Oligopoly

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Reading: Chapter 15

Examine markets with a few sellers. There are many models of oligopoly: difficult to say which one is the best. We briefly discuss a few. We also examine game theory which is relevant in many spheres of life where strategic considerations are involved. Also discuss anti-trust policy in more detail.

Oligopoly and its prevalence

Oligopoly is an industry with a small number of producers. A producer in such an industry is known as an oligopolist. When no one firm has a monopoly, but producers nonetheless realize that they can affect market prices, we say that an industry is characterized by imperfect competition. Two types: oligopoly and monopolistic competition. Oligopolies are very common. Often oligopolists are giant corporations. But sometimes they may be small firms – eg: two grocery stores in a neighborhood. The most important explanation of oligopolies is the existence of economies of scale. Not as strong as in the case of natural monopolies, but still strong enough to allow a few firms to satisfy market demand. Could also be due to technological superiority.

"Four-firm concentration ratios" (share of industry sales accounted for by four largest firms). Those industries with high ratios are oligopolies.

Understanding Oligopoly

Some key issues regarding oligopoly can be understood by examining the simplest case, a duopoly, a market with two firms.

Each would realize that by producing more it would drive down the market price. So each firm would, like a monopolist, realize that profits could be higher if it limited its production.

So how much will the two firms produce? What prices will they charge?

It turns out that there is no simple answer to this question. There are many possibilities. This makes the analysis of oligopoly complicated.

Collusion

One possibility: two firms engage in collusion, that is, they cooperate to raise each others' profits. By acting as if they were a single monopolist, oligopolists can maximize their combined profits. So there is an incentive to form a cartel (strongest form of collusion), agreement by several producers that increases their combined profits and determines how much each seller one will produce. (Ex: OPEC). But:

1. In many countries (including the US) illegal to form cartel.
2. Each firm has an incentive to cheat — to produce more than it is supposed to under the cartel agreement. If others stick to the agreement, each firm can increase its own profits by producing more. Producing more has a positive quantity effect on profits, but negative price effect on all producers. Each firm will ignore the price effect on others' profits. If legal contract not to break agreement cannot be enforced, cartels are unlikely to collude successfully.

Understanding Oligopoly

Collusion: Organization for Petroleum Exporting Countries (OPEC)

Most oil exporting countries are members of OPEC, the international oil cartel. It is not illegal because it involves governments of different countries. OPEC raised real crude oil prices in 1974. But since then they have not successfully kept the price high. Has responded to supply and demand shocks, mostly political events. But sometimes they have limited oil production and secured price increases.
Understanding Oligopoly
Non-cooperative behavior

Firms may therefore engage in non-cooperative behavior, ignoring the effects of their actions on each others’ profits.

Firms may decide to engage in:
1. **quantity competition**: this is more likely if competitors cannot expand their profits much by cutting prices, since they cannot increase their output much because of capacity constraints.
2. **price competition**: if they can change their output levels quickly they are more likely to engage in price competition. Take over the entire market if they produce homogenous products.

Understanding Oligopoly
Quantity competition and the Cournot model

The basic insight of the quantity competition is that when firms are restricted in how much they can produce, it is easier for them to avoid excessive competition and to “divvy up” the market, thereby pricing above marginal cost and earning profits. They achieve an outcome that looks like collusion without a formal agreement.

Shown by Cournot model, in which each firm producing homogeneous product takes other firm’s output as given, and maximizes its own profit by choosing its output, taking into account the effect of its production and therefore industry production on the price level. This gives the reaction curve for each firm. Equilibrium where the two reaction curves intersect. At the equilibrium, each firm is maximizing profits given the other firm’s output level. Total industry output, \( Q_1 + Q_2 \), is more than monopoly output, and profits less than under joint profit maximization. This is because the firms do not take into account the fact that their decisions have adverse effects on the profits of the other firm.

Game Theory
Basic concepts

When the decisions of two or more firms significantly affect each others’ profits, they are in a situation of interdependence. The study of behavior in situations of interdependence using optimizing behavior is known as game theory. It is used in a variety of contexts, for instance, to understand oligopoly, arms races between countries, union-firm bargaining, and military strategy in battles.

A game is often shown with a table. Games have players, each having possible actions, which yields payoffs to them depending on what action they take and the action taken by other players. Payoffs are shown with payoff matrices. Example with two players and two actions is shown here. Each box shows payoffs for the two players. Interdependence is shown by the fact that each player’s payoff depends not only on the action of the player, but the action of the other players.

Players choose actions, that is, adopt a strategy, to obtain the highest payoff taking into account the actions of other.

Game Theory
The Prisoners’ Dilemma

The prisoner's dilemma is a game in which: (1) each player has an incentive to not cooperate (or cheat), regardless of what the other player does; (2) when both players do not cooperate (they cheat) their payoffs are lower than their payoffs when they cooperate (they do not cheat).

Two prisoners, held in separate cells, are each offered a deal by the police—a light sentence if she confesses and implicates her accomplice but her accomplice does not, and heavy sentence if she does not confess but her accomplice does, and so on.

It is in the joint interest of both prisoners not to confess. It is in each one’s individual interest to confess.
Trusts

3. Price leadership.

To limit competition and price wars, firms resort to tacit collusion, where firms interact with each other repeatedly. So some form of tacit collusion will emerge, implying market failure.

Antitrust Policy

Large firms often tried to collude, sometimes forming trusts. Ex: Rockefeller’s Standard Oil Company formed a trust, in which shareholders of major companies in industry placed their shares in hands of a board of trustees who controlled the companies and essentially created monopolies.

Legal Framework

Public backlash due to economic effects and the rising power of the owners led to changes in laws. The Sherman Antitrust Act of 1890 aimed to break up monopolies. Ex: Standard Oil in 1911, Bell Telephone in 1980s.

Oligopoly in Practice

Although oligopolies operate under legal restrictions in the form of antitrust policy, many succeed in achieving tacit collusion. Firms in most oligopolistic industries keep prices above their noncooperative levels and certainly above marginal costs.

However, prices are not at monopoly levels either. Tacit collusion is limited by a number of factors, including:

- **Large numbers of firms.** Reduces possibility of cooperation and increases chances of cheating.
- **Complex products and pricing schemes.** Many different products, pricing methods, makes it difficult to ascertain whether firm is cheating on tacit agreement.
- **Differences of interest among firms.** Established firms versus new ones. Differences in costs.
- **Bargaining power of buyers.** Often oligopolists sell to not individual consumers but to large buyers like Wal-Mart who can keep prices low through their market power.

Because tacit collusion is hard to achieve, collusion sometimes breaks down, leading to price wars as in the Bertrand model. These can be very destructive for firms.

Kinked Demand Curve and Price Rigidity

When firms achieve tacit collusion, they may have a tendency not to change their behavior even when there are changes in the environment, for instance, a change in costs unique to the firm.

The oligopolist’s demand curve is very flat to the left of Q*. The kink in the demand curve leads to the break AF in the marginal revenue curve.

Oligopoly in Practice

Tacit collusion and price wars

Oligopoly is very important in reality. Then why use perfect competition model so much with only a small part on oligopoly? Should we drop perfect competition and work only on oligopoly? Some reasons for doing perfect competition:

1. In several markets conditions approximate perfect competition.
2. Oligopoly is much harder to analyze, since there is no unique model which takes interdependence into account which can be applied to all situations. General simple theories do not exist. Since the nature of interdependence depends on context, maybe no such theory can be developed, unlike perfect competition and monopoly.
3. Perfect competition provides a benchmark case which under some assumptions leads to efficiency (though not equity). By studying that we can see how other market forms create welfare losses which can be corrected by public policy.
4. Supply and demand issues are also relevant under conditions of oligopoly. Example of OPEC. Rise in demand due to growth in "emerging" nations can make collusion easier. Supply shocks due to wars can also restrict supply and make collusion easier. So ideas relevant for perfect competition can be applied to oligopolistic markets.