Petroleum Economics and Management
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Module - 08
Oligopoly and Game Theory
Lecture - 36
Market Structure

Hi everyone welcome to the NPTEL course, Petroleum Economics and Management. I am your instructor, Dr. Anwesha Aditya. So, we are in module 8 of our course, where we are going to discuss Oligopoly and Game Theory, a very brief overview. So, in the 1st lecture of module 8, that is our lecture number 36 in our course, we are going to discuss about the different types of Market Structure.

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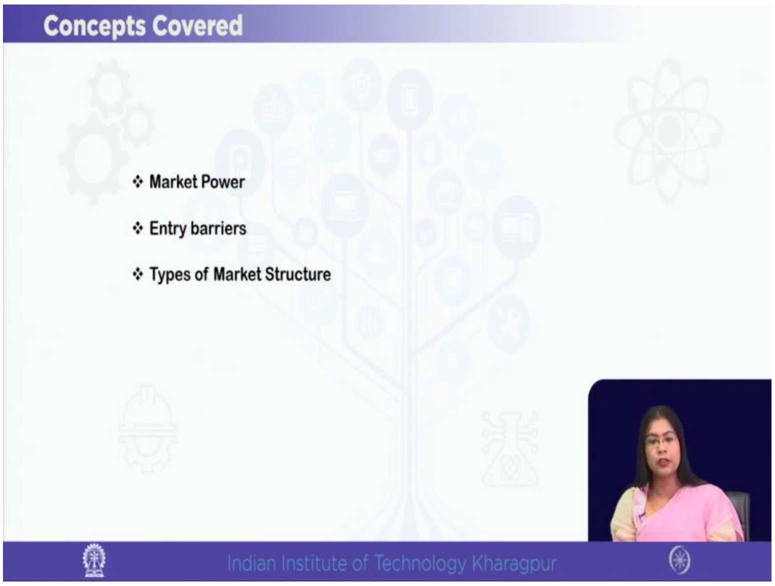

So, you see if you remember our course outline, we are going to discuss in detail about the market structure of the petroleum industry global oil industry. So, we have already discussed about OPEC and OPEC plus. So, we have discussed whether OPEC is a successful cartel or not the views from the literature and empirical observation. Now, we need to know about the cartel model ok. So, with this idea in mind, we have developed module 8 and module 9.

But before we go to and discuss the cartel model, we need to also know what are the different types of market, because otherwise we cannot distinguish the cartel model from other types of market. We need to know how do we distinguish across different types of market. So, basically depending on the degree of market power that a firm may enjoy, we distinguish between different types of market. So, that is why in today's class, we will start with defining market power. What do we mean by market power?

Now, we will see that in some markets, the firms do not have any market power, whereas, in some other markets, the firms have market power and the degree of market power also varies. Now, if the firm, existing firms, suppose it has a market power. So, then you may ask how can the firm preserve the market power ok. So, we will be also discussing how a firm can preserve market power by using entry barriers. So, what are the different types of entry barriers?

And finally, we will discuss the types of market structure. And in the next module, you see the two modules, module 8 and 9, they are actually interconnected. So, in module 9, we will be studying the global oil market, the cartel model, the price leadership dominant firm model.

In module 8, we are going to give you brief overview of what are the different types of market structure. And as you also earlier also, I mentioned that when discussing about whether OPEC is a successful cartel or not we mentioned that the cartel model its a part of, is an example of collusive oligopoly model.

So, we need to also know what is oligopoly and what is collusive oligopoly. Now, to understand oligopoly model, we also need a some basic exposure to game theory. So, some of our lectures in this module will also be devoted to game theory. Now, let us now concentrate on today's lecture, where we are going to discuss just now I mentioned. So, we will start with market power and then define the types of entry barrier and then distinguish across different types of market.

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So, what do we mean by market power? Often you hear this term, market power. So, market power means the ability of the firm to influence market price by changing the quantity supply. So, there are markets where if a particular firm changes the output or a particular seller, let us say if you have a vegetable vendor or fruit vendor in your locality and if that particular seller, sales changes the quantity sold or a seller may not be selling on a particular day.

But that change in quantity supplied by an individual vendor will not affect the market price of that particular fruit or vegetable. So, in that market, we can say that the firms do not have any market power, the seller does not have any market power, but there are markets where the firms can influence market price by changing the quantity supply.

Now, the degree of market power that a firm can have that can also vary; there are examples where the firm can have the entire market power ok. We will discuss those things and the market power can also be limited. So, there may be some firms which may control the market.

So, as you have already studied the world oil markets. So, where OPEC is a leader and, but we do have non-OPEC suppliers because OPEC alone cannot supply the entire market. OPEC is not a monopoly, we do have non-OPEC suppliers. So, you can see that depending on the degree of market power, we can a classify the market.

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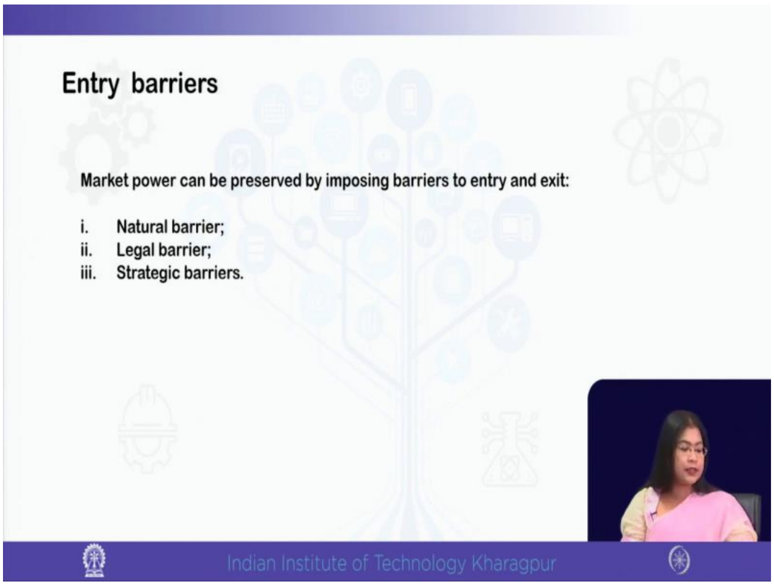

So, we will discuss about the different types of market structure, but before going into that part, now you may think how a firm, suppose a firm is having a market power, how it can maintain that market power. So, market power means the ability to influence the market price by changing the quantity. That means, we will see that when the firms have market power, they also enjoy positive profit or in economics term, we say it is a super normal profit.

So, that positive profit should attract new firms to enter the market, but often the existing firm, they operate with positive profit. So, how is it possible? Why cannot new firms always enter? Ok so that is why we need to know about what are the types of entry barrier. So, that can help a firm to preserve its market power.

So, otherwise what will happen? If there is no entry barrier, so if there is a positive profit opportunity in an industry, so new firms will enter the market. So, that is why its very important. If a firm wants to enjoy positive profit, we need a market power and means we need barriers to entry. So, what are the different types of entry barrier? Entry barrier means even if there is a positive profit opportunity, new firms would not be able to enter. It may not be cost effective to enter or it may be legally also not permissible to enter ok.

So, we will be defining different types of entry barrier, but the same entry barrier can also apply with respect to exit. So, that means, if the industries operating in loss, then also the firms may not be able to exit the industry instantaneously ok. So, barriers to entry and exit can help a firm to preserve its market power. Now, see entry barriers can be of different types.

So, one very important source of entry barrier can be technology or which we can think of as a natural barrier. See, the technology sometimes can be such that the initial investment may be very high. So, the if the initial fixed cost plus sunk cost is very high. So, it may not be profitable for the new firms to enter ok. See, you can think of the example of say railway, which is an example of natural monopoly as we proceed, I will give you the definition of monopoly and natural monopoly.

See, in this case what happens? You can think of when suppose the Indian railway was set up. So, the it was very costly to set up the to construct the station, to set up the railway track to buy the engines. So, it is very costly. So, the initial investment is very high, but once the infrastructure is created, now the operating cost, so annual cost is not that high.

So, if the initial investment is very high, so it will take time for the existing firm to come down along the cost curve. Suppose, the cost curve is downward sloping, so if the initial investment is high, so for when output increases to a larger extent. So, the power unit cost can be divided across a larger unit of output. So, the average cost can fall over time. So, often the firms enjoy advantage of large scale production or what we call economies of scale. So, this is an example of natural entry barriers.

So, technology is such that new firms cannot enter the market. If new firms enter, they are stuck at a high level of cost, because already the existing firm is selling a very large level of output. So, the new firm will be able to sell only small part. So, if the new firm is producing less level of output, cost will be very high.

So, it may not be profitable for new firms to enter the market. So, technology can impose a natural entry barrier and often it gives rise to what we call natural monopoly. Natural monopoly means only one firm can exist with positive profit. So, it is not profitable for new firms and the reason here is technology ok.

Second type of barrier can be by putting some legal restriction like say licensing requirement can be put by the government or even you may have heard about patent requirements. So, often what happens say you can take the example of pharmaceutical industry. So, a new firm is pharmaceutical industry firm is coming up with a new medicine or new drug. So, the firm will apply for patents. So, if a firm gets a patent, patent can be applied for different stages like production marketing.

So, if a firm acquires patent, no other firm can sell the same product. So, by getting a patent or license. So, legally the existing firm can prohibit entry. So, this legal barrier has to be implemented by some third party not by the existing firm either by government or some third party like say WTO also very strict the World Trade Organization has very strict patent laws. So, some third party should be operating this legal restriction. So, often we hear about license. So, those who get the license they can sell the product ok.

So, the license can be distributed by the government in different methods like first come first basis or people can the firms who want to acquire a license they can beat or they can apply. So, there are different process of distributing the licenses, but these are all licenses and patents are examples of legal entry barrier ok.

So, legally new firms cannot enter the market for the same goods. So, the existing firm can maintain their positive profit and third is strategic barrier to entry. So, as the name suggests, so this is a strategic barrier means it is done by some action of the existing firm. Like many times we will see that the existing firms they create huge capacity.

Ok see, in the manufacturing industry often the existing firms create huge capacity, but they may not be utilizing that huge capacity they may be producing less than the optimal level of output or maximum capacity level. So, they maintain some unused capacity. Now, often this unused capacity is used as an entry-deterring strategy.

What do you mean by entry- deterring strategy? That means if suppose some new firms try to enter that particular good market. So, the existing firm can threat the new firm that the existing firm can utilize the capacity. When utilizing the unused capacity means then output will increase.

Now, if see the output increases we know from our basic understanding of demand and supply that supply will increase. If supply increases, so we know that price falls. So, for the new firms then it may not be profitable to enter. See now, if the new firm does not want to enter.

So, the existing firm will not utilize its excess capacity. So, this creating this capacity and maintaining this unused capacity is used by the existing firm as a threat strategy as an entry-dithering strategy. There are very a interesting theoretical models also by J. Tirole and many other economies.

So, those who are interested can go for further exploration of the theoretical models. These it is a very interesting area of industrial organization, but we cannot devote more time because of our time constraint. Because we will be our focus will be on the collusive of oligopoly part.

So, just to distinguish oligopoly from other markets. So, we are designing this lecture to give you a brief overview on what are the different types of market structure. So, here what we learn is that if a firm has market power that can be preserve by using entry barrier and we distinguish between we distinguish among three types of entry barriers.

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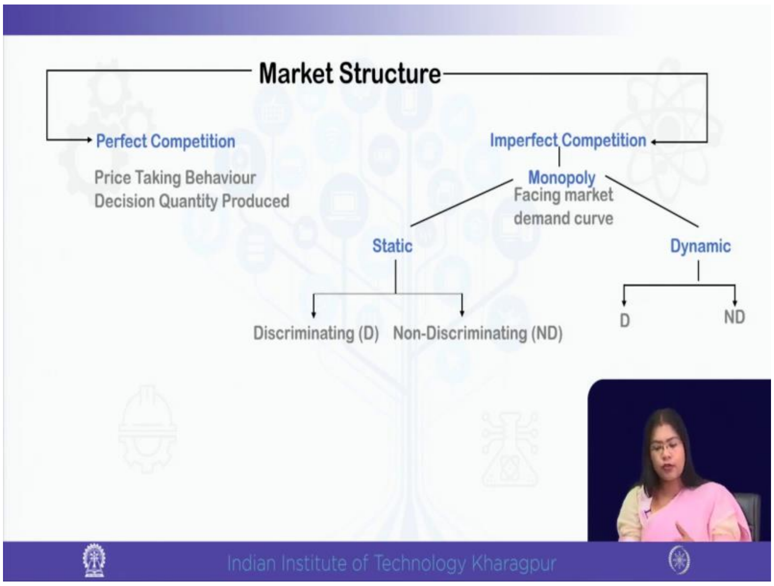

Now, coming to the types of market structure depending on the degree of market power. So, in first part of our lecture in today's class I already took example of situation where the individual sailors do not have any market power. That means, the individual sailor may not be able to change the market price by changing the quantity supplied. So, the fruit vendor or vegetable vendor, so if they change the supply of a the product they are selling, they if they do not sell on a particular day that will not affect the market price.

So, this type of market is called a perfectly competitive market. I think we have talked about perfectly competitive market previously also in demand supply. So, we assumed a perfectly competitive market structure. So, in perfect competition the firms are price takers.

So, the individual firms they take the market price as given and what they decide? They decide about how much to produce. They are also maximizing their profits. So, ultimately in the long run the profits will be 0 because we have many times told in theory of production also in the factor market we have shown you that price is equal to marginal cost under perfect competition.

But profit will be in the long run it will be equal to 0, price will be equal to marginal cost will be equal to long run average cost, but they maximize profit by choosing quantity because out price is given. So, the individual firms are price taker. So, this is one extreme of market structure where the individual firms do not have any market power. Now, what is the other extreme? The other extreme is imperfect competition.

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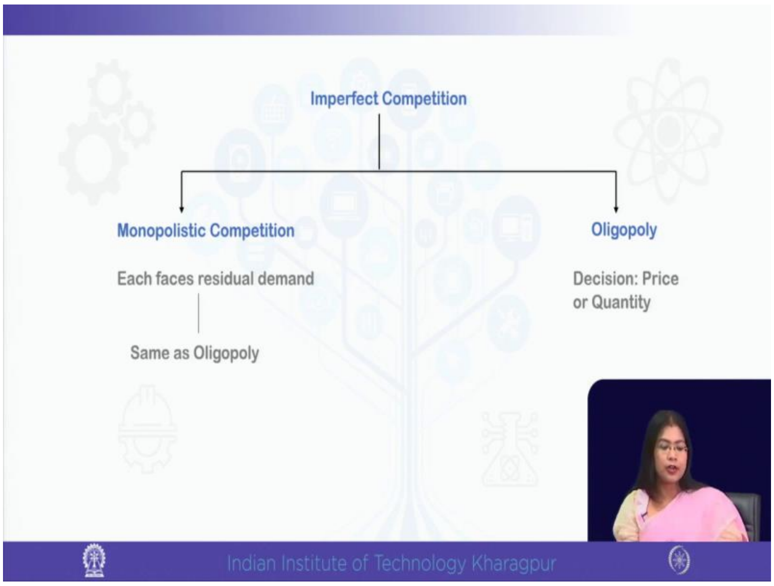

Now, under imperfect competition depending on the degree of market power we can classify imperfectly competitive market into three categories. So, the extreme case of imperfectly competitive market is when one firm has all the market power. So, we call that single firm which is having all the market power that firm is called a monopoly mono means single or solo.

So, monopoly means when only one firm has all the market power. So, obviously; that means, if the firm changes the quantity supply market price will definitely be affected. If the firm does not supply that particular goods, so there will be no supply no availability of the good in the market. So, a monopolist will determine the price. So, it is not a price taker anymore it is the price maker ok.

Now, in monopoly what will happen? A monopoly being the single seller can maximize profit by choosing either price or quantity. Now, you see a monopoly cannot simultaneously choose both price and quantity because we are saying that the monopoly can produce whatever it wants.

But obviously, that is subject to market demand a monopolist cannot produce beyond the demand if something is not demanded. So, monopoly cannot produce there will be no takers right. So; that means, a monopoly will choose either price or quantity subject to market demand.

So, the monopolist can maximize profit by choosing quantity then price will be from market demand or the monopolist can maximize profit by choosing price then quantity will be from market demand. Now, in case of monopoly market demand is also a individual demand faced by the monopolist because monopolist is the single seller ok.

Now, coming to monopoly you see monopoly can be different types. So, monopoly can charge same price that is called uniform pricing monopolist or non-discriminating monopolist. So, just when defining market power I took some example of natural monopoly like railway. So, often we see that the public utilities or railway these are examples of natural monopoly.

So, these are either provided by the government because the initial cost is very high or this may be also subsidized by the government ok may be provided by private firms, but it needs some subsidy or some help by the government because the initial investment is very high. Now, one thing we should remember that just now I said that monopoly can either choose price or quantity subject to market demand not simultaneously both cannot be the choice variable, but the solution will be the same.

Suppose you are given the market demand and you have the cost structure of the monopoly. So, you can carry out this profit maximization exercise by either choosing price or by choosing quantity, but the resulting equilibrium price quantity solution this combination will be same in both the cases ok; because you see the monopolist cost structure is also same and market demand is also same.

So, price quantity combination the equilibrium price and quantity in either case will be same. So, out the equilibrium will not change if the monopolist is choosing price as the choice variable or if the monopoly is maximizing profit by choosing quantity ok. So, this is one thing we should note because this is important because this will be true in case of oligopoly.

In oligopoly model we will see that if the choice variable changes the outcome will also change. Now, coming to the different types of pricing strategies; so one example I took of uniform pricing; that means, the monopolist will charge same price to all the consumers in the market for the quantity supply the per unit price is same ok. So, it is the uniform pricing monopolist where we took the example of natural monopoly's or you can also think of examples of a patent.

So, may pharmaceutical industry the MNCs they go for patent and they can preserve their market power ok. So, these are the examples of uniform pricing monopolist. But often you see monopolist will enjoy a very high profit we can show that the profit is highest possible in monopoly because you can well understand that monopoly being the single seller can explore the consumers output sold will be less and price will be high ok.

So, there will be positive dead weight loss if you remember in our very initial lectures in initial modules we discussed about if we deviate from perfect competition there will be resulting dead weight loss. The perfectly competitive output is considered to be the socially optimal level of output now in mono in case of monopoly the output will be less price will be high, so there will be loss of consumers surplus ok.

Because a part of the consumers surplus will now be enjoyed by the monopoly monopolist is earning super normal profit. Now, many times what happens? The monopolist will also try to capture some part a capture some part of consumer surplus. See compared to perfect competition in monopoly the consumer surplus is less, but even in monopoly some amount of consumer surplus will be there.

Now, there are some examples or some cases where the monopolist will further try to capture the consumer surplus. So, these are the situations of price discrimination strategy. So, that means, the monopolist may not be happy with the positive profit only and it may try to capture a part of consumer surplus. And hence it can charge different prices either to different consumers or for different prices for different quantities of consumption.

So, this is called a discriminating pricing strategy or price discrimination and there are different types of price discrimination the in one extreme case is a perfect price discrimination or first degree price discrimination where the monopolist will charge customized prices to every consumer.

See, remember we have already interpreted the demand curve as the locus of the maximum willingness to pay prices for different quantities right that is the interpretation of the inverse form of the demand curve. Now, the monopolist may design a pricing policy by which in the monopolist will charge each consumer his or her maximum willingness to pay price. Therefore, all the consumers surplus will be extracted by the monopolist.

However, you see this perfect price discrimination it is difficult to implement in reality because first thing is it is not possible in practically to charge customized price to every consumer right there are lot of consumers in the market. So, it is there is operational difficulty and second thing is that you see as consumer if I know that I will be charged my maximum willingness to price am I going to reveal my maximum willingness to pay price? No right.

So, it is also very difficult for the monopolist to know the exact maximum willingness to pay price for all the consumers. But often we see that the firms often practice price discriminating strategy, which are very close to perfectly price discriminating strategy. For example, you see often doctors can charge or even the medical institutes can charge insured patient higher than the non insured or poor patient or even the income tax lawyers.

CAs they can charge depending on the clients income because they know the clients income. So, these are some examples of very not exact perfect price discrimination are very close perfect price discriminating strategy. Now, another type of price discrimination can occur across quantities of consumption, so that is called a second degree price discrimination.

So, often we know that we get lot of discounts when you buy in large quantities. So, nowadays it is very common buy one get one free. So, what is that? That is nothing, but a quantity discount. So, if you buy or buy two get the third one free or you pay 50 percent price for the third one, right.

So, these are all quantity discount or even you can think of say for internet, electricity, telephone tariff. So, there are slabs ok. So, if you consume beyond a particular limit then you have to pay a different tariff below that limit the tariff may be less for electricity often we see that ok. So, these are examples of quantity discount and these are all ways of capturing the consumer surplus.

One example of quantity discount is block pricing which is often followed by the water supply or electricity companies where they charge different prices for different blocks of consumption like I took the example of electricity same can hold for water supply also. So, if you exceed a particular limit you have to pay more. So, for a particular unit a threshold level say 100 unit the charge is same for all the units, beyond 100 unit the charge can vary. So, 100 to 200 unit there will be a particular charge.

So, under each slab the charge is same, but there are different a charges for different slabs or different categories of consumption. So, this is an example of quantity discount. Another type of price discrimination can happen that is called a third degree price discrimination where the firm can divide the consumers into different categories and then can charge different prices.

See, often we see that in railway let us say we have different fare for children senior citizen and adult. So, these are ways of capturing the consumer surplus or even in air transport also we have economic class and business class. See you get the same service means you are going from one place to another, but you can have a different packages ok you can get some extra facilities.

So, the airline company can design packages, so that those who want more luxury and they can pay more they will go for the business class right. So, this is example of third degree price discrimination and there are also some other type of real life pricing strategies like tying bundling ok.

So, those who are interested they can have more in detail analysis due to time constraint we cannot go into detail. So, now, monopoly can be static and dynamic also till now I was talking about a static monopoly in dynamic monopoly can be a sequential move; that means, a one firm is already there operating in the market.

Now, in the and earning a positive profit so, in the next period say new firms decide whether to enter or not and if you remember we just now talked about a strategic barriers like a using excess capacity as an entry- deterring strategy. So, these are the examples of dynamic model. So, in the next second stage if a firm new firm wants to enter so, the existing firm how that firm will react ok. So, again under dynamic monopoly the pricing strategy can be uniform or non-discriminating.

So, you see we in this particular slide what you have done what we have done is we have this discussed between two extreme type of market structure; one is a perfectly competitive market structure where there are large number of small firms without any market power earning zero profit. The other extreme type of market structure is when there is only one firm having all the market power and is obviously, the price maker.

Now, these both these two types of market the extreme cases are very interesting theoretically, but empirically they are means bit restrictive you do not get often frequent examples like in perfect competition also one of the assumption of perfect competition is perfect information on part of all economic agent means including the buyers.

See with these assumption perfect competition is not very realistic because hardly the buyers have perfect information complete information ok. So, that is why this extreme type of market structure are bit unrealistic. So, that is why more a realistic are the in between market structure, see these are the two extreme perfect competition and monopoly.

Now, in between also we have two other types of market structure which are imperfectly competitive, but they are more realistic. So, for presentation purpose only we have put them in two different slides ok. So, and the third category of market structure is monopolistic competition which is lying in between just perfect competition and monopoly.

And as you can see the name suggest monopolistic competition ok it was developed by Chamberlain so, it is often referred to as Chamberlinian monopolistic competition, it has got the characteristic of both perfectly competitive market and monopolist. And we encounter a monopolistically competitive market structure in our day to day life in many cases.

So, you can think of examples like toothpaste, toothbrush, electronic products, cosmetics, shampoo, soap these are all examples of monopolistically competitive market. So, what happens? Just now I said that it has characteristic of both the market structure. What does it mean?

So, that means, there are large number of firms and each firm has a monopoly power over its own brand. Let us say Colgate, Colgate toothpaste has monopoly power over its own brand; that means, no other brand can manufacture Colgate toothpaste. But obviously, you see there are substitutes there are other brands of toothpaste available in the market. So, even though Colgate has monopoly power over its own brand the extent of monopoly power is not very high because there are close substitute.

So, the varieties are close substitute in monopolistic competition. So, the extent of monopoly power is less. So, each brand is a price maker Colgate will set its own price, but the extent of monopoly power being less price will not be that high as compared to monopoly ok.

So, each brand has monopoly power over its own product this is the component of monopoly. Now, you may ask what is the component of perfect competition. Now, you see if Colgate is setting its own price you can think of other examples I took even the electronic product markets.

We have so many varieties of a say electronic products like television, air condition refrigerator and the varieties are very near close substitute. So, one important aspect of monopolistic competition is that the varieties of are close substitute. So, the extent of monopoly power is less.

You remember in defining elasticity in discussing cross price elasticity we discussed that if the varieties if the products are very close substitute cross price elasticity is high and own price elasticity will also be higher. So, that happens that is an example of monopolistically competitive market.

So, what is the component of perfect competition? So, if the existing firm is earning super normal profit now there is free entry and exit. So, new firms can enter the market ok. So, this free entry and exit is the component of perfect competition. So, the resulting outcome will be a monopolistically competitive market.

So, each firm will face a residual demand curve. So, market demand less the supply of all the other firms ok. Suppose the market demand is capital D, then the individual ith firm will supply say total market demand minus the market demand of all say n minus i number of firms or n minus 1 number of firms.

So, suppose you are considering the first firm and there are n number of firms. So, the residual demand will be what? D of n minus 1, Dn is the total market demand. So, you will be supplying means the rest of the market. So, each firm will face a residual demand and will maximize the profit ok.

And we will see that there is some amount of dead weight loss because output will be less than perfectly competitive market. But of course, there are other arguments in favor of monopolistic competition because though there is some amount of dead weight loss price is greater than marginal cost.

But you see in the long run we will see that profit will be 0, the long run profit will be 0 by the assumption of free entry and exit. But the consumers also gain in terms of variety, is not it? See the varieties are very closely substitutes of one another. Often there is only superficial difference in terms of say packaging or fragments or colour. But nowadays we prefer varieties and that is why we prefer say online shopping or going to the shopping mall rather than shopping in the very traditional market, is not it?

Because we look for more variety, there are approaches, there are utility functions developed by Dixit and Stiglitz which shows that utility is not only a function of quantity of consumption. But it also depends on the number of varieties consumed. So, as we consume more and more variety the consumer can derive satisfaction out of that.

So, with this idea you see the love of variety approach, monopolistically competitive market may have a dead weight loss, but the consumers can gain by having the opportunity of consuming many varieties ok. So, this is what is monopolistic competition which is very realistic.

Now, the other type of imperfectly competitive market and what is of utmost importance to us is oligopoly. So, we will be discussing in depth about oligopoly, how oligopoly market is different. Now, in oligopoly like I also said that in oligopoly earlier also we mentioned when discussing about whether OPEC is a successful cartel or not. So, in oligopoly there are few firms with significant market power. Now, a special case of oligopolies when there are only two firms that is called duopoly.

So, typical example of duopoly is Boeing and Airbus in the market for aircraft. And other examples of oligopoly often include the automobile industry. In oligopoly you do not have free entry and exit and oligopoly firm can choose either price or quantity, but the outcome will be different.

So, this is why oligopoly is different from all other types of market structure. See in case of monopoly I also told that the monopolist can either choose price or quantity subject to the market demand, but in both the cases the equilibrium price quantity combination will be same. However, this is not true in case of oligopoly.

In case of oligopoly if the choice variable changes the outcome will also change. So, we will discuss in depth and we will classify the oligopoly models in subsequent lectures.

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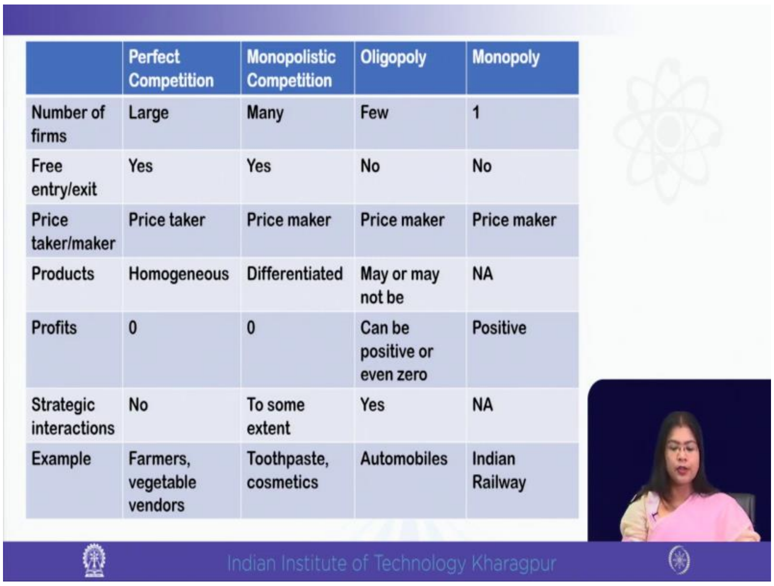

	Perfect Competition	Monopolistic Competition	Oligopoly	Monopoly
Number of firms	Large	Many	Few	1
Free entry/exit	Yes	Yes	No	No
Price taker/maker	Price taker	Price maker	Price maker	Price maker
Products	Homogeneous	Differentiated	May or may not be	NA
Profits	0	0	Can be positive or even zero	Positive
Strategic interactions	No	To some extent	Yes	NA
Example	Farmers, vegetable vendors	Toothpaste, cosmetics	Automobiles	Indian Railway

Before that so let us see then let us compare these four types of market structure ok. And so, as I already mention in case of OPEC also so oligopoly is different from all other types of market structure because of the strategic interaction. So, strategies of the firms are interrelated with each other.

So, it is not only that profit depends on the output of the firm or the market demand, but profit of ith firm will also depend on the output of the jth firm. It will depend on whether the two firms are taking decisions simultaneously or sequentially if the firm can observe each other's actions or not. So, depending on that we have wide range of outcomes..

So, I will discuss about oligopoly model in our subsequent lectures. So, for the time being let us first compare these four types of market. So, we have used some parameters like the number of firms. So, I am just summarizing you can say in this slide our discussion so far in this lecture I am just summarizing.

So, in perfect competition we already know that we have large number of firms in monopolistically competitive market also we have many firms the brands, the varieties are close substitutes. In oligopoly we have few firms, in duopoly we have only two firms and in monopoly we have one firm single firm.

Now, I have already discussed that in perfect competition and monopoly we have free entry and exit because in monopolistic competition. In monopolistic competition free entry and exit is the component of perfect competition. But in monopoly as well as in oligopoly market there is lack of free entry and exit and that is how they can operate with positive profit.

See, I took the example of electronic products under monopolistic competition, but I mentioned that automobile comes under oligopoly. So, you can also think of why because in oligo automobile also the varieties are substitutes different models of car say the home varieties, the foreign varieties these are very close substitutes in the same price range you can get lot of varieties of domestically manufactured and imported brands. So, why we are not classifying automobile under monopolistic competition?

So, answer is this free entry and exit in automobile market since you need to create a huge factory space. So, there is no free entry or exit it takes time to set up an automobile unit a manufacturing unit you often need a to import, the machineries the machineries may not be available in the domestic market ok.

So, that is why it is because of lack of free entry and exit automobile market is an example of oligopoly not a monopolistic competition. Now, regarding price taking behavior we have already discussed that perfectly competitive market are price the firms are price taker in all other markets monopolistic competition monopoly and oligopoly the firms decide or choose their own prices ok.

Now, coming to the distinction between whether the products are same or different identical you see of course, in perfect competition the products are homogeneous right there is no much quality difference among the products you can think of fruits or vegetables.

So, we consider homogeneous product which leads to a price taking behavior. In monopolistic competition you see we have already discussed the main distinction in monopolistic competition is the products are differentiated from one another that can be a superficial difference, but till they are differentiated. See in monopoly it really does not matter its immaterial right monopoly is being the single seller whether the product is same or not it really does not matter right.

So, it is not applicable you can say if the monopoly is not supplying the product there is non availability of the product in the market or an in oligopoly market the products can be differentiated it can be identical also ok we can have both type of products in different types of oligopoly market, but the outcome will be different if the product is whether it is homogeneous or it is differentiated.

Now, profits of course, we have discussed already so, perfect competition has 0 profit the firms will not earn any positive profit in the long run. So, here I refer to long run profits ok monopolist in monopolistic competition also because of free and free and exit all the long run profits will be wiped out.

Because if a particular variety is enjoying a positive profit new firms will enter that industry because of free entry and exit. Even more firms can enter the industry and then some firms will incur loss and they will exit. So, you can see the importance of the free exit assumption also.

Now, in oligopoly of course, the firms can be earning positive profit because there if there are few firms and they are price makers so, they will have market power. So, they may be earning positive profit, but I will show you that there are situations in oligopoly market where if the firms are competing with each other it is a cut throat competition and that can lead to 0 profit also.

So, in oligopoly we have a model where the it may be possible that the firms are earning 0 profit which happens in the Bertrand model I will discuss it later and Monopoly will of course, operate with positive profit. Now, strategic interaction you see we have strategic interaction only in case of oligopoly market in perfect competition.

Of course, there is no strategic interaction in monopoly also the monopoly is being the single seller there is no strategic interaction, but it can use the strategic entry barrier. In monopolistic competition as I told that monopolistically competitive market faces residual demand..

So, the monopolistically competitive firms have to take into account the rivals. So, to some extent there is strategic importance, but of course, not to the extent of oligopoly market say oligopoly strategic interaction is most important which is not there in other types of market structure and I have included the examples which I have already mentioned in the last row we have included the examples ok.

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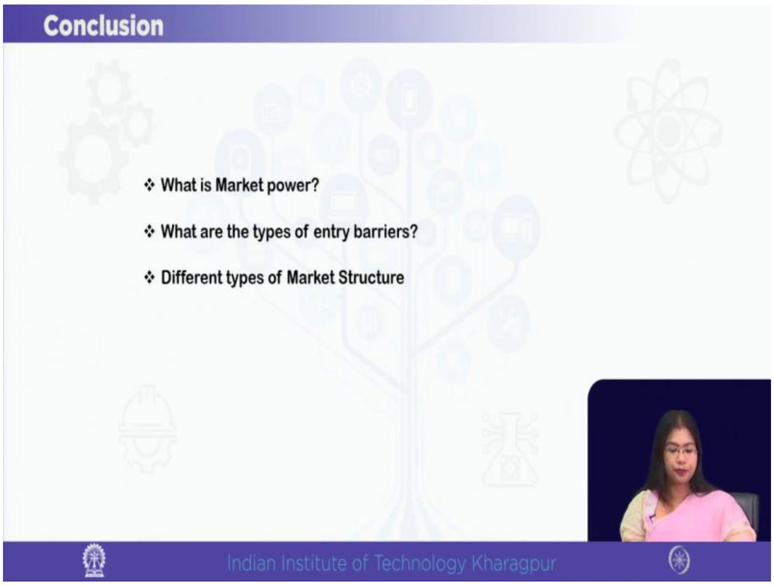

So, if we summarize today's class we started with defining market power, we discussed how it is possible for a firm to preserve market power and finally, we distinguish between different types of markets perfectly competitive and imperfectly competitive and then we concentrated under imperfectly competitive market.

We discussed about different types of imperfectly competitive market which can be classified depending on the degree of market power and finally, we compared the four types of markets ok. So, this is what we have done in today's class.

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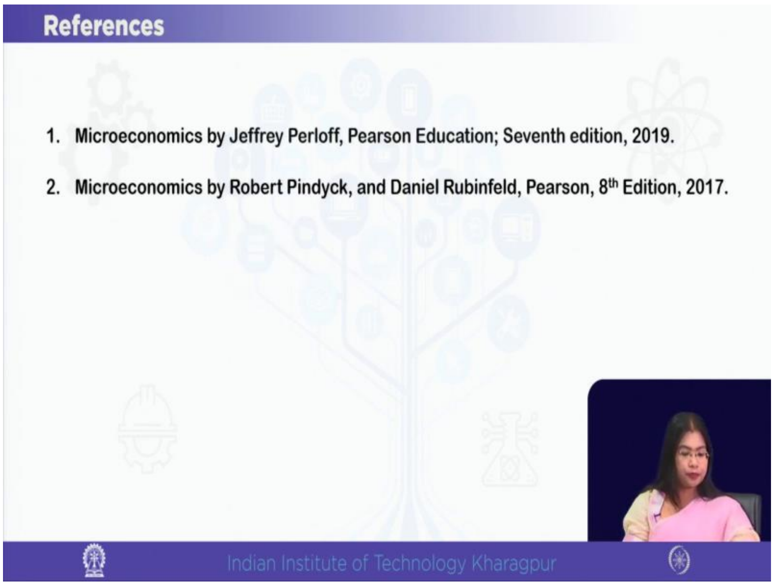

So, you can follow any standard Microeconomics book also to be consistent we are following the book of Pindyck and Perloff, but you can also follow some advanced books like (Refer Time: 42:19) or Oz Shy if you have; if you want to have a deeper understanding of industrial organization related topics.

I hope that the course will be able to generate enough interest in you, so that you will be interested to browse for more advanced and more in depth analysis of these topics.

So, thank you very much, see you in the next class.