# Petroleum Economics and Management

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## Module - 05
## OPEC and its Role in Oil Price
## Lecture - 23
## Cartel

Hi everyone. Welcome to the NPTEL course, Petroleum Economics and Management. We are in module 5, where we are discussing the role of OPEC in explaining the movement of Oil Price. In lecture 23 of module 5, we are going to discuss about Cartel.

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Now, if you remember, we have already discussed in depth the oil price movement. So, in module 4 now, in the next 2 modules as I already mentioned in explaining the outline of the course, we are relating the role of OPEC with the movement of oil price and in the next module that is module 6, we will be explaining the oil price movement from the point of view of resource.

Is it that petroleum is a depleting resource that the oil price is increasing? So, these are the sequences that we are following for our course. Now, in the previous lecture, what we have done? We have studied the structure of OPEC; functionalities of OPEC and we

have also discussed how the OPEC is now expanded and it has formed a new group which is called the OPEC plus.

So, with this idea now we need to know whether OPEC is a cartel or not. But before that first, we should understand what do we mean by cartel, ok. So, with this idea in mind today's lecture is arranged in the following sequence. So, we start with defining then oligopoly market.

We give a very brief overview of oligopoly market, how oligopoly market is different from other types of market structure like perfect competition or monopoly or monopolistic competition. Next, we will be studying the different types of oligopoly market like oligopoly can be cooperative oligopoly or collusive oligopoly or it can be very competitive oligopoly.

So, we will be defining the different types of oligopoly market structure. Now, cartel is an example of collusive behavior. So, we will be studying what do we mean by cartel and how cartel operates, what the what are the conditions of a successful cartel and why do we often see that the cartels fail.

After that, we will be starting the laws related to cartel because in many of the countries in the world, we find that a collusion is not allowed by the government or the policy maker. So, we will be studying the antitrust laws of US and what are the laws with respect to cartel in India.

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Oligopoly

- Oligopoly- It is a small group of firms in a market with substantial barriers to entry.
- In an oligopoly market, there are *small* number of *large* firms with significant market power.
- Market power is the ability to influence market price.

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Now, first and foremost, we need to understand what do we mean by oligopoly. Now, you see if you look at the course structure in one of the module, we will be discussing in detail about the market structure of the world oil industry. So, we will be defining what do we mean by market power, what are the different types of market structure.

So, one lecture will be completely devoted towards that, but today, before proceeding further, since we need to discuss the role of OPEC, whether it is a cartel or not, we need to understand some very basics of oligopoly and cartel behavior. So, what do we mean by oligopoly?

Oligopoly is a market structure where there are small number of large firms. So, what do we mean by that small number of large firms? It seems very paradoxical. So, I am using both small and large in the same sentence. So, what do we mean here is that by small number, we mean there are less number of firms, few firms in the market with large market share. Now, you see the term market power, we are here to define market power. So, what does market power mean?

Market power means the ability to influence market price, whether a firm can influence the market price by changing the quantity supply. Suppose, if you remember in our very basic of microeconomics, we studied about the supply curve, we derived the individual supply curve of the firm and then we went on to get the market supply curve, right. So,

there you see if, we also studied that initially in microeconomics part, we studied everything under perfect competition.

So, in perfect competition, the firms take the price as given. Think about a local fruit vendor or vegetable vendor in your locality. So, they can sell individually any amount, a particular fruit vendor in your locality can sell any amount of fruit he or she wants. One day he or she may not be selling also, but that will not affect the market price of that particular fruit. So, this type of behavior is called perfectly competitive behavior.

So, in perfect competition, firms do not have any market power. So, by market power, we mean the firm's ability to influence market price by changing the quantity supply, but there are instances where the firms can influence the market price. So, like we have already discussed, we have seen how Saudi Arabia and OPEC overall can influence the market price by changing the total supply of oil, right.

So, there are situations where the firms can change the market price by changing their supply. So, these type of markets are called imperfectly competitive market. Now, there are different types of imperfectly competitive market. We will be studying that in very detail in module 8, let us we are not going into very detail. So, one other extreme form of market structure is monopoly.

As you can see the name suggests mono means single. So, if the market is served by a single seller that is called mono-poly like say for example, public utilities or railway say Indian railway, right. So, these are the examples of monopoly. Now, these two perfect competition on the one hand and monopoly on the other hand, these are two extreme of market structure which are very interesting for theoretical understanding.

But they are not very realistic also for reasons we will be discussing later in module 8, but there are some in between market structure means in between of perfect competition and monopoly, those are very realistic those are more often found in reality and they are very interesting also. So, one such market structure is oligopoly. The other will be monopolistic competition.

So, I am not going into that detail because we have a lecture devoted to that in module 8. So, for, the time being let us concentrate on oligopoly where the firms have market power. So, the oligopoly market is served by few firms who have market power they

have the ability to influence market price. So, particular case in oligopoly is when there are only 2 firms. So, that is called duopoly. So, one typical example of duopoly is Boeing and Airbus in the market of aircraft, ok.

But there can be more than two firms, but not very high. So, if suppose there are few firms, 5-6 firms they have substantial market power to influence the market price that is called oligopoly. Say, automobile industry is often characterized by oligopoly market structure. In oligopoly now you can ask then if there are few firms they have market power they can influence the price. So, it is obvious that there will be positive profit.

So, you may ask why the new firms do not enter if the existing firms are earning profit. So, one important characteristic of how the firms they preserve their market power is by putting entry barrier. So, in oligopoly market you often see that there are barriers to entry as well as there is no free exit also. That means, if the existing firms they are earning positive profit that positive profit will attract new firms, but the market will be prohibiting entry of new firms in the same product.

So, there can be different sources of entry barrier it can be technology. Let us say we are taking the example of railway. The technology may be such that the initial investment is very high. So, it may not be profitable for new firms to enter the market or one another source of technology apart from technology will be say government intervention like for example, patent or licensing.

So, if the new firm has to enter the firm has to get a patent a license or the existing firm can also go for patent of the product. So, no other firm will be able to produce and sell the same product. So, markets can be protected by using artificial barriers of entry like patent or licensing. So, we will be discussing about the entry barrier in the lecture where we will be discussing more about market structure.

So, in a nutshell what we can say is that in oligopoly market there are few firms with substantial market power they operate with positive profit, but there is no free entry as well as free exit. Free exit means if the existing firms they are incurring loss they cannot go out of business immediately because even if they want to go out of business that will be in long run because they have already made huge investment.

So, there is no free entry as well as free exit because in perfect competition if there is a loss say the market is not very good. So, the individual fruit vendor or vegetable vendor can switch the profession also or may not be selling the fruit or vegetable for some period. So, that person can exit the market, but that is not possible in oligopoly market structure.

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Characteristics of Oligopoly

- The important element of an oligopoly is the strategic interactions between firms and interdependence of firms.
- Whether firms produce homogeneous or differentiated good and/or whether entry is limited or prohibited are not that important.
- Examples: Automobiles, Boeing and Airbus.

$\pi_i = TR_i - TC_i$

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Now, one very important aspect of oligopoly which is not there is not the free entry exit or if the firms are earning a positive profit or not, but one very important distinctive market structure the characteristic of oligopoly is strategic interaction. Why I said that these are not very important distinctions of oligopoly like barrier to entry because in barrier to entry is also there in monopoly, because that is obvious if one firm is earning a positive profit new firms will have incentive to enter the market.

So, obviously, the monopoly can maintain its market power by restricting entry into the market by the new firms right. So, free entry and exit is also not there in monopoly. Now, again if the products are whether the products are homogeneous or differentiated that is also not important in oligopoly ok that may affect the oligopoly outcome, but that is not the sole characteristic of oligopoly.

Because you see in monopoly it does not really matter if the products are same or not because a firm being the single seller the monopolist being the single seller the product is

homogeneous or differentiated it is not applicable at all. Because if the monopolist is not supplying the product there will be no supply of the good in the market right.

But now you take the example of perfect competition one of the very important assumption of perfect competition is that products are homogeneous right. So, that is why a firm cannot increase the price above the market price and there are other reasons like the firms are very small with respect to the total market.

So, in monopoly it does not matter if the products are homogeneous or not in perfect competition the products are homogeneous, there is the other type of market structure in between monopoly and perfect competition is monopolistic competition where the firms products are differentiated.

So, examples of monopolistic competition include say the cosmetics industry toothpaste, toothbrush, electronic products. So, there the products are differentiated from each other they are close substitutes of one another. However, one element which is not present in any other type of market structure and is only there in oligopoly market is strategic interactions. What do we mean by strategic interactions? By strategic interaction we mean that the firm strategies or actions are interdependent. What do we mean by that?

So, that means, profit of $i^{th}$ firm is not only a function of output of $i^{th}$ firm, but also it is a function of output of $j^{th}$ firm. It is also a function of if the firms are producing identical or homogeneous good. It is also a function of if the firms are taking decision simultaneously or sequentially. So, all these factors can influence the profit of the $i^{th}$ firm. So, that is why we say that the when a particular $i^{th}$ firm is taking decision of how much to produce.

So, it should not only consider its own cost it should also consider its rivals decisions. So, in general what happens you see if we write the profit, profit is generally written by this function $\pi$, profit of $i^{th}$ firm what is profit, profit is the difference between total revenue and total cost. So, total revenue of $i^{th}$ firm minus the total cost. You remember we have already defined what is total revenue.

Total revenue is basically the price into quantity that is the value of the product and total cost is the total cost of producing the good right. Suppose the per unit cost is small c. So, total cost will be c into capital Q if Q is the total output right. So, in other type of market

so, the profit of $i^{th}$ firm will depend on how much it will produce it will depend on the cost of production. Now, cost of production in turn depends on what? Cost of production depends on the factor prices and how much the firm is producing.

So, in other type of market profit of the firm will depend on how much it will produce, the cost of the factors of production, the market price. But in oligopoly market apart from all these factors the profit of $i^{th}$ firm will also depend on if the firms are deciding about their output or price, if they are deciding about the choice variable at the same time or one after another.

So, we will be getting completely different outcome, polar opposite outcome if the choice variable or the timing of decision changes in oligopoly market. So, that is why we say that in oligopoly market the most important element is strategic interaction which is not present in any type of market structure.

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Now, since we understand that the since the oligopoly equilibrium varies whether the firms are deciding about their price or quantity, if their firms are taking decision at the same time or they are moving one after another or even the firms decision output can also vary or the equilibrium can also vary if the firms are cooperating or competing. So, then if you ask me what is the equilibrium condition in oligopoly. So, can I say that, no.

So, that is why the study of equilibrium in oligopoly market is complicated because we have a wide range of possibilities depending on the choice variable, timing of move, whether the products are differentiated or same or if they are the firms are cooperating with each other or competing with each other.

Therefore, we do not have any equilibrium I mean a single equilibrium or single oligopoly model, like in perfect competition if you ask me we can tell what is the equilibrium condition, in perfect competition price is equal to marginal cost and marginal cost should be rising in the short run.

In the long run the equilibrium condition is that all profit should be wiped out price is equal to average cost is equal to marginal cost, so that leads to zero profit in the long run. In monopoly we can derive the equilibrium both in the short run and long run same in monopolistic competition also.

So, if you ask, we can tell what is the equilibrium condition in perfect competition or monopoly or monopolistic competition, but we cannot do that in oligopoly unless we know if the firms are deciding about their price or quantity, if the firms if suppose one firm is taking the lead the other firm is following, if the firms are cooperating with each other or not, what do we mean by cooperation and I will just come to that, ok.

So, we cannot say without knowing all these details we cannot say how the oligopoly equilibrium will be. So, we there is no single model and unique equilibrium in oligopoly we have a wide range of possibilities and the possibilities are very extreme, ok.

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**Collusive versus Competitive oligopoly**

- Collusive Oligopoly: It is a market structure in which firms cooperate with each other. They often enter into agreement or they can tacitly collaborate to set prices. They do not compete with one another and may adhere to similar pricing policy. e.g, cartels, price leadership models, price signaling models.
- Non-Collusive or Competitive Oligopoly: In this oligopoly market firms engage into competition. They enter into rivalry and independently set the price of their products. e.g., Cournot model, Bertrand model, Stackelberg model.

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So, that is why the oligopoly market structure is more complicated than other type of market structure and we will be discussing it in more detail in module 8 and 9 that often we use the game theory concepts to solve the oligopoly model. The oligopoly models were developed much earlier than the development of game theory, but after the development of game theory especially the concept of Nash equilibrium.

Nowadays we study the oligopoly models as an application of Nash equilibrium. But I will be doing that later for the for time being let us concentrate on what do we mean by cartel. Before going into the cartel we should know that cartel is one example of collusive oligopoly. Now, what do we mean by collusive oligopoly?

So, just now I told you that oligopoly equilibrium can vary depending on if the firms are cooperating or they are non-cooperating or competing with each other. So, when the firms collude or cooperate with each other that is called a collusive oligopoly. So, collusive oligopoly it is a market structure in which the firms cooperate with each other. They often enter into agreement this agreement can be a tacit collusion also because as we will proceed, we find that in many countries explicit collusion is not allowed.

So, firms often enter into tacit collusion, they do not compete with one another, they try to maximize their joint profit, there are different types of collusive oligopoly behavior. So, one such collusive oligopoly model is cartel, there are other behaviors like the price leadership dominant firm model, the price signaling models we will be discussing more

about these in module 8. Now, other type of oligopoly market structure is when the firms are competing with one another.

Now, see the interesting thing is that in oligopoly model when the firms are competing with one another the competition can be a cut throat competition; that means, the competition can be so intense that there are situations in oligopoly model where the profits will be wiped out entirely. So, the solution will be similar to perfectly competitive solution.

So, zero profit now that is very counterintuitive because suppose we have two firms in a market. So, with two firms in the market obviously, you can understand that the firms have market power; that means, they can influence the market price by changing the quantity supply.

So, obviously, if there are only two firms in the market with market power they should be able to make positive profit in the long run equilibrium. But there are examples in oligopoly market where if the firms are choosing price simultaneously, we finally, see that the equilibrium occurs when price is equal to marginal cost; that means, profits are zero. So, this is same as the perfectly competitive solution. So, this is the famous Bertrand model. So, in oligopoly market if the firms are competing that can be a cut throat competition.

Now, in the same setting of two firms suppose you assume identical marginal cost everything else remaining same the firms are taking the decision simultaneously now you change the choice variable from price to quantity, we get what we call the Cournot model. There the firms are making positive profit, but when we change the choice variable from quantity to price the firms are earning zero profit that is the Bertrand model.

So, you see that even in oligopoly market we can get a perfectly competitive solution if the firms are competing with one another. So, competition can be a cut throat competition they enter into rivalry and they independently set the price of the product. So, competition is very intense competition in oligopoly market. So, for our purpose we are sticking to collusive behavior because cartel is an example of collusive oligopoly. So, we will be next we will be starting whether OPEC can be termed as a successful cartel or not.

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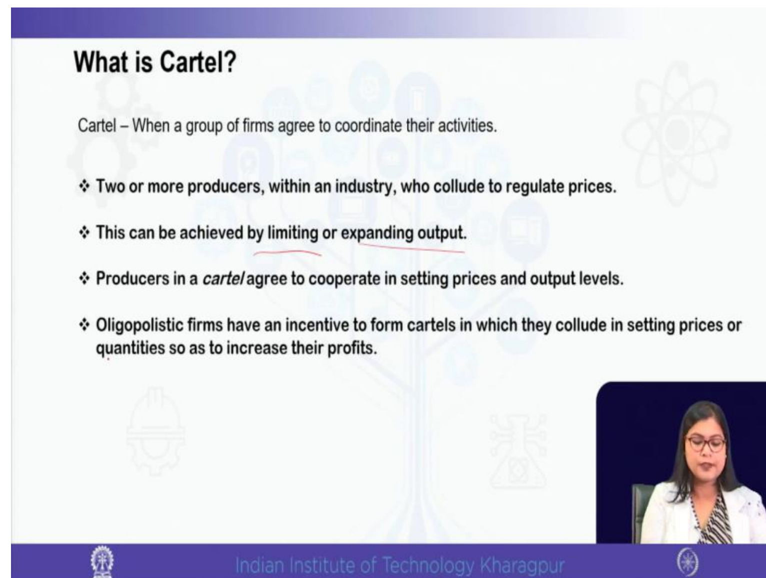


So, what do we mean by cartel? Cartel occurs when a group of firms they coordinate their activity. They suppose jointly they maximize their profit. So, to be more specific cartel can be defined as a situation where two or more producers within an industry they collude to regulate the price.

Now, how do they regulate the price? Because if they independently they maximize their profit so, they will find out their own profit maximizing quantity. So, what will happen the total market supply will increase? Now, you see you have already studied the basic of demand and supply. So, from there we can tell that if total supply increases price falls.

Therefore, if the firms want to restrict the price what should they do? They can do so, if they want to maximize the price jointly. So, they can do so, by limiting the quantity right or there are examples also when they influence the market price by expanding output. So, that means, they control their output level they decide about the output level to regulate the price.

So, producers in a cartel they agree to cooperate in setting the price and output. It is not that they are just driven by their own profit maximizing behavior. So, they collude they cooperate with each other ok. So, oligopoly firms often we see that they have incentive to form cartels to increase their profit. Because we will see that what happens as I was telling about the competitive behavior the Cournot model will be seeing that in Cournot model the firms are not earning positive profit.

But the profits will be greater if the firms collude and act as a monopoly. So, you see they are actually doing good for themselves if they cooperate, but we will also study the application of prisoners dilemma game, a very famous game which shows that individual economic agents often have incentive to deviate because they are self interested they want to maximize their own payoff ok.

So, we will be seeing that, but often we can also see that the firms or the even the countries in the case of OPEC it is the countries who form cartel. So, the individual economic agents can also cooperate if the game is played repeatedly right. So, we will be seeing those conditions also as we move forward.

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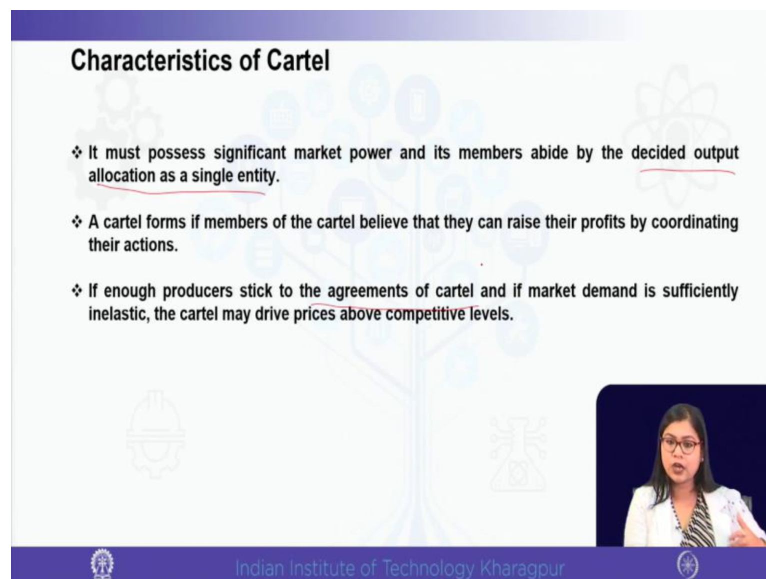


Now, what are the characteristics of cartel? Is it the situation that if any few firms they enter into agreement and they will be able to make a cartel? No. If suppose few perfectly competitive firms they enter into agreement they would not be able to have a successful cartel because the perfectly competitive firms they are price takers they cannot influence the market price.

So, when I am saying that few firms are agreeing to cooperate and the regulate the price and quantity so, these firms should have market power. So, the first condition or characteristic of cartel is it must possess significant market power right and the individual members of cartel should abide by the decided output allocation as a single

entity. So, if they go by their own profit maximizing behavior so as I was telling will deviate, like in the Cournot model.

So, if they maximize, they go as per their own profit their reaction function, they will be earning positive profit. But the Cournot firms will be earning higher profit if the firms collude, they act as a single unit they act as a monopolist. So, if they jointly maximize the profit, they earn more profit they enjoy more profit ok. So, the members should follow the decided output allocation, but often they are a sitting incentive to deviate from what they agree to.

So, a cartel firms if members of the cartel believe that they can raise their profit by coordinating their action ok they can coordinate their action. So, if many producers they follow the cartel agreement and if the demand is sufficiently inelastic then the cartel should be in a position to increase the price much above the competitive price.

But the producers need to stick to the agreement ok because if individually if they are deviating from the agreement. So, each one will produce more. Now, if there are few firms who are forming cartel and each have market power. So, if they are producing more, price will fall ok.

So, the most of the producers should stick to the cartel agreement and the other condition is that demand should be sufficiently inelastic because we know that if demand is elastic what happens, if the cartel the firms they increase the they reduce the price sorry they reduce the quantity price increases. So, in case of elastic demand if price increases quantity demanded will fall more.

So, the cartel will be successful if the firms are able to increase the price for inelastic good. So, even if price increases quantity demanded of the consumer does not fall to that extent. So, these are mainly two conditions for a successful cartel the good should be inelastic and most of the producers should stick to the agreement of cartel.

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So, with these we can also understand why do you often see that the cartels fail. So, obviously, as I also talked about cartel is not a monopoly like in case of OPEC also we have already seen. You remember we have already seen that there are non-OPEC countries which are very important suppliers of oil, though OPEC has the leadership position, but non-OPEC countries are also there who supply oil.

So, if non-cartel members can also supply the consumers with large quantity. So, cartel will have limited market power to influence the price. So, that is one reason why cartels are not often successful. So, if there are firms which are beyond the cartel and they can also influence the market price by supplying the quantity. So, in that case cartel is not successful.

Second is each member of the cartel should have an incentive to cheat on the cartel agreement and then cartel is not successful. So, I already told about the cheating incentive. So, if by you are jointly maximizing the profit, but if you cannot trust your partner or the other firms you often have the incentive to deviate, because by deviating so you can if you can earn more. So, you think about the current scenario and you want to deviate from the agreement.

And then also it is obvious that the cartel will not be successful because we are deviating from cooperation. Cooperation means you are limiting your total output in the market so that price is high profit is maximum for all the firms who are forming the cartel, but

individually if you now want to maximize your own profit you want to produce more. You think that if you produce more you gain larger market share you earn more profit.

So, we will see that in OPEC also you often find out that the individual members they end up producing or supplying more than what they agree to ok. And then also cartel will not be very successful because if all the firms are behaving in the same fashion, everyone will supply a bit more from what they agree to total output will be high, price will fall. So, these are the situations where cartels often fail.

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**Maintaining Cartels**

To keep firms from violating the cartel agreement, the cartel must be able to

- detect cheating and punish cheaters;
- keep their illegal behavior hidden from customers and government agencies.

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So, that means, we can also then conclude that how we can maintain the cartel. So, if there is some punishment scheme suppose you cheat and then you will be punished. So, that is one of the way out that you can maintain preserve the cartel for a longer time. So, if the cheaters can be detected and they can be punished so, a punishment scheme is required. So, that the firms do not violate the agreement which they made to enter into the cartel. So, this is very important.

And second aspect is to keep their illegal behavior hidden from the customers and also the government agencies. So, the customers and the third parties like the government or the regulatory bodies they should not know about the illegal behavior. So, in this way the cartel members should be able to maintain the cartel.

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United States Antitrust Law

- Cartels were initially legal and common in the United States.
  - Examples: oil, railroad, sugar, and tobacco.
- However, after that the antitrust laws came into force which prohibited the American companies from colluding.
- Congress passed the first antitrust law, the Sherman Act, in 1890 as a "comprehensive charter of economic liberty aimed at preserving free and unfettered competition as the rule of trade."

Source: https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/antitrust-laws

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Now, in many countries we see that the cartels are actually not allowed. Why? Because if the firms cooperate as I was telling that the firms are restricting the output, if output is restricted price is higher, right we have already started from demand supply. So, if the output is less price will be higher.

So, what happens if price is higher, as consumers we are adversely affected. See you have already studied the concept of consumer surplus right. So, if price increases consumer surplus will fall, I am talking about the market price. So, consumers surplus just a brief recapitulation it is the difference between the maximum willingness to pay price and at the actual price.

So, if the actual price of the market price increases consumer surplus will fall. So, consumers have to pay high price and some consumers are unable to buy the good right. So, that means, it is not good for the society also. So, if the good is suppose a necessary good a medicine.

So, some consumers are not able to buy, the poorer consumers are not able to buy. The output is also less than the perfectly competitive output level why? Because the cartel is operating by restricting the output ok. So, there is a loss of total surplus. So, consumers surplus falls from the point of view of the society output is less if the good is necessary good.

So, the consumers are not able to buy the good many consumers are, suppose it is medicine, many consumers are outside the healthcare market right. So, that is why many countries want to promote competition and cartels are regulated. So, US Antitrust Laws are very strict earlier in the very initial days cartels were allowed they were common.

So, there are examples of oil, railroad, sugar, tobacco, cartel, but the cartels have been banned since 1890 in US ok. So, the US Congress first passed the antitrust law which is known as the Sherman Act and it prevented cartel in order to increase the competition.

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United States Antitrust Law

- In 1914, the US Congress passed two additional antitrust laws:

a) the Federal Trade Commission Act (which led to creation of the FTC) and

a) the Clayton Act.

- These laws prohibit firms from *explicitly* agreeing to take actions that reduce competition.
- With some amendments, these are the three core federal antitrust laws still in effect today.

Source: https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/antitrust-laws

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Then in 1914 the US Congress also passed two more antitrust laws one is the Federal Trade Commission Act and that led to the creation of FTC Federal Trade Commission which looks after so, the extent of competition and the second is the Clayton Act. So, these two acts and along with the Sherman Act these three antitrust laws are very strict in US and that prohibit the firms from explicitly agreeing to take action which reduces the competition in the market ok.

So, these laws are till there in US with some amendments. Now, see explicit collusion is not possible, but as I told initially in to this lecture that many times, we see that the firms also collude implicitly or what we call tacit collusion often firms can take price as signal. So, we will be discussing about tacit collusion also in module 8 and 9.

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Then why and how do Cartels exist?

i. International cartels and cartels within certain countries operate legally. Moreover, countries, or companies owned or controlled by foreign governments can easily form cartels.

ii. Some illegal cartels operate with the attempt of avoiding detection or hoping that the punishment will be insignificant.

iii. Some firms are able to coordinate their activity without explicitly colluding and violating the competition laws.

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So, even after these laws then how do cartels exist? So, one is that you see there are countries where the cartel laws are not very strict, I mean antitrust laws are not very strict in those countries cartels exist. Even international cartel is also very common because many countries can form cartel or firms belonging to different countries who do not come under the suppose the US law, they can also form cartel.

Some illegal cartels also operate with the attempt of avoiding detection or in the hope that the punishment will be less. Third is when some firms are able to coordinate their activity without explicitly colluding and violating the competition law. So, as I told that often we see tacit collusion in a place of explicit collusion because explicit collusion will be subject to legal restrictions. So, often the firms make tacit collusion.

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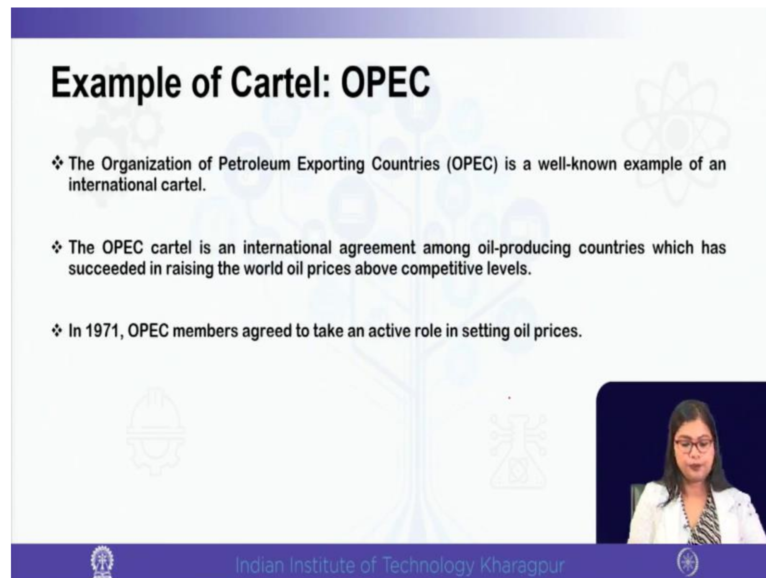


So, what are the examples of cartel? We as we already know that the organization of petroleum exporting country OPEC it is a well-known example of cartel we have discussed in depth about the structure of OPEC. So, again I am not elaborating on that. However, in the next lecture we will be discussing whether OPEC can be termed as a successful cartel or not.

But you can see that OPEC is also coming under this first category when the countries various countries in the world are forming a cartel. So, that is where they are not coming into any regulation or legal restriction.

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Now, what about India? In India also there are laws against explicit collusion. So, the competition commission of India CCI is the nodal agency who looks after the extent of market competition. So, as I told that often we want to promote competition because now there are views and counter views also because if we restrict competition if the market power is concentrated in the hands of few. So, as I told that it is adversely affecting the consumers.

Consumers surplus falls, output is less than the perfectly competitive level. If you remember in public policy, we discussed that welfare is maximum under perfect competition without any intervention right. Now, if we deviate from perfect competition or if we impose restriction in perfect competition so, welfare will decrease and the loss in welfare is called dead weight loss.

So, when we deviate from perfect competition and we enter into any type of imperfectly competitive market where the firms have market power. So, then what happens? Then there will be positive welfare loss or what we call dead weight loss. So, the government may want to reduce the dead weight loss because consumer surplus falls, output is less than the socially optimal level therefore, the government can regulate the extent of competition.

But at the same time there is the other side in the coin which tells that some to some extent market power can also be good. Especially, if you take the example of today's

globalized world when the products of different countries are competing with one another. So, we need to come up with quality differentiated, variety differentiated product better quality products. So, the firms always need to innovate and come up with new products.

Now, how do they do that? So, one very important requirement of innovation quality upgrading is research and development investment. Now, you see the perfectly competitive firms they often lack the fund to invest in R & D. So, from that point of view also so, if you think about new innovations especially say in the pharmaceutical industry.

So, we need market power where the big the imperfect competition where the firms can reinvest their profits and they come up with better products new products right. So, that means, what should be the level of competition in the industry there is no yes or no answer, it varies from industry to industry right.

So, that is why we have the competition commission of India which looks after the extent of competition in different industries of India. So, the competition commission act defines a 'cartel' as "an association of producers, sellers, distributors, traders or service providers who, by agreement among themselves, the limit, control or attempt to control the production, distribution, sale or price of a trade in good services and provisions" ok.

So, we should need a balance we cannot say that in all markets concentration is good or in all market competition is good. So, that is the objective of the competition commission of India, but of course, it has some laws against formation of cartel.

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- The Competition Act, 2002 wants to promote competition and protect consumers.
- The Act prohibits anti-competitive agreements, abuse of dominant position by enterprises, and regulates combinations (mergers, amalgamations and acquisitions).
- The Act prohibits any agreement which may have adverse effect on competition in markets in India.

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So, the Competition Commission Act 2002 wanted to promote a competition and protect the consumers because if the regulations are not in place, then the markets will be hugely concentrated which will be adversely affecting the consumers the output will be less than the social optimal.

So, this Competition Act 2002 it prohibits anti-competitive agreements, abuse of dominant position by the enterprises and regulates combinations like mergers, acquisitions, amalgamations. And the act also prohibits any type of agreement which can have adverse impact on competition in markets in India ok.

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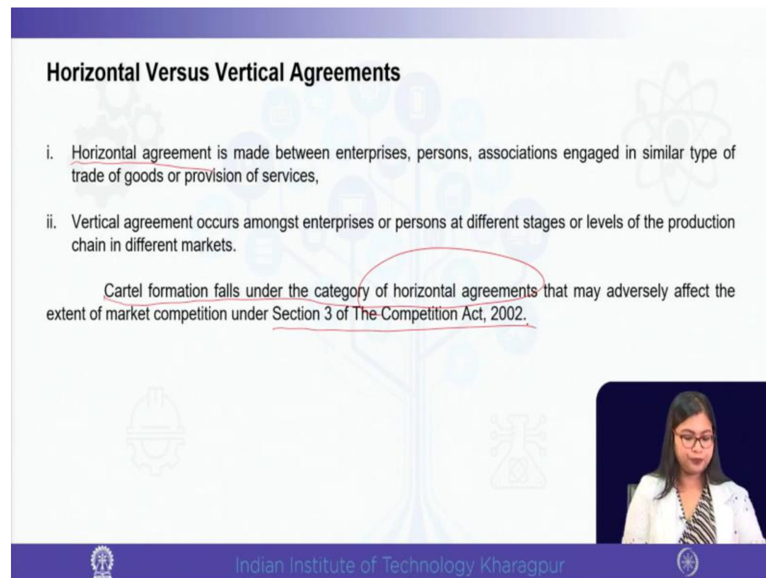


Now, you see cartel comes under which type of agreement. So, agreements can be categorized as horizontal and vertical. So, horizontal agreement is made between enterprises, persons associations engaged in similar type of trade of goods or provision of services. And what is vertical agreement? So, vertical agreement occurs among enterprises persons at different stages or levels of the production chain in different markets.

So, cartel formation you see it falls under the category of horizontal agreement because it is form it is formed among similar type of industries enterprises ok. So, cartel comes under horizontal agreement which can adversely affect the extent of market commission sorry market competition under Section 3 of the Competition Commission Act of 2002.

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Conclusion

❖ What is Oligopoly and Cartel ?

❖ Cartel formation

❖ Antitrust Laws of US and India

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So, what we discussed in today's class if we summarize, we gave a very brief overview of what we mean by oligopoly. We differentiated oligopoly from other type of market structure we discussed the characteristics of oligopoly. And then we discussed about the two types of oligopoly market cooperative and competitive oligopoly and we saw that cartel is an example of collusive oligopoly.

Then we discussed about the conditions of cartel the legal restrictions on cartel, how the cartels often fail and what are the conditions which are required for a successful cartel. And then finally, we discussed the antitrust laws of US and India. So, this is what we done in today's class in a nutshell.

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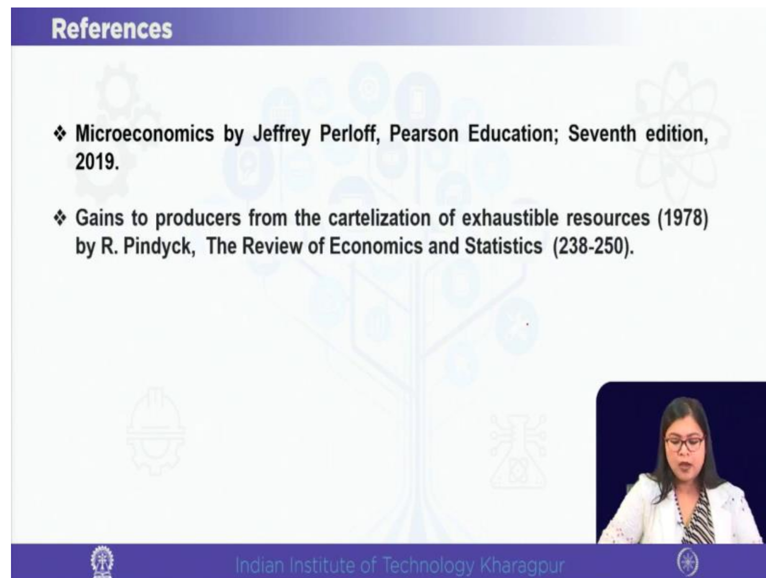


So, these are the main references by the Microeconomics book by Perloff and there is one paper by Pindyck. So, and you can also refer to the website of the Competition Commission of India and also the US Antitrust laws. So, we have provided the sources also.

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