**CHAPTER 3**

**Market Concentration**

**Introduction**

In this chapter we are going to discuss various concepts associated with market concentration, its measurement, policy aspects and its roles on profitability of a firm. In the coming discussion we will deal with the positive aspects of market concentration, leaving the regulatory or normative side for a later chapter. This chapter will have different sections, each one dealing with a specific aspect of the market concentra­tion. The first section will be devoted to some basic concepts and theoretical implications of concentration, the second one will deal with its measurement aspect, the next two will be devoted to concentration and its impact on firm's behaviour and performance and finally the policy implications will be analyzed in brief.

**3.1 Meaning**

Market concentration means the situation when an industry or market is controlled by a small number of leading producers who are exclusively or at least very largely engaged in that industry. It is also known as ***degree of seller's concentra­tion*** in the market. It is an important element of the market structure which plays a dominant role in determining the behaviour of a firm in the market. Two variables that are of relevance in determining such situation are:

***(i) The number of firms in the industry, and***

***(ii) Their relative size distribution.***

How these two dimensions cause different forms of the market structure having vital consequences for the pricing and output decisions of the firms, has been discussed in your micro economics course. In the context of industrial economics, however, the implications of market concentration are far wider than whatever we find in the theory of the firm. It will be our attempt in this chapter to focus on such implications in the framework of 'market structure-conduct-perfor­mance' link or any subset of this. The major elements of market concentration, such as

* ***Concentration in the owner­ship of the industry,***
* ***Concentration of decision-making power, and***
* ***Con­centration of the firms in a particular location or region, etc*** may have considerable impact on the market performance of the firms such as profitability, price-cost margin, growth, technological progress and content. These links are to be understood properly, because all of them are very much relevant from the point of view of decision-making and regulation of industries.

**3.2 Measurement of Market Concentration and Monopoly Power**

Various quantitative indexes have been suggested for the measurement of market concentration, which we are going to summaries in this section. Some of them are used to measure the monopoly power of the firms and some for market concentration. These two terms, i.e. monopoly power and market concentration, are closely inter­related and cannot be separated from each other in the measurement process. The degree of market concentration would vary with the mono­poly power in a particular industry, or we may also say that existing firms acquire monopoly power if market is concentrated. The indexes that we are going to discuss here would therefore be indicating to us almost similar things with a minor difference. The measures for monopoly power would be more appropriate at firm level. They indicate the actual monopoly power exercised by the firms. The measures of concentration on the other hand would give us the potential monopoly power in the market or industry as a whole. Obviously some firms would be having monopoly power in the situation of market concentration. If the number of firms and their relative sizes in the market are changing we expect a change in the monopoly power of the firms. The concentration is therefore a necessary condition for the monopoly power although it is difficult to say that there is one to one proportionality between them.

Before discussing the indexes it will be useful here to mention some general conditions or requirements which should be satisfied by each one of them. This helps us in screening the indexes while marking the final choice for empirical work. The conditions are:

1. The measure must yield an unambiguous ranking of industries by concentration. Consider Fig. 3.1 in which concentration curves, i.e. the graphs between cumulative number of firms from largest to smallest and cumulative percentage of market supply are shown by It. hand h for three industries separately. *II* is above hand 13 every where. It means the industry which is represented by it is more concentrated than the other two. However, there is ambiguity in the ranking of the second and third industries represented by 12 and 13 respectively.

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**Fig. 3.1**; **Hypothetical cumulative number of firms**

(Largest to smaller concentration' curves)

1. The concentration measure should be a function of the combined market share of the firms rather than of the absolute size of the market or industry.
2. If the number of firms increases then concentration should decrease. However, if the new entrant is large enough, then concentration may go up.
3. If there is transfer of sales from a small firm to a large one in the market, then concentration increases
4. Proportionate decrease in the market share of all firms reduces the concentration by the same proportion.
5. Merger activities increase the degree of concentration.

There are several measures suggested for the measurement purpose. All are equally good or bad. Let us review them briefly before making a final comment in this regard.

***A. The Concentration Ratio***

The most popular and perhaps simplest index for measurement of market concentration or monopoly power is the use of the concentration ratio, that is, the share of the market or industry held by some of the largest firms. The market share of such firms may be taken either in production or sales or employment or any magnitude of the market. In symbolic form the concentration ratio is written as

 

Where; Pi = market share of ith firm in descending order.

 The normal prac­tice is to take the four-firm *(m* = 4) concentration ratio but if the total number of firms operating in the market is large enough then one has to compute the 8-firm or even 20-firm concentration ratio to assess the situa­tion. The higher the concentration ratio the greater the-monopoly power or market concentration existing in the industry.

***B. The Hirschman-Herfindahl Index***

It is the sum of the squares of the relative sizes (ie; market shares) of the firms in the market, where the relative sizes are expressed as proportions of the total size of the market.

 Symbolically, Herfindahl Index 

Where; Pi = *qi/Q, qi* is output of ith firm and *Q* is total output of all the firms in the market, and *n* is the total number of firms in the market.

This index takes account of all firms in the market (i.e. industry). Their market shares are weighted by the market share itself. The larger the firm more will be its weight in the index. The maximum value for the index is one where only one firm occupies the whole market. This is the case of a monopoly. The index will have minimum value when the *n* firms in the market hold an identical share. This will be equal to l/n, that is

 

H decreases as *n* increases. The index is simple to calculate and it is popular in use and consistent with the theory of oligopoly because of its similarity to measures of monopoly power.

***C. The Rosenbluth Index***

This index is based on the rank of each firm in the market and its market share. It gives more weight to the number of the firm and importance of small firm. It is computed as,

 

 1/n ≤ R ≤ 1

Where;

 *n* = number of firms,

*Pi* = market share of ith firm.

This index has the apparent properties as the *H* index but it is rarely used in practice.

***D. The Entropy Index***

This index has been suggested quite recently to measure the degree of market concentration. It uses the formula

 

 0 ≤ E ≤ log *n*

Where;

 *E* is defined as 'Entropy Coefficient',

 *Pi* is the market share of ith firm and

*n* the number of firm.

This coefficient in fact measures the degree of market uncertainty faced by a firm in relation to a given customer. This will be the situation when number of firms is large enough, i.e. market is not concentrated. For a monopoly firm *(n* = 1) the entropy coefficient takes the value of zero which means no uncertainty and maximum concen­tration. Thus we find opposite (inverse) relationship between the entropy coefficient *E* and the degree of market concentration

The entropy coefficient is a useful measure of market. concentration in the sense that the population of the firms for which the entropy coefficient is to be computed can be decomposed or disaggregated into several groups, say on the basis of sizes, regions, products and the classification of indus­try etc.

 ***E. The Horvath Index***

This index is called as a *'comprehensive concentration index*' (CCI) in the sense that it takes into account the share of the largest firm in the market in a discrete manner and of the other firm's market shares in a weighted form conforming with other summary measures of the concen­tration (a summary index is one which takes all firms in account while measuring the concentration).

The formula Horvath suggested is,

 

 *j = 2, 3,...................., n*

The upper limit for the CCI is unity when there is only one firm, and the lowest limit is *(3n2* - 3n + *1)/n3* provided n ≠ 2. For n = 2, i.e. for duopoly, CCI comes out to be equal to 0.875. *PI* is the discrete part of the concentration and remaining portion of the formula is the summary part. The index is not popular in use as it does not provide either theoretical or computational advantages over the other indexes discussed so far.

***F. The Learner Index***

There are some other indexes which are mainly used to measure monopoly power of a firm but some of them can be applied to the market as a whole with little modification or by simply reinterpreting the variables concerned. The Lerner index is the best known of them. It is expressed as;

 

Where;

P = Price

MC = Marginal Cost

We know, under perfect competition price will be equal to marginal cost. If there is a difference between the two, such that price > marginal cost, this is because of market imperfection or what we call as the monopoly power of the firm. Greater the deviation between price and marginal cost, a higher the monopoly power of a firm. The steps to derive the index are straightforward. Writing the expression for marginal revenue (MR) for a monopoly firm we get

 

ep = price elasticity of demand, and for profit maximization we have the familiar condition,
 MR = MC

From these two equations we get the Lerner index as,

 

that is, the index is inverse of the price elasticity of demand. Remember,

 ep < 0, so > 0

***G.The Elasticity Index***

The ratio of *'own elasticity of demand and cross-elasticity of demand*' for a firm could be used as a measure of monopoly power or market concentration in terms of *'number-equivalent',*

 ie;  or 

Where;

*eii* = own elasticity of demand and

*eji* = cross elasticity of demand

 An increase in the ratio means lesser number of firms in the market and a decrease means higher number. Under pure monopoly the cross elasticity will be zero. Greater the number of firms and products, higher will be the cross elasticity.

***H. The Profit Ratio***

This was suggested by Bain. According to him, when a firm persistently earns excess profit for a long period of time, then it should be attributed to its monopoly power. Monopoly power and profit rate are assumed to be linked positively. The profit rate is defined as "that rate which, then used in discounting the future rents of the enterprise, equates their capital value to the cost of those assets which would be held by the firm if it produced its present output in competitive equilibrium. This rate of profit is then compared with the normal rate of profit to assess the mono poly power of the firm. There is some operational significance of this index but it is not always true that profits accrue because of monopoly power. A firm without any such thing may manage its business well and earn profits for a long time. Moreover, estimation of the conceived profit rate is itself very much complicated. The profit rate index for monopoly power is, thus, a weak proposition. It is unsatisfactory as well as unreliable.

Now we have reviewed the common indexes, used for measuring market concentration and mono­poly power .Which one is to be used is a matter of judgment and convenience. All are merely approximations based individually on some specific property of the concentrated market. It may be difficult to develop a comprehensive index for measuring the market power.

**3.3 Concentration and the Market Performance of a Firm**

The important behavioral hypotheses about concentration and market performance are going to discuss in brief in this section. As we study in microeconomics, a firm with substantial monopoly power will tend to charge high price, produce and sell less output, make high rates of profit, grow faster than others, capable of doing anything it wants in connection with its business such as R&D, advertisement and so on. Let us presume that concentration is an 'appropriate measure of such power, we are then in a position to verify the various propositions of the econo­mic theory which reflect the relationships between concentration and market performance of the firm.

***A. Concentration and Profits***

A firm derives market power or monopoly power in the' situation of con­centration. Such market power, via market conducts activities or directly leads to an increase in the profitability of the firm. It is frequently assumed that persistency of high rates of profits over a long period is the conse­quence of high degree of intra industry concentration. J. S. Bain was the first to make an empirical study of this proposition, who found it valid for the U.S. industries. The relationship was found so strong that Bain was to argue for the profit rate as an index to measure the concentration. Since then there has been a flood of studies on the relationship which by and large supported his argument.

***B. Concentration and Price-cost Margins***

Price-cost margin is another way to define profitability. This is a short ­term view of profitability based on current sales and cost figures. Say, the average price-cost margin is just a ratio of these two magnitudes. Empiri­cal studies particularly those conducted by

Collins and Preston supported the positive relationship between concentration and the price-cost margin for the American four digit industries. Shepherd also confirmed the positive relationship between them for most of the U.S. industries. Koch and Fenili, however, looked at concentration acting as a surrogate for other determinants of price-cost margins because of its being causally linked with them.They found it as .an insignificant predictor of price-cost margins when other relevant indicators of market structure like product differentiation, rate of technological change etc., were also considered side by side.

***C. Concentration and Growth of the Firm***

Here we will just mention how concentration is relevant for the growth of the firm. There are two different streams of thoughts to explain the causal relation­ship between the two variables. According to one view, a firm with market power, as a consequence of concentration, may prefer to maintain its high rate of profit by restricting the output and charging high price. If it grows, it has to sacrifice some profit margin, and lower price which may not be in its interest. Moreover, there will be all kinds of restrictions imposed by the government to stop further growth of such firm. Thus, we expect that higher the monopoly power of the firm lesser may be its growth. The few firms in the concentrated industry may be dominant enough to restrict the growth of the other firms and to stop the entry of new ones because of the various barriers to entry at their disposal. There is, thus, very little prospective for the growth of the firms in a concentrated industry and so for the over­all growth of the industry itself. There are some empirical studies where the inverse relationship between initial market, concentration and, subse­quent market growth has been verified.

The second view about the concentration and growth of the firm and hence of the market, is a positive one. In order to maximize the long-term profit, firms may like to grow over time even under market concentration. They may prefer to create excess capacity to meet the future growing demand and to discourage new entry in the market. They may have some short-term sacrifice of profit in order to stimulate long-term benefits. So, we find a case for the positive relationship between initial market concen­tration and growth of the firms. The firms with market power may be finding themselves at ease regarding finances and other requirements of growth.

***D. Concentration and Technological Change***

Now let us look into, whether concentrated industries are the most research oriented and technically progressive. It is true that the few firms who enjoy monopoly power in a concentrated industry will be large enough. They will be having stability, financial resources and ability to initiate the processes of R&D and gain the benefits from them. Dasgupta and Stiglitz, clearly showed the situation when market concentration and innovative activities are positively corre­lated. There is no conclusive empirical evidence to prove such proposi­tion. In fact studies conducted by Williamson have shown quite opposite results. Doubts about this have also been expressed by Blair. It may not be the concentration but the other attributes of market structure like size of firm, product differentiation possibilities etc., which may be having collinearity with concentration and thus causing a spurious positive corre­lation between concentration and technological change.