CHAPTER VIII
Profitability and the Degree of Product Differentiation

Product differentiation adopted by a firm is, in fact, an outcome of its policy selected in the war of non-price competition. The war is usually waged by either product variation or product differentiation. The former refers to quality competition, which is essentially a combined effect of technological improvement, innovation and scientific research and the latter refers mainly to artificial quality competition. The salient feature of product differentiation referred to here is true and in conformity with our definition of product differentiation. An artificial quality creation is done by brand names, trade marks, distinctive designs, packaging and by a myriad of other devices and artifices. While product differentiation, now a days, is brought about primarily by advertising and other kind of selling efforts product variation is a result of the application of scientific invention for commercial purposes.

Of these two weapons used in the war of non-price competition the use of the weapon of product differentiation by a firm in modern oligopolistic market has been found to be more in vogue than the weapon of product variation. The reasons for this are not very difficult to understand. It is meaningless to debate on the objective like profit realisation in the case of a firm although there are other objectives. Variables relating to other objectives can be ignored, if necessary, by a firm but profit can not.
Now in following oligopoly analysis while price variation is seldom found to exist profitability depends on either product variation or product differentiation. The classical solution of the problem of determining the choice between these two weapons is provided in terms of marginal analysis.

The amount of profit reaped by a firm due to product variation may be less than that due to product differentiation and therefore, the firm may prefer product differentiation to product variation. Secondly, in practice, product variation requires a firm to have command over more factors - exogenous and endogenous than product differentiation. Thirdly, application of scientific invention for commercial purpose needs much time which a firm may not be ready to spare. Fourthly, the provision of skilled and specialised labour, engineering technology, managerial efficiency in controlling more sophisticated method of production are pre-requisite qualifications of a firm to adopt product variation whereas adoption of product differentiation requires an insignificant fraction of some of these variables. Fifthly, product variation is almost impossible for a uniplant firm but not product differentiation since the plant technology once fixed for a particular variety of product is very difficult to change whereas there is no technological constraint in changing the nature of product differentiation. Sixthly, there is always a considerable time lag between the adoption of product
variation and the supply of final marketable output but in the case of product differentiation the time lag is short resulting in less likelihood of a change in the values of exogenous variables and thus lessens the risk-burden for the firm. Lastly, requirement of a larger lump of money capital for the adoption of product variation than for the adoption of product differentiation is a formidable barrier for a firm and thus leads it to prefer product differentiation to product variation.

Therefore, all the factors noted above lead a firm to prefer the weapon of product differentiation to product variation.

Taking it for granted that a firm has selected the weapon of product differentiation as preferable to product variation let us be clear regarding the role of product differentiation.

Though Marshall pointed out long time back two specific functions of product differentiation expressed in terms of advertising viz, spreading of information and increase of competition, it is however, not possible in practice to distinguish between advertising which is basically informative and which is combative since the relative strength of these functional aspects of product differentiation depends - mainly on the particular structure of a market. For example, the market structure as contemplated by Chamberlin is one where the role

1. A. Marshall : Industry and Trade
of advertisement done by a firm happens to be more informative and less combative since in such a case there would be, what Prof. Kaldor points out, an increase in general demand; but in an oligopoly the role of advertisement is likely to be more combative since the particular demand for the product of an oligopolist in such a situation is likely to increase at the cost of the demand for the products of the rivals. As our study is devoted to oligopoly markets we can expect here the combative role of product differentiation to be more prominent. The combative function of product differentiation being accepted let us also understand the dual role of the combative function. First, it influences the character and degree of competition among the established firms and second, it exerts influence upon the character of competition among the 'established firms' say, x and the existing 'non-established firms' say, y, and among x and the potential firms say, z. The second role either creates or raise the height of entry barrier and thereby tends to inject monopoly element in the market performance of x. This tends to increase profitability of the firm x. Thus we can expect the existence of a positive relationship between the degree of product differentiation and


3. Non established firms are firms in an industry, that have not satisfied the conditions necessary for being treated as established firm as defined in our study.
profitability.

However, the degree of product differentiation bears a positive and direct relationship with profitability subject to some conditions. They are in the form of scale economies which result from the increasing effectiveness of product differentiation per unit of output sold and decreasing cost for each purchased variable in the act of product differentiation. The economics of scale thus generated enable an established firm to spend less on product differentiation than its rivals.

A good number of empirical investigations in the developed countries reveal the fact that highly advertised products of the renowned firms are in general sold at substantially higher price than those of the new or less established firms. Here we can note that this phenomenon also explains that established firms can set prices above existing cost level without inducing entry. The investigations to which reference was made earlier have found in almost every case that there exists a positive relationship between the degree of product differentiation and profitability.

How far the 'maintained hypothesis' holds good in a developing country like India is a question which deserves our proper consideration.

In a sample of ten established firms belonging to ten industries we have tried to estimate the relationship between
profitability and the degree of product differentiation by the respective regression co-efficients. The variable profitability (γ) has been regressed upon the variable, the degree of product differentiation (L). Estimating equations are taken as linear on the basis of the scatter diagrams.

The sample size being very small we have subjected the co-efficient 'b' of each regression equation to the 'T' test at 5% level of significance (α) and also estimated its standard error by using the formula stated in the previous chapter. The test statistic to test the relevant hypothesis is the same as stated earlier.

In chapter VII we have estimated equation stating the nature of relationship between γ and L and therefore, we refrain from repeating them here.

Corresponding to these estimating equations we have tested the hypothesis

H : There exists no such relationship in the universe as observed in the sample between γ and L.

Accordingly ψ = 0. The hypothesis is rejected if either 

\[ t = \frac{b}{S_b} \text{ or } t = \frac{b}{S_b} \] 

at the 5% level of significance. Table 26 sets out the estimate.

The relationship between γ and L is found to be positive in biscuits, rubber goods, bicycles, electrical goods and cotton textiles manufacturing established firms while the relationship is found to be negative in cigarette manufacturing established firm.
The relationship between \( \gamma \) and \( L \) is found to be significant in cigarette and electrical goods manufacturing firms and nearly significant in biscuits, bicycles, rubber goods and cotton textile firms. In tea, automobile, cosmetics and manufacturing firms, the relationship between these variables is found to be insignificant.

Existence of negative relationship between \( \gamma \) and \( L \) in cigarette manufacturing firms can be explained with the help given by informations obtained from tables 4 and 12. Existence of a low degree of product differentiation, positive slope of the trend of the time series of the variables representing the degree of product differentiation together with high degree of 'importance given to selling efforts' and positive value of the slope of the trend fitted to the time series of the variable measuring the 'importance given to selling efforts' indicate that sales are increasing at a smaller rate than product differentiation, the firm has been giving relatively more importance to product differentiation than to production itself. Therefore, profit per unit sales declines with additional selling effort per unit of output. Finance capital for product differentiation and production of this period is coming from profit of the previous period and as the two are increasing significantly overtime, profit declines overtime. Secondly, as the degree of product differentiation has been increasing overtime, profitability declines possibly due to decline in the scale economies of product differentiation.
Scatter diagram—Cigarette mfg firm for assuming linear relationship between \( r \) and \( L \).
<table>
<thead>
<tr>
<th>Established firms in industries</th>
<th>Estimating equations</th>
<th>Calculated value of t</th>
<th>N-2</th>
<th>Tabulated 5%</th>
<th>S.E. of b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tea</td>
<td>( \gamma' = 0.9716 - 0.26657L )</td>
<td>0.349</td>
<td>17</td>
<td>2.110</td>
<td>0.7637</td>
</tr>
<tr>
<td>2. Biscuits</td>
<td>( \gamma' = 0.0034 + 1.4213L )</td>
<td>1.9413</td>
<td>13</td>
<td>2.160</td>
<td>0.7816</td>
</tr>
<tr>
<td>3. Rubbergoods</td>
<td>( \gamma' = 0.01546 + 6.909L )</td>
<td>1.307</td>
<td>9</td>
<td>2.262</td>
<td>5.2645</td>
</tr>
<tr>
<td>4. Cigarettes</td>
<td>( \gamma' = 0.03855 - 1.32326L )</td>
<td>2.965</td>
<td>13</td>
<td>2.160</td>
<td>0.446</td>
</tr>
<tr>
<td>5. Bicycles</td>
<td>( \gamma' = 0.04114 + 1.515L )</td>
<td>1.107</td>
<td>11</td>
<td>2.201</td>
<td>1.3765</td>
</tr>
<tr>
<td>6. Automobiles</td>
<td>( \gamma' = 0.0813 - 4.909L )</td>
<td>0.342</td>
<td>13</td>
<td>2.160</td>
<td>14.334</td>
</tr>
<tr>
<td>7. Cosmetics</td>
<td>( \gamma' = 0.264 + 1.43L )</td>
<td>0.0462</td>
<td>11</td>
<td>2.201</td>
<td>30.886</td>
</tr>
<tr>
<td>8. Electrical goods</td>
<td>( \gamma' = 0.0513 + 0.36115L )</td>
<td>2.5066</td>
<td>11</td>
<td>2.201</td>
<td>0.144</td>
</tr>
<tr>
<td>9. Cotton textile</td>
<td>( \gamma' = 0.0119 + 4.356L )</td>
<td>1.737</td>
<td>15</td>
<td>2.131</td>
<td>2.318</td>
</tr>
<tr>
<td>10. Medicines and Drugs</td>
<td>( \gamma' = 0.0465 - 0.185814L )</td>
<td>0.330</td>
<td>13</td>
<td>2.160</td>
<td>3.028</td>
</tr>
</tbody>
</table>
due to decline in the scale economies of product differentiation over time in the said firm. Thirdly, other factors contributing to the profitability are possibly making negative contribution at a greater rate than the rate of positive contribution of the degree of product differentiation to profitability. It appears that profit is being increasingly used to finance the size of the product differentiation since it does not increase the size of the firm as suggested by the regression co-efficient (see Table-25) although the co-efficient has not passed the test of significance. On the other hand, from the negative relationship we can also infer that if the degree of product differentiation increases, profitability decreases over time and if profitability declines, the size of the firm or the value of the variable \( k \) increases. In other words, if the degree of product differentiation increases, the structure of aggregate capital investment expenditure expands. However, this issue will be considered in the next chapter.

Implications of the positive relationship between profitability and the degree of product differentiation in this study can not be made clear until we come to know about the nature and significance of the relationship between \( \text{H} \) and \( r' \).

In all other cases like tea, automobile, cosmetics and medicine we do not have sufficient evidence to believe that the nature of relationship as indicated by the regression equation exists between \( r' \) and \( L \). It indicates that the degree of
product differentiation in these established firms does not play any important role in determining profitability.

Table 4 states that in tea, automobiles and medicines and drug producing established firms the degree of product differentiation has been increasing overtime while it has been decreasing in the cosmetic goods manufacturing firm. Secondly, as per Tables 14 and 15 all the said firms, except the firm producing and selling medicines and drugs have been found to be giving more importance to selling effort than to production. Therefore, finding no relationship between and in the cases of these established firms we may suppose that product differentiation weapon here has been adopted mainly to maintain the existing market share and/or to increase the market share.

Tea being a non-essential consumer good has not experienced any significant technological development for improving the quality of the product and therefore, reliance on selling effort especially in foreign markets has become a must. Increasing rivalry among the firms in imitating style, design and method of placing the product on the market on the one hand and relatively strong brand switching mentality of the buyers together with competition from the coffee industry have been responsible for the growing value of cross elasticity with respect to product differentiation on both the supply side and the demand side. Moreover, variables constituting selling effort in the firm are not upto the amount which may generate
scale economies and hence the firm is supposed to have taken
resort to product differentiation only to compete with its
rivals and to keep the buyers' allegiance to its own brand.

Regarding automobile firms one can say that speciali-
isation, capital requirement and licensing system have been
working as factors preventing entry and highly concentrated
industrial character has been providing the firm with the
level of profitability which the firm has been expecting from
the business. The rising trend of the degree of product
differentiation and 'importance given to selling effort' most
probably are to resist the competitive force coming from
substitutes like motor cycles and scooters etc. and to induce
the snobbish consumers to choose the particular type of auto-
mobile by spending more for quantitative as well as qualita-
tive selling effort. Correspondingly, there exists no relation-
ship between $Y$ and $L$. In this case, product differentiation does
not aim at increasing profitability.

The principle of sacrificing present profit with the
expectation of higher profit in future may have been followed
by the firm manufacturing cigarettes. A positive slope of the
trend of 'importance given to selling effort' is found to be
highly significant (vide Table-15) and this explains that the firm
has been trying to expand its market share since the firm
in a highly concentrated industry may reap monopoly profit
to some extent. But the decline in profitability with an
increase in the degree of product differentiation shows that
the film hence uses its profit in augmenting the quality and quantity of selling effort more for the expansion of market size by spreading information and thereby inducing the potential buyers. This is why, profitability bears a negative relationship to the degree of product differentiation. Moreover, theoretical reasoning spells the inevitable feature of the declining profitability with a rise in the value of the degree of product differentiation when the values of cross elasticities with respect to product differentiation on both the supply side and the demand side become greater than zero due to the rise of gradual inertias of the buyers' mind which creates psychological resistance to allurement of product differentiation on the one hand and due to increasing rate of imitation of the product by the rivals. Cigarette industry being highly concentrated value of cross elasticity on the demand side is likely to be greater than that on the supply side. Apart from this, inter-brand competition in a cigarette manufacturing firm is very likely to exist. Therefore, if these factors prevail, profitability should decline with an increase in the degree of product differentiation.

In the electrical goods manufacturing firm the relationship between \( \gamma \) and \( L \) is found to be positive and statistically significant and hence we have sufficient evidence to believe that the firm has been experiencing scale economies.
of product differentiation during the study period. The goodwill and reputation of the firm together with genuine increase in quality and selling effort have been working as factors conducive to increasing profitability.

Though we have not found the relationship which exists between \( r^2 \) and \( L \) statistically significant, yet in consideration of the slope value of the regression lines and the value of the standard error in the cases of the established firms producing biscuits, bicycles and cotton textiles we can speak of a positive relation between \( r^2 \) and \( L \). These firms have been showing a declining trend of the degree of product differentiation (vide Table 4) and also both biscuits and bicycles producing firms show the declining trend of 'importance given to selling effort' and although the established firm producing cotton textiles shows a positive trend of 'importance given to selling effort' it is very insignificant (vide Table - 14). This feature shows that the firms have been realising scale economies of selling effort and hence profitability in these established firms bears a positive relationship to the degree of product differentiation.

Thus out of ten established firms belonging to different industries we have found the existence of positive relationship between the degree of product differentiation and profitability in the cases of six firms of which two firms have no sufficient evidence to make us believe in the
existence of positive relation between and \( L \) in their cases. They are the rubber goods and cosmetic goods producing firms. In the cases of the remaining four we have found the existence of negative relationship between and \( L \). Among the four we have sufficient evidence to believe in the existence of negative relationship only in the case of one firm namely the cigarette manufacturing firm.