Foundation Course in Managerial Economics
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Lecture - 35
Oligopoly - Determining P and Q

Welcome back to our discussion on oligopoly. We have developed our understanding about what a oligopoly market structure looks like and what kind of products they might be selling and how the firm's decision of determining P and Q are dependent on the rivals decision also. So we have had a preliminary discussion on this but we have not looked at any model yet. So that is what we are going to do in this module.

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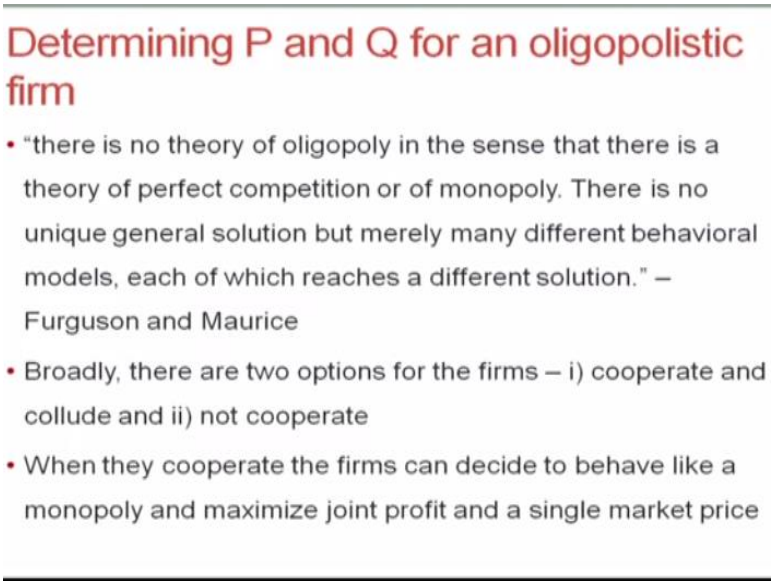

So determining P and Q for an oligopolistic firm. So I quote Furguson and Maurice by saying that there is no theory of oligopoly in the sense that there is a theory of perfect competition or of monopoly. There is no unique general solution but merely many different behavioral models, each of which reaches a different solution.

So this is this summarizes our discussion from the previous module where we said that basically the oligopolistic firm has to make its P and Q choices depending on the behaviour or depending on the actions of its rivals; what kind of price the rival is charging, what kind of output it is supplying in the market, what is it likely to do in the future.

So these are the things that each of the firms keep into keep, each of the firms they keep into consideration and decide what P and Q to charge and as I also said in the previous class that it is basically like a strategy planning for the firms. They have to plan a strategy of how to behave in this kind of market where there are only few other players in the market and they have to stay in business and they have to earn a profit and they have to preferably do better than their rivals.

So there could be various like in case of a game, like in case of say a game of chess you know that there could be various starting moves one could think of. Those of you who play chess or play say cards they know that there could be various starting moves and also depending on whether the it is you are playing with white or black and accordingly you are going to make your moves and you are also going to decide that if my move is this way this is what these are the likely reactions of my competitor or the other player whom with whom I am playing the game of chess and you are going to decide accordingly that if that is the fall in the next move then I am going to do this in my third move.

So these are the things, these are the strategies that a player plans or if he is not the you know like opener in the game he may observe what the rival has done or what the competitor what has been the move of the competitor and accordingly he decides how or plans how the game is going to follow eventually.

So similarly in case of oligopoly also one can imagine various situations, various strategies of the firms to do well in business and accordingly one can imagine various reactions of the rival firms and hence P and Q are going to vary from situation to situation. So we are going to discuss a few situations here.

So very broadly speaking there are 2 options for the firms, there are 2 options for the firms. So there are only 4 or 5 firms in the market so or imagine the case of 2 firms say for example Pepsi and Coke. Both of them are catering to the major soft drink demand of the country. Most of the people like they are either buying different products of coke or they are buying different products of Pepsi.

So basically major portion of the as we discussed about concentration ratio so probably more than 80% of soft drinks is being produced by only 2 firms in the market. So the concentration ratio is very high and they are like a oligopoly. They are sharing the market and so there are 2 options for the firms.

One option is they can collude or they can cooperate or they can say that see the two of us are only catering to the market. There are no other rivals here. Probably no one is going to enter the market because it is not easy because we have already created or established a reputation in this market and there is the consumers are we have more or less divided the consumers so let us collude, let us cooperate, and let us charge a common price and let us split up the market amongst us.

So this is one option that the firms have and the other option is they might decide not to cooperate and because there could be various reasons of not cooperating. First they do not trust each other so not they would not cooperate or they have a lot of confidence in themselves that they will be doing much better if they do not cooperate.

So whatever may be the reasons the other option for the firms is to not cooperate. So we are going to see so when the when they cooperate the firms can decide to behave like a monopoly and maximize joint profit and a single market price.

So when they cooperate they may decide they may say that let us behave like a monopoly. Let us get together. Let us behave like a monopoly. Let us charge a common price and let us split up the total output amongst ourselves which will probably be dependent on the cost structure of each of the firms. So if they have very similar cost then probably it will be 50%, 50% of the output. So that situation we are going to discuss later.

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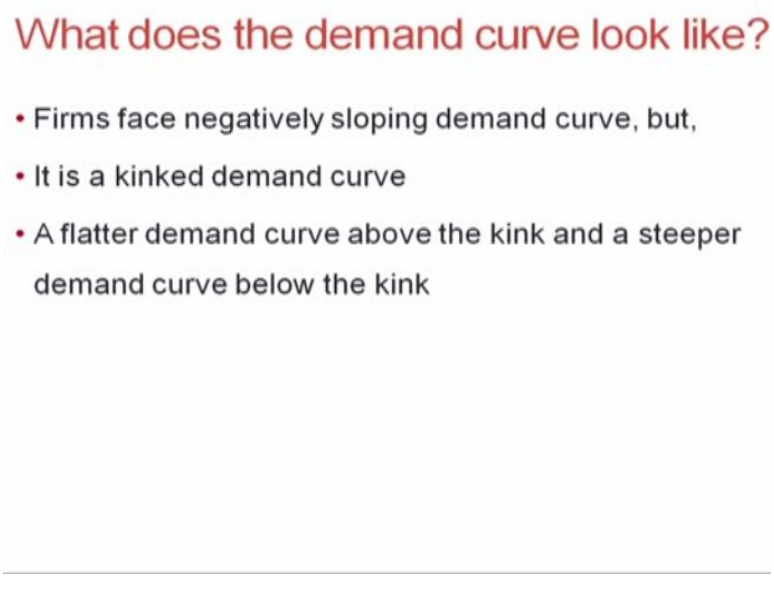

Now let us move on to the situation where they do not cooperate or the situation where a firm behaves individually. It makes its choices individually and then decides what price to charge and what quantity to produce. So when we try to do that first we need to develop the demand curve. So our question is what does the demand curve look like?

So the firms will be facing negatively sloping demand curve because they this is a market structure which lies between say monopolistic competition and monopoly both of them it could be product differentiation, it is very unique it is even if it is not unique then also the barrier to entry is very high so the demand curve is negatively sloping.

But it is a kinked demand curve. I am going to explain on board why it is a kinked demand curve. A flatter demand curve above the kink and a steeper demand curve below the kink. This is how the demand curve looks like for a oligopoly firm when they are not cooperating or when they are deciding P and Q on their own. So let us let me draw try to draw the demand curve what it looks like.

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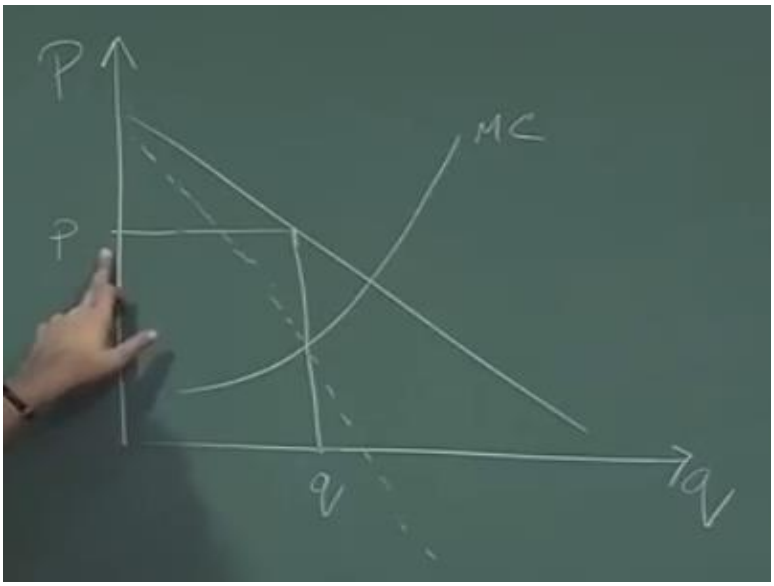

So this is for a firm and so this is for a firm and it has a so you probably know the exercise already. So this is a firm and say it has started with this demand curve. It is its demand curve that the firm is facing and it is the marginal cost curve and the firm has it is a profit maximizer so obviously it has made MC is equal to MR and it has decided to produce q and it is decided to charge a price of P.

Now imagine that this is the situation in the market. This is the equilibrium situation where we start from. Now the so the prevailing price in the market is say P. Now what happens? So the prevailing price in the market is P. Now what happens if the firm decides to reduce the P. If the firm decides to so say imagine a situation where the firm is or even it is possible not to draw okay let it be here let me draw so this is P this is q and say this is the equilibrium P in the market.

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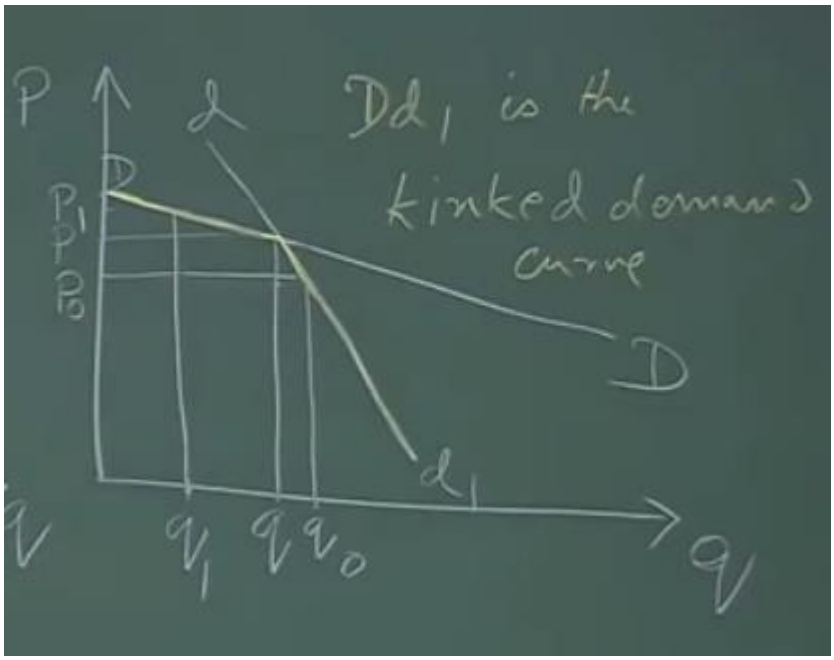

Now so if this is the P in the market and say the firm was selling a quantity of amount q and there are a few more rivals in the market who are keeping a close watch on this firm. Now the assumption here is suppose the firm decides I am going to reduce the price. Suppose the firm decides I am going to reduce the price. In that case what is going to happen?

So if it reduces the price to P 0 then how much is the quantity going to change? Now what is going to the assumption here is as soon as the firm reduces its price to P 0 the other firms are going to follow suit why? Because they know that since if they are operating in the same market and when they have this price that I have started with.

So say this is the equilibrium situation. Like this is the market at rest and it is a this is the prevailing price in the market. So everyone is charging around P. Now this firm decides I am going to reduce the price to P 0. So as soon as it reduces the price to P 0 what will happen is other firms in the market are also going to reduce their price to P 0. So all the firms will see that if they if since each of them faces a negatively sloping demand curve and one firm reduces the

price so what will happen is they know that one firm has reduced the price so most of the market or most of the consumers they are going to rush to this firm and because there has been a price drop and hence the rivals to stop that from happening they are also going to reduce their price because they do not want to lose their customers to this firm.

So they are also going to reduce the price. Hence the firm which had hoped to increase its output because of by reducing price cannot increase it too much. So the increase in output will be very little say q to q 1 because all the firms other firms have also reduced their price. So the demand curve for this firm now looks like this which is a steep demand curve which means that if the firm is to reduce the price, quantity, rise in quantity is not going to be much.

On the other hand if this firm decides that I am going to raise the price due to whatever reason say the cost has increased. So he decides I am going to raise the price. So if he raises the price to P 1 what will happen is since it is a negatively sloping demand curve law of demand price increase associated with drop in quantity.

So since that is going to happen so all the other firms in the industry are not going to raise their price. They will think that okay fine this firm has raised its price so now the product of this firm is costlier so hopefully many of the consumers are going to come to us. So they are not going to do anything. They are not going to raise their price and as a result this firm is going to lose lot of customers. Hence the drop in quantity is going to be very big.

So when he raises the price, the drop in quantity is very big. Say let me call this q 0 to match with the P 0 and this is the q 1 to match with P 1. So here the drop in quantity is very high as a result in this portion the demand curve is flat. So above P the demand curve is very flat and below P the demand curve is steep.

So this is one demand curve and small d is another demand curve. So if the market starts from a stable price quantity combination in that case the demand curve facing each of the firm is a kinked demand curve. So it is a kinked demand curve. It looks like this, the yellow demand curve D, capital D d 1, d 1 is the kinked demand curve.

So capital D d 1 is the kinked demand curve that each of the firms is facing. That is it would be it would not like to raise the price but it has to follow its rivals if the price falls. So if the its rivals also they reduce their price it would probably follow suit but if the rivals are raising the price it will be reluctant to raise the price. Hence a flatter demand curve above the kink and a so a flatter

demand curve above the kink and a steeper demand curve below the kink. So that is how the demand curve looks like.

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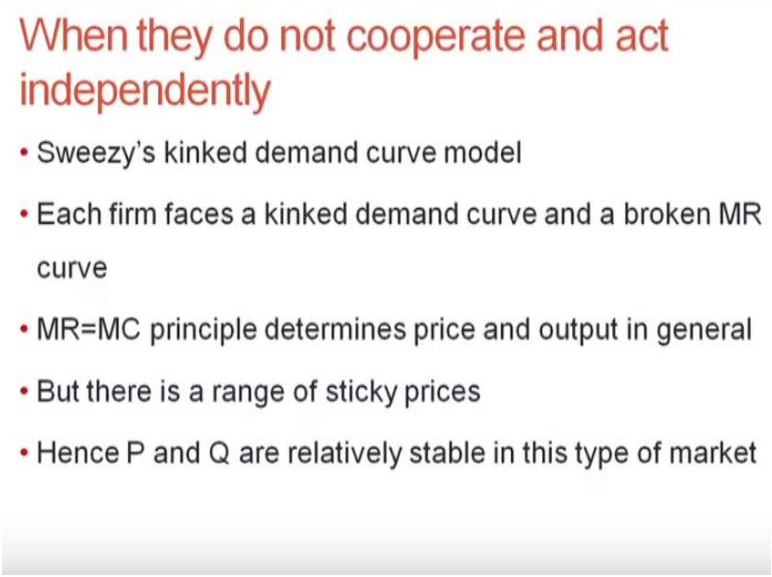

So what happens when they do not cooperate and act independently? So this is called the Sweezy's kinked demand curve model, Sweezy's kinked demand curve model. So each firm faces a kinked demand curve and a broken market revenue curve. I have not yet drawn the market revenue curve, I am going to do that but let me first go through the slide and then explain the points that we have in the slide.

So once we know the marginal revenue curve and cost curve is given so MR is equal to MC principle determines price and output in general. But there is a range of sticky prices. Hence P and Q are relatively stable in this type of market. What does this mean? So this has just summarized the model. Let me draw what this looks like. So we have understood what the kinked demand curve looks like. Let me draw the marginal revenue curve here. Let me draw the marginal revenue curve.

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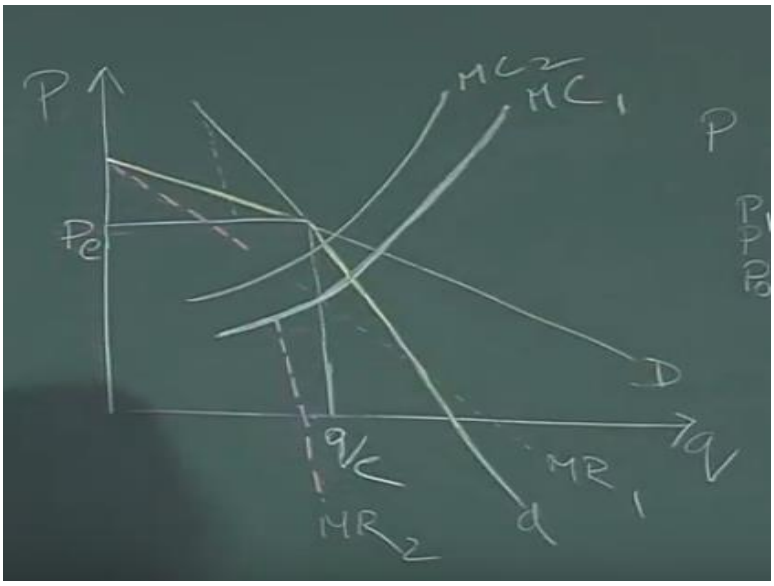

So I have drawn the 2 demand curves. One is the capital D other is the small d and from here I have the kinked demand curve. This is the kinked demand curve. So this is the kinked demand curve and this is the so this is the marginal cost curve. So this is where the so this was the equilibrium price, this was the equilibrium price and from the first demand curve capital D so this is where the market was stable.

Now what does the demand curve, what does the marginal revenue curve actually look like? Now the marginal revenue curve till P, this is P; so till P the marginal revenue curve follows the flat demand curve. The marginal revenue curve of the flat demand curve and then it is the marginal revenue of the steeper demand curve. So this is here. So this is the marginal, the pink marginal revenue is the marginal revenue curve. So and let me draw the marginal cost as green. So this is the this was the marginal cost of the so this was the marginal cost of the firm.

So this was the marginal cost curve of the firm and it started from P and the pink line is the pink dotted line is the marginal revenue curve. So marginal revenue as you will see it has a discontinuity between when the demand curve shifts from capital D to small d. So there is a discontinuity in the marginal revenue curve and this is the space where it is a the marginal revenue curve has a discontinuity because of the kink in the demand curve.

Now the next question is if MR is equal to MC? MR is equal to MC basically had decided the equilibrium output and equilibrium quantity so let me call them q e and P e. So this is where the market was stable. Now what happens say for example if the marginal now say the market

started from here. Now what happens if the marginal cost of this firm goes up? So there is a firm, due to whatever reason its marginal cost has gone up.

So in that case the marginal cost is now say from MC 1 it has increased to MC 2. So what is it going to do? Is it going to so if it has increased from here so MC is equal to MR that would in other situations had this not been a kinked demand curve, had this been a say monopolistic competition firm what would it do?

It would in general make MC is equal to MR and in that case price would go up because it would follow the MR 1 the it would be following the marginal revenue curve as continuity of this line MR 1. So in that case it would be charging a higher price and producing a lesser amount of output but in this situation since there is a kink in the demand curve because of this logic that if he increases the price he is going to lose a whole lot of output so he is going to,he is not going to increase the price in this region.

So for a long period of time he is going to try not to raise his price. So he is not going to raise his price because he is going to lose a lot of customers which means that if marginal cost shifts up and down in this region he will continue to charge a price of P e and produce a quantity of q e for the fear of losing customers. So hence P and q are relatively stable in this type of market.

So what does that mean? That means that because of this kinked demand curve the firms are reluctant to change their prices and they try to stick to the prices that they have been charging and produce the same amount of output for a whole lot of for a for quite a range of marginal revenue and marginal cost. So that is what they are going to do for quite a range of marginal revenue quite a range of marginal cost even if marginal cost goes up a little bit they are they will be reluctant to change their prices.

Hence price is called sticky in this situation. So it is a sticky price situation which is happening here and the firm is not changing the firms are not changing their prices and hence this kind of kinked demand curve gives the oligopoly market a very relatively stable kind of price quantity combination where the firms do not change their prices so easily.

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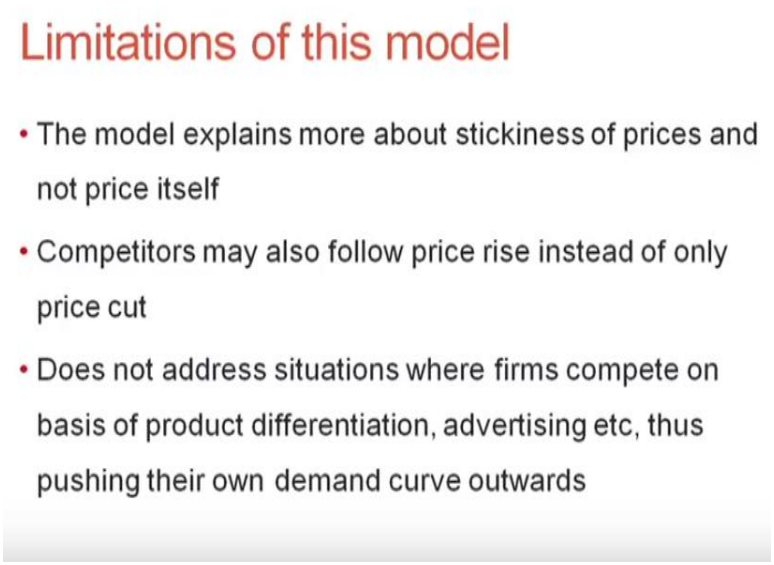

But this is only one of the models of oligopoly and what are the limitations of this model? Now the limitations of this model is are that the model explains more about stickiness of prices and not price itself. So it talks about why price is fixed at P e but it does not say too much about why how prices will go above P e or how prices can fall below P e. So the model explains more about stickiness of prices and not price itself.

And competitors may also follow price rise instead of only price cut. This has been actually empirically proven that it is not always true that if the firm raises its price above P e other firms will not follow suit. That is actually not true because one can imagine in situations where there is a industry level change in cost situation say for example all the firms are having to pay a higher having to pay higher taxes or they are having to pay higher price for a certain input.

So in that case marginal cost is going to go up for everyone and if one firm takes the chance of actually raising the price other firms will be too relieved to come out of this sticky situation and charge a higher price like the other like this firm. So that happens all the time in the market and one could actually see different forms of price signaling happening in the market where different firms indicate that costs are going up and we need to increase our prices and that is kind of signal which happens so that is proof that it is not always that competitors do not follow price rise.

The third point is it does not address situations where firms compete on basis of product differentiation, advertising, etc. thus pushing their own demand curve outwards. So in this situation again we have assumed that this demand curve is fixed for the firm. But what the model basically ignores is it is possible for the firms to product differentiate. They could try to advertise

like the kind of product differentiation we discussed in case of monopolistic competition that they hold true in this case also and it is possible for the firms to go for various forms of product differentiation and thus capture a high share of the market and basically push their demand curve to the right and hence when marginal cost goes up they can actually charge a different price. Those kind of situations can also be imagined.

So that basically ends our discussion on the Sweezy's model of the kinked demand curve which is a very simple model of non-cooperating firms in oligopoly and next we are going to discuss about collusion and if that is possible among oligopoly firms when we take up we use the game theory we apply game theory to understanding the strategies of firms in responding to their rival's moves. Thank you.