**OLIGOPOLY**

The oligopoly is a market structure (large set of different models) dominated by a small number of firms that produce either differentiated or non-differentiated products (e.g. Kellogg, General Mills, Post and Quaker control 85% of breakfast cereal market; Coca Cola and Pepsi are the main suppliers of cola beverages).

These few firms do not necessarily represent the largest ones but sometimes those with some kind of advantage (e.g. technological). Starting from perfect competition (0 price control), the level of competition decreases and the price control increases in a rank going from monopolistic competition, passing through oligopoly and arriving to monopoly.

To define interactions between different agents, the level of competition within a market is defined by an index, the most important of which is the Herfindahl-Hirschman Index (HHI). It is calculated as the sum of the square of each firm’s share of market sales.

e.g. three firms have 60%, 25% and 15% of market share: 602 + 252 + 152 = 4500

* If HHI is **less than 1000**, the market is **strongly competitive**.
* If HHI is **between 1000 and 1800**, the market is somewhat **competitive**.
* If HHI is **above 1800** there is an **oligopoly**.

If HHI is above 1000, a merger that results in a significant increase in the HHI will receive special scrutiny and is likely to be disallowed.

The analysis of oligopoly is complicated because it is not a single firm considering its costs and pricing in a vacuum, yet we have to consider the **strategic interaction** among few firms, which have to decide price and quantity considering the actions of the competitors. In fact, the final price depends on the total quantity of a good available in the market, so the profits of a firm depend heavily on the actions of other firms. We can study these interactions through **game theory**, which is applied to a simplified model of oligopoly called **duopoly**, namely an oligopoly where only two firms are active and cooperate in the industry. Each of them must decide how much to produce taking into account the actions of the other one, since profits would be higher if production is limited and prices are kept high. A kind of cooperation aimed at raising each other’s profits is **collusion** and its strongest form is a **cartel**, an agreement by several producers to restrict output in order to increase their joint profits (e.g. OPEC 🡪 cooperating for the same objective, sometimes successful and sometimes failing because of cooperative or uncooperative behaviour).

Game theory is the study of behaviour in situations of **interdependence** (the actions of each single agent affect both their own and others’ profits): it is a way of predicting outcomes in strategic situations like oligopoly. The father of game theory is John Nesh, an American mathematician, Nobel Prize in economics in 1994. Game theory deals with any situation in which the reward to any one player – the payoff – depends not only on their own actions but also on those of other players in the fame. In the case of oligopoly, the **payoff** is the **profit** of the firm. According to Nash, Adam Smith was wrong because, in his theory of the invisible hand, he did not take into account the **sequential interaction** among agents, whose actions affect each other.

Game theory uses a payoff matrix where two or more potential actions are considered for two players. When we include the payoff, we can see that if two companies are not able to cooperate and one of them decides to produce more to increase its own revenue, its profit will rise but the other firm’s one will fall. However, if both of them decide to increase production both of them will get a lower profit with respect to the one they would receive if they divided equally a lower production. Player 1 should choose to increase production only if player 2 did not do (**dominant strategy**: best strategy for one player independently of the actions of the other player) the same and vice versa, otherwise they would both have a lower profit. The **Nash decision** would be to choose the option in which both players increase their production to the same quantity, yet this equilibrium is not efficient because profits are not maximized. If they cooperated and decided to reduce the quantity the equilibrium would be efficient, yet firms often turn to uncooperative equilibrium because they fear that the other one will not cooperate.

When each firm has an incentive to cheat but both are worse off if both cheat, the situation is known as prisoner dilemma. This is based on two premises:

* Each player has an incentive to choose an action that benefits itself at the expense of the other player.
* When both players act in this way, both are worse off than if they had acted cooperatively.

e.g. two accomplices in crime have been caught by police. The police has enough information to put both of them in jail for 5 years. They both know that the other one has committed other crimes that would make them stay in jail for 20 years. The police put them in separate cells and say the following to each: “Here’s the deal: if neither you confess, you know that we will send you to jail for 5 years. If you confess and implicate your partner, and she does not do the same, we will reduce your sentence from 5 to 2. But, if your partner confesses and you don’t, you will get the maximum 20 years. And if both of you confess, we will give you both 15 years”.

The dominant strategy for both players is to confess independently of what the other player does; the equilibrium is reached is both of them confess (15 years each), yet it is not efficient because if neither of them confesses their payoff will be increased (5 years each). However, if the same game is played repeatedly, they will be able to reach a cooperative equilibrium because in the second round they can realize that not confessing is the best option for both. So, in the case of **repeated interaction**, players who don’t take their interdependence into account arrive at a Nash equilibrium which is not cooperative. But if a game is played repeatedly, players may engage in strategic behaviour, sacrificing short-run profit to influence future behavior. **Tit for tat** is a strategy of playing cooperatively at first, then doing whatever the other player did in the previous period.

When oligopolists expect to compete with each other for an extended period of time, each individual firm will conclude that it is in its own best interest to be helpful to the other firms in the industry. So each firm will restrict its output is a way that raises the profits of the other firms, expecting them to return the favour. In this case, firms engage in **tacit collusion**.

In practice, oligopolies operate under legal restrictions in the form of **antitrust policy**, namely efforts undertaken by the government to prevent oligopolistic industries from becoming or behaving like monopolies. However, many succeed in achieving tacit collusion (unspoken agreements), nevertheless limited by a number of factors, including:

* Less concentration.
* Complex products and pricing scheme.
* Differences in interests.
* Bargaining power of buyers.

When collusion breaks down and prices collapse, there is a **price war**. To limit competition, oligopolists often engage in **product differentiation**, an attempt by a firm to convince buyers that its product is different from the products of other firms in the industry. Oligopolists often avoid competing directly on price, engaging in **nonprice competition**through advertising and other means instead. In **price** **leadership** one firm sets its price first, and other firms then follow.

Cartels may be tough to keep together, yet oligopoly can still maintain prices (and profits) that are higher than those of competitive firms.