Subject : Managerial Economics

Semester/Year : Second (Semester-II)

Name of the Faculty : Dr. Sudip Kumar Ghosh

Name of the Topic : Oligopoly (Cournot's model)
(Unit 3 : Theory of Firm
and market organisation)

Oligopoly

The term oligopoly comes from the Greek words oligos and polis and means, literally, few sellers. Oligopoly is a common form of market structure in modern economic system. The automobile, and steel industries all in India would qualify. However, oligopolies exist at the local as well as the national level. For example, although there are thousands of movie theatres scattered throughout the nation, the typical consumer considers only a few nearby locations. Other theatres that are farther away may offer lower prices or better food, but proximity is probably the dominant consideration. Hence, the market for movies faced by the individual consumer could be described as an oligopoly.

Market structure characteristics of oligopoly

8 Number and size distribution of sellers — Small number of sellers. Each firm must consider the effect of its actions on other firms.

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11 Number and size distribution of buyers — Unspecified

12 Product differentiation — Product may be either homogeneous or differentiated.

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2 Condition of entry and exit — Entry difficult

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Oligopolistic interdependence

The most distinctive feature of an oligopolistic industry is that sellers must recognise their interdence. That is, the action of one seller may affect another and thus, cause that seller to respond in ways that will affect the first seller. Oligopolists are likely to deal with this interdependence in different ways, depending on the specific nature of the industry. In some cases, most actions of competitors will be ignored. In other situations, a price war may occur in response to a seemingly innocuous price change. Many factors, such as industry maturity, nature of the product, and methods of doing business, can affect the way firms respond to actions of rivals. The difficulty of formulating models of oligopoly ~~decisions~~ stems from the many ways that firms interact. Consequently, there is no general model of oligopoly. There are, however, models that analyse oligopoly decisions on the basis of specific assumptions about the interaction between firms.

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Cournot's Model

The earliest duopoly model was developed in 1838 by the French economist Augustin Cournot. Cournot assumed that there are two firms, each owning a mineral well, and operating with zero cost. They sell their output in a market with a straight-line demand curve. Each firm acts on the assumption that its competitor will not change its output, and decides its own output so as to maximise profit. Therefore, the Cournot model of duopoly is based on the following assumptions:

(a) There are two interdependent sellers selling a homogeneous product

(b) There are large number of buyers in the market

(c) Both the duopolists have identical cost curves. It is assumed that each duopolist has zero cost of production.

(d) Each duopolist seeks to maximise his total profits in each period.

(e) Each duopolist makes an output plan during a period which can not be revised in that period.

(f) Neither duopolist sets the price but each accepts the price for his product at which total planned output can be sold.

(g) Though each duopolist is aware of the mutual interdependence between their output plans, each is quite ignorant of the direction and magnitude of the revision in his rival's plan that would be induced by any given change in his own. Each assumes that the output level of his rival is constant at a certain level and adjusts his own output so as to maximise his total profit. Let us explain Cournot's model with the help of Figure 1.

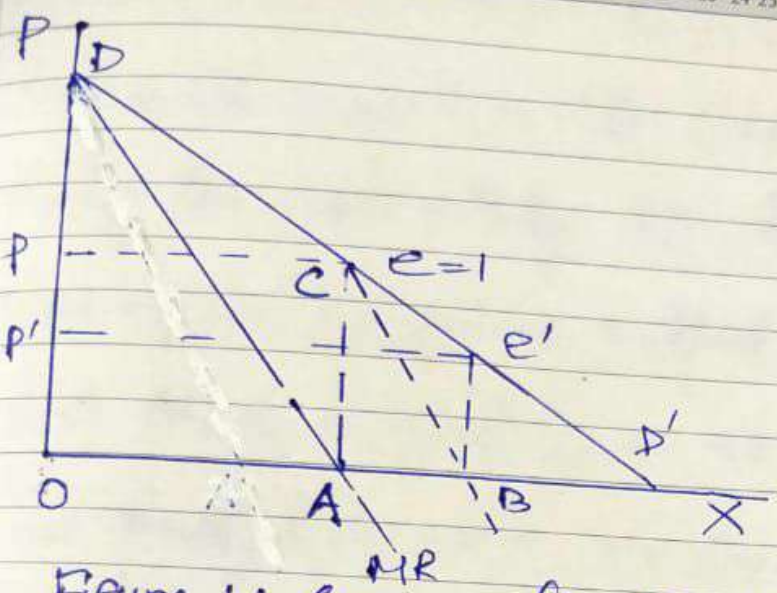

Figure 1: Cournot's Model

Assume that firm A is the first to start producing and selling mineral water. It will produce quantity A_1 at price P where profits are at a maximum, because at this point $MC = MR = 0$. The elasticity of market demand at this level of output is equal to unity and the total revenue of the firm is a maximum. With zero costs, maximum R implies maximum profits, π. Now firm B assumes that A will keep its ~~output~~ output

fixed (at OA), and hence considers that its own demand curve is CD'. Clearly firm B will produce half the quantity AD', because (under Cournot's assumption of fixed output of the rival) at this level AB of output (and at price P') its revenue and profit is at a maximum. B produces half of the market which has not been supplied by A, that is, B's output is $\frac{1}{4}$ $(= \frac{1}{2} \cdot \frac{1}{2})$ of the total market.

Firm A, faced with this situation, assumes that B will retain his quantity constant in the next period. So he will produce one half of the market which is not supplied by B. Since B covers one quarter of the market, A will, in the next period produce $\frac{1}{2}\left(1 - \frac{1}{4}\right) = \frac{1}{2} \cdot \frac{3}{4} = \frac{3}{8}$ of the total produce

Firm B reacts on the Cournot's assumption, and

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will produce one-half of the supplied section of the market, i.e. $\frac{1}{2}(1-\frac{3}{8}) = \frac{5}{16}$

In the third period firm A will continue to assume that B will not change its quantity, and thus will produce one-half of the remainder of the market, i.e. $\frac{1}{2}(1-\frac{5}{16}) = \frac{11}{32}$

This action-reaction pattern continues, since firms have the naive behaviour of never learning from past patterns of reaction of their rival. However, eventually an equilibrium will be reached in which each firm produces one-third of the total market. Together they cover two-thirds of the total market.

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IMPORTANT

Please refer to "Modern Microeconomics" (2nd Edition) by A. Koutsoyiannis for the following topics:

1. Perfect Competition : Page 164-170
2. Monopoly : Page 179-189
3. Price Discrimination : Page 192-201
4. Monopolistic Competition : Page 204-214