CHAPTER - I

Basic concept and Relationship.

An industry in this study is defined on the basis of demand for the product. It is a group of firms producing output which to all of the buyers of such output are generally very close substitutes for each other.

The word 'company' has been used for firms which are producing and selling commodities perhaps produced in different plants. An 'established' firm is defined in this study as a firm which had an initial paid up capital amounting to not less than one million rupees, is not a firm with negative profit during its period of operation and has been functioning in the market for a period of not less than ten years. The inclusion of an established firm for this study has been made on the basis of size as measured by the firm's assets.

A firm's size can be theoretically defined and measured by using either a monetary measure or a physical measure. Apart from the practical accounting difficulties, as Penrose points out, there is no way of measuring the size of a firm, which is not open to serious conceptual objections. Experts have defined and measured a firm's size in conformity with their respective conceptual frameworks designed for their particular studies.

1. E. T. Penrose: Theory of the growth of the firm.
Different variables like [i] capital investment involved, [ii] labour-capital ratio, [iii] total sales of the firm concerned relative to total sales of the industry and [iv] total employment in the firm relative to total employment in the industry etc. have been used for measuring the size of a firm.

Definition of a firm's size by the employment criterion can understate the actual size since a firm which produces labour intensive products differs significantly from one producing capital intensive goods.

Employment level of a firm after all depends on various internal situations, for instance, the state of technology involved in production, the degree of economic efficiency of the input combinations and the wage rate which can be supported by the firm's pecuniary positions etc. These factors guide the firm in either increasing or decreasing or maintaining the existing level of employment. Exogenous factors like the demand condition in the market, the trend of the price level, monetary policy adopted by the financial institution and the fiscal policy determined by the state authority influence the firm's decision for bringing about any change in its employment level.

The labour-capital ratio is essentially a concept which is an indicator of a 'process' i.e., whether or not a firm is growing, while the firm's size is a 'state' concept. Giving our lips to the Penrosian music we can repeat 'Growth is a process; size is a state. State is a by-product of the process'\(^2\).

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2. ibid.
Sales as indicator of a firm's size is not a good one since it partially depends on the consumers' allegiance to the particular product of the firm and as preference is volatile, the definition of a firm's size by its sales variables can fail to capture the actual state of the firm.

To all intents and purposes, a firm's size is largely a function of its own policy as pointed out by Baumol. We feel inclined, for our purpose, to follow Baumol and define a firm's size by the owned and borrowed money capital to which asset is a good approximation.

From the viewpoint of market policy adopted by a firm, the degree of non-price competition is well reflected in the degree of product differentiation. Expenditure incurred by a firm in selling effort \( w_2 \) has been used in this study as a proxy of product differentiation, because if the firm behaves

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   (ii) On the theory of the expansion of the firm,


5. In the 'Introduction' to this study we have used the symbol \( nM \) in place of \( w_2 \). These two symbols bear the same meaning.
reasonably a high level of expenditure on selling effort \( w_2 \) indicates that products are differentiable and in this sense expenditure on selling effort is a symptom of product differentiation. Second, a high level of expenditure on selling effort \( w_2 \) itself is an important determinant of the level of product differentiation which is realised by the established firm vis-a-vis potential entrants and in this sense \( w_2 \) is a source of product differentiation.

6. In Oligopolistic markets rational policies are not unambiguous since what is rational policy for the group acting in concert is not rational policy for the individual firm expecting to gain a march over its rivals. So, the term 'reasonably' should be used instead of rationally - W. S. Comanor and T. A. Wilson, Advertising, market structure and performance, Review of Economics and Statistics, Nov. 1967.

7. The same line of argument for using advertising expenditure as a proxy of product differentiation can be found in the said article written by W. S. Comanor and T. A. Wilson although advertising expenditure is a part of total expenditure in selling effort. Expenditure in selling effort is a better approximation to product differentiation than advertising expenditure since if expenditure on selling effort which includes rebate, discount, window display, advertising, canvassing, after sale service and commission to sales representatives and their salary is a genus, expenditure on advertising is merely its specie.
In the theory of the firm the term 'product differentiation' has nowhere been defined unambiguously since it can be based on either input or output or both. On the basis of this ambiguous concept one can never measure it quantitatively and therefore, the need for a workable definition arises. Confusion if any, regarding the two terms 'product differentiation' and 'product variety' should be removed right now. These two are, indeed, not the same thing. As Bain puts it 'The steel industry produces a variety of products which are sold to the knowledgeable buyers but product differentiation is minimal. In contrast, the cigarette industry offers a smaller variety, but product differentiation — based largely on advertising extensively is great. For an oligopolist firm product differentiation can reasonably be defined as the expenditure of the firm by which it mainly competes with its rivals from both demand side and supply side — demand side, because an established firm by increasing this type of expenditure induces the existing as well as the potential buyers to prefer its own brands and products to others and not to switch significantly over the products of the rivals in response to a small difference in price; supply side, because by this sort of expenditure the firm tries to maintain the standard of the artificial quality of its products so that the rivals should not eliminate the consumers' preference for the products of the firm. Correspondingly, the expenditure on selling effort represents product differentiation.

8. J. S. Bain : Barriers to new competition.
Sales of the firm and industry are defined in terms of sales revenue received by selling the product or by-products. As the influence of expenditure incurred in selling effort \( [v_2] \) is directed usually to a particular product or products it is not proper to define sales, at least if we are interested in finding the relationship between the degree of product differentiation and sales, by all kinds of receipts. Inclusion of receipts on waste product such as cotton waste and cotton seeds for instance, in a cotton textile firm can never conceptually relate expenditure on selling effort of the said firm to the sale of cotton seed since this expenditure is directed to the sale of the finished goods. While net profit is defined as the profit after tax, profitability is defined as profit per unit sale.

The structure of capital investment expenditure \([K]\) is defined as the ratio of net asset \([V]\) plus total expenditure \([M]\) to the amount of expenditure incurred in the production sector \([PE]\) i.e.

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K[t] = \frac{\int_0^t dA + \int_0^t M[t] dt}{\int_0^t PE[t] dt}
\]

5. A firm may receive revenue from different heads like scrip fees, replanting subsidy, profit on block asset sold, profit on redemption of investment, interest on advance payment of taxes, interest on current deposit account, provision for pension written back and sometimes processing charge etc.
Over this ratio we have already given some deliberation and we can understand the ratio as the one denoting the proportion of non-productive investment expenditure to productive investment expenditure measured in monetary terms.

The term 'degree of product differentiation' is defined as the ratio of expenditure on selling effort to sales expressed in percentage terms. The industries studied here being consumer goods and intermediate goods producing industries, the ratio of expenditure on selling effort \([w_2]\) to sales \([TR]\) is considered to be a reliable measure of the degree of product differentiation since the demand for the consumer goods or intermediate goods is likely to be more responsive to selling effort than the demand for capital goods. The demand for capital goods depends primarily on rates of return. Our measurement of the degree of product differentiation is in full conformity with the measurement of the degree of competition by cross elasticity of demand for and supply of the competing products. For instance, when cross elasticity of demand tends to assume high value an established firm normally tends to increase the value of \(w_2\) in order to induce the existing as well as the potential consumers to prefer its own brands and products to those of its rivals. In the presence of a sufficiently high value of cross elasticity of the competing goods from the supply side which means that the rivals are able to imitate the products of the established firm

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it is compelled to increase the value of its $\frac{w_2}{TR}$, if not for market expansion at least for retaining the existing market share.

A firm's size [$a$] represents in this study the relative size instead of absolute size. The relative size is measured by taking the ratio of assets in succeeding periods to the assets of the initial period regarded as base period when the degree of product differentiation is assumed to be zero. Taking the absolute size we can not understand how much large or small it is in comparison with that of the previous period and how much in comparison with that of the next period. By measuring size in this way we obtain a size index of the firm. But conceptually the index must not be confused with an indicator of growth since such an index is essentially a 'state' concept. In this we follow Penrose\textsuperscript{11} and maintain a distinction between the 'state' concept and the 'Process' concept.

In trying to find out the relationship profitability [$y$] and the size of a firm [$a$] we have introduced a one period lag between these two variables on the basis of the fact that a firm

\textsuperscript{*} Cross elasticity on the supply side here means cross elasticity with respect to product differentiation on the supply side. We have discussed the concept in Chapter II.

\textsuperscript{11} ibid.
distributes dividend and bonus from the net profit of this year and the remaining portion of the profit of this year is reflected by the variables which constitute assets in the next year as shown by its balance sheet.

The change in asset overtime which we have defined as net asset \( \int_0^t v(t) \, dt = \int_0^t dA \) is measured by the change overtime in paid up capital \( \int_0^t dp \) and change in total reserve \( \int_0^t dR \) in order to keep undistorted the flow concept of net asset so that

\[
\frac{\int_0^t dA + \int_0^t M(t) \, dt}{\int_0^t pE(t) \, dt}
\]

can be used for measuring the structure of aggregate capital investment expenditure of the firm concerned.

Total cost of placing the product on the market \( (E) = (M+QV) \) is composed of manufacturing cost \( (w_0) \) plus administrative cost \( (w_1) \) plus expenditure on selling effort \( (w_2) \). In conformity with the conception of total expenditure in the production sector \( (pE) \) expressed in equation (2) in the introductory chapter of this study we have added \( w_0 \) and \( w_1 \) together to get \( pE \). In other words,

\[
mM + QV = w_0 + w_1 = pE.
\]

As it is not possible to find out how much of the total administrative cost is for production sector and how much for selling sector we have assumed, for convenience, that administrative cost \( (w_1) \) is nothing but a part of total expenditure in the production sector. It is important to note here that the result of this study will not be significantly affected even if we include \( w_1 \) in the selling sector or share \( w_1 \) fifty fifty between the production sector and selling sector.
Importance given to selling effort is defined by the ratio of expenditure on selling effort to total expenditure.

Let us summarise the nature of the different variables used for our study. These were earlier presented along with our conceptual framework in the introductory chapter of this study. The variables are as follows:

\[ \begin{align*}
[1] & \quad I_t = \int_0^t dA + \int_0^t p \cdot t \, dt \\
[2] & \quad M = E - 8V \\
[3] & \quad E = u_0 + u_1 + u_2 = M + 8V = pE + nm \\
[4] & \quad pE = u_0 + u_1 \\
[5] & \quad \pi = p^G + \Gamma \\
[6] & \quad \int_0^t dA = \int_0^t dP + \int_0^t dR \\
[7] & \quad \Gamma = \pi / TR \\
[8] & \quad \beta = u_2 / E \\
[9] & \quad L = u_2 / TR = nm / TR \\
[10] & \quad a = \frac{A_t}{A_{t-1}} \\
[11] & \quad K(t) = \frac{\int_0^t dA + \int_0^t M(t) \, dt}{\int_0^t pE(t) \, dt}
\end{align*} \]

When \( A \) denotes assets, \( M \) means expenditure incurred for the purpose other than expenditure for capital creation, \( pE \) means total expenditure in production sector, \( E \) denotes total expenditure for placing the product on the market, \( dA \) means change in asset, \( dP \) and \( dR \) denote change in paid up capital and reserve respectively.
In our endeavour to find out the relationship between profitability and the degree of product differentiation, we have taken the ratio \( T \) and \( L \) on the basis of the assumption that there is at least a one period time lag between profit or sale and expenditure on selling effort. Normally, the effect of expenditure on selling effort of this year exerts its influence on sale and profit of the next year. There is no time lag where time is treated as year in the accounting year of a firm between profit and sale. Secondly, we have introduced a one period time lag between reserve or share capital and profit on the basis of the fact that this period's reserve is shown by a firm from the accumulated fund created by net profit of the previous period.

As suggested by the Scatter diagram, we have used linear equation for estimating the trend of the variables \( L \) and \( \beta \) overtime.

For estimating the nature of relationship between two variables, we have regressed one variable on the other by using the method of least squares.

The degree of 'importance given to selling effort' by either an established firm or an industry relative to its
'marketing effort' is measured by average ratio of expenditure on selling effort \([w_2]\) to total cost of placing the product on the market \([E]\) expressed as a percentage.

Co-efficient of variation of the \(w_2/Tr\) and \(w_2/E\) respectively measure the consistency in 'product differentiation' and 'importance given to selling effort' in different industries and established firms. As co-efficient of variation uses both means and standard deviation we think co-efficient of variation provides us with more reliable measure to be used for determining 'consistency of the variables' than the measure provided by standard deviation.

Variation in \(w_2/Tr\) and \(w_2/E\) industrywise have been estimated with the help of the technique of the analysis of variance in one way fixed model.

In estimating elasticity of sales with respect to product differentiation we have used the formula specially designed for measuring elasticity of one variable with respect to the other when the relationship between them is assumed to be linear as suggested by the scatter diagram. The method of estimate has divided the entire period of observation into three or four equal time periods to make it a short run analysis on the one hand and to exclude the effect of price upon sales on the other.