for example Vodafone decides say Vodafone now decides that let me break the agreement, let me break the agreement without informing the other firm, without informing Airtel let me break the agreement and let me produce Q equals 40 instead of 30. So it decides I am going to produce 40 units instead of 30 units and in that case and the prevailing price in the market is what?

So as soon as he produces 40 units Airtel assuming that Airtel so Vodafone thinks that if it increases its output to 40 units Airtel will continue will continue to produce or let me just make it shorter; Airtel produces Q is equal to 30. So total output in the market is equal to 70 units now. So total output in the market is 70 units now and price immediately then falls to so price immediately falls to 35 Rs.

So price immediately falls to 35 Rs. So as soon as the price falls to 35 Rs what happens to Vodafone's profit? So in this situation if Vodafone decides that I am going to increase the output then profit of Vodafone profit of Vodafone is equal to 40 into 35 minus 10; cost, price, and output is equal to 1000 Rs which is more than 900 Rs.

So when they decide, when they collude Vodafone gets a profit of 900 Rs but if he breaks the agreement, produces another 10 more units in that case his profit is 1000 Rs as against 900 Rs so there is every incentive for Vodafone to break the agreement because all of them are profit maximizers and he would like to maximize his profit.

So he is going to break the agreement or Vodafone is going to break the agreement and charge a higher price charge a or break the agreement and produce a higher amount of output thus bringing down the price in the market and hence getting a profit which is higher than the Cartel situation.

But now what happens and in this case what if Airtel continues to do the same; the profit of Airtel is, profit of Airtel falls, profit of Airtel falls to 750 Rs. So the profit of Airtel falls to 750 Rs. So that is what happens. So when 35, 70 profit is 1750. So when the one who is breaking the agreement he gets 1000 Rs out of this profit and the other one who sticks to the agreement he gets a much lesser profit than 900; he gets a lesser profit of 750 Rs.

So in that case so now the Airtel also knows if there is a collusion between the 2 firms and there is no way of legally enforcing this agreement in that case each of the firm has enough incentive to break the agreement. So each of the firm knows this also. So the Airtel will know that it makes sense for Vodafone to break the agreement and produce a higher amount of output.

So that is what Airtel is also going to do or to think about it in a different way is independently also the Airtel also thinks in the same lines as Vodafone and thinks that if I break the agreement I am going to get a higher return. I am going to get a higher profit. So let me break the agreement. So as a result what happens is each of the firms breaks the agreement and each of the firms ends up producing 40 units of output.

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So each of the firms now, so each of the firms now break the agreement and Airtel also produces, now Airtel also produces Q is equal to 40. So total output in the market now becomes 80, even higher. Price now falls to 30 and now the profit falls to so each of the firms now this calculating in similar way. So profit of Vodafone now reduces to 800 Rs and for Airtel also profit reduces to 800 Rs.

So they each of them is going to break the agreement and each of them is now going to produce higher amount of output because they do not trust each other. Each of them is going to produce a higher amount of output. So firstly there is distrust amongst the firms that the other is going to probably break the agreement. Second is they are acting in self-interest and they are going to do whatever is going to make them best, make them the best of in this situation.

So this is what they are going to do and they will end up each getting a profit of 800 Rs which is now less than the Cartel outcome of 900 Rs. So what we see is even if the firms decide to collude and they agree to produce a certain amount of output which makes their profit highest in the joint profit highest, because of their self-interest getting priority they end up producing a output level which is actually much more than the monopolistic level of output and the result is that each of them ends up getting a profit which is less than the monopoly profit which is less than the Cartel outcome of profit.

So this is what happens and next another interesting thing to see would be are they going to keep on increasing the output so 40 is something we tried. Now Vodafone is it going to increase the

output to 50. Is he going to increase it to 50? So what happens if Vodafone increases the output to 50?

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So going by the same argument if the Vodafone increases its price to or output to 50 then this is 50 and total output then becomes 90. So price will be 25, price will be 25 and Vodafone profit will reduce to 50 into 25 minus 10 equals 750. So in that case Vodafone if Vodafone decides to increase its output even further to 50 units in that case its profit is going to fall from 40 units.

So in that case it is not going to increasing his output and it just going to continue to produce 40 units. So both the so this is the Vodafone is not going to choose so neither of the firms is going to increase the output even further beyond 40 units and they will settle at producing 40 units and together they are going to produce 80 units in the market.

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Conflict between collusion and self interest

- Both firms earning higher profit (₹900) if they stick to the cartel agreement
- But, individually they have incentive to break the agreement
- And together end up producing more than monopoly output at a lesser price and lesser profit (₹800)
- Self interest and lack of trust on rivals may make it difficult for cartels to sustain
- Especially since there is no legal binding possible on the cartel members

So to summarize there is conflict between collusion and self-interest. So although collusion leads to a higher profit for individual firms acting on self-interest leads the firms to such a situation where they end up getting a profit which is less than collusion outcome. So both firms earning higher profits if they stick to the Cartel agreement but individually they have incentive to break the agreement and together they end up producing more than monopoly output at a lesser price and lesser profit.

Self-interest and lack of trust on rivals may make it difficult for Cartels to sustain. Especially since there is no legal binding possible on the Cartel members. So as you may already know that Cartel is Cartel formation is not legal for the benefit of the consumers because if the firms get together and if there is legally if it is Cartel is enforceable then they will end up producing monopoly output at monopoly price which is not at all a desirable situation for the customers so for the consumers so this is something which is not legally approved.

So because since it is not legally enforceable there is every incentive for the firms to default on the agreement and they work on their they basically act on their own self-interest and they end up producing a output level which is higher than the monopoly output level which is which in a sense actually is beneficial for the consumers.

So this was an example that illustrated how a Cartel formation or how collusion is not so easy in case of oligopoly. In the following modules we are going to talk more about these. Thank you.