CHAPTER I

INTRODUCTION

1.1. Introduction

The present study envisages to analyse market share, its determinants, cross and advertising elasticities, advertising and market share dynamics and durability of advertising effect on sales.

A widely used measure of a company's marketing performance is the market share the company and its product have. Market share is a ratio measure that allows one company or product to be compared to another. It is calculated as the percentage sales that a company obtains as compared to the total sales combined. Companies undergo strenuous efforts to increase market share at the expense of competitors, as market share is generally considered to be one of the important measure of business success. The existing literature considers market share to be one of the most important indicators of organizational success and the implication is that bigger the market share, more successful the company would be. Gale and Buzzell (1993) suggest that market share can be an important determinant of profitability in the medium to long term. They state that larger market share is both a reward for providing better value and a means of realizing lower costs.

The importance of market share is also acknowledged in the Boston Consulting Group Matrix as a key indicator of industry growth (Lynch 2000). This is not surprising as companies with market leader status tend to derive profitability from their economies of scale capability as well as their established branding (Buzzell et al, 1975).

Porter (1985) in his strategic planning model suggested that a firm with a low market share can succeed by developing a well focused strategy and a firm with high market share can succeed through cost leadership or a differentiated strategy.

In Product Evaluation Matrix developed by Yoram and Henry Claycamp (1976), the current and projected positions of a company's products are examined on three measures viz. sales, market share and profitability.
Market share can be explained as a company’s sales in relation to total industry sales. Generally it is accepted that increased market share can be equated with success, whereas decreased market share is a manifestation of unfavorable actions/inactions by a firm and is usually equated with failure.

Market share can be increased in a number of ways by enhancing the perceived value of the products (a realistic measure) or by reducing the market price (short-term measure) or a combination of both measures. Finlay (2000) suggests that increased market share occurs when (1) current markets are not saturated, (2) present customers can be induced to buy more, (3) increased economies of scale and (4) the company has spare production or distribution capacity.

Intuitively, the relationship between a firm’s market share and its profitability is appealing. If a firm gains market share, sales should increase leading to increased profits. Empirically, this relationship has proven difficult to establish.

Buzzell et al. (1975) found a strong, positive relationship between market share and profitability. Hergert (1984) documented that market share and profitability appear to be positively related on average, but the relationship is weak overall and non-existent in many industries. Smirlock (1985) found that bank branches whose markets were clearly defined by geographic boundaries with no overlap had a strong positive relationship between market share and profitability; however, Markell et al. (1988) concluded that the link between market share and profitability is an occasional phenomenon rather than a universal law. Fraering and Minor (1994) suggested that the link is so unclear that firms should take heed before embarking on a strategy of increasing market share in order to increase profitability. Sankaranarayanan (2006) found a weak and insignificant relationship found between market share and profitability. These studies used various measures of profitability including return on investment (ROI), return on assets (ROA), and cash flow from investments. In sum, the results on the relationship between market share and profitability range from no significant association to a strong positive association.

All advertising is not designed to lead directly to sales. For example, some advertising may be aiming for long-term brand-image building. Whether it is designed for short-term or long-term purposes, advertising’s effectiveness lies in its capability to
help stimulate or maintain sales (Eachambadi 1994; Mantrala, Sinha, and Zoltners 1992; Naik, Mantrala, and Sawyer 1998; Vidale and Wolfe 1957). Thus, advertising is frequently used as an independent variable in explaining changes in sales (Lilien 1994). According to Abraham and Lodish (1990, p. 50), however, a real and important issue in advertising effectiveness is "the incremental sales of a product over and above those that would have happened without the advertising or promotion". If short-term advertising can result in a sustained high level of sales, as they put it, the company is "getting the most out of advertising." Although advertising managers have long considered the idea that advertising's impact on sales can persist longer than the current period "intuitively attractive" (Clarke 1976, p. 346), many of them still assume that advertising's effect on sales is short-term. They also hold that, in all cases, more and longer uses of advertising are better than less and shorter uses of it—whether or not advertising is directly boosting sales (Jones 1992, 1995). Darral G. Clarke (1976) after reviewing 70 articles reported that none of the papers gave a satisfactory answer to the question of how long advertising affects sales.

Since a number of questions remain unanswered in the existing literature, the present study made an attempt to analyse market share, its determinants, elasticities, profitability relationship, advertising and market share dynamics and durability of advertising effect on sales in selected Indian consumer durable products.

1.2. Need for the Study

Market share and profitability has become a central concern of business policy. The relationship between market share and profitability is perhaps the most studied single phenomenon in business policy. The correlation between these measures is undeniable. PIMS found (and continues to find) a link between market share and the return a business makes on its investment.

Although it has been more than two decades since the first published studies reporting a positive market share—profitability association and the nature of this relationship continues to receive a great deal of attention Gale (1972), Shepherd (1972), Buzzell et al. (1975), Mac Millan et al. (1982), Smirlock (1985), Tony (1987), Jacobson (1988a), Markell et al. (1988), Shanklin (1988), Cool et al. (1989),

Many practitioners hold the view that higher market share leads to higher profits, research findings indicate that the market share profitability association is dependent upon strategic and competitive settings, and spurious effects account for at least sizable component of the measured association.

Whereas Rumelt and Wensley (1981), Lynn (1986), Jacobson (1988), House and Taylor (1991), Schwalbach (1991), Fraering and Minor (1994) and Sankaranarayanan (2006) found a weak and statistically insignificant relationship in selected Indian consumer durable products. There were also mixed findings of this relationship in the studies conducted by Hergert (1984) and Bourantas and Mandes (1987). The data for these studies had been sourced from PIMS, the Standard and Poors Compustat Service, Bank Financial (call) Reports and Ward’s Business Directory. However, the empirical evidence regarding the strength of the relationship between market share and various measures of profitability (return on investment, return on assets, return on total assets) was not uniform. Goddard, Tavakoli and Wilson (2005) found that firms that increase in size tend to experience reduction in profitability, but an increase in market share was associated with profitability on average.

However, scanning the existing literature have shown the following gaps and this study makes an attempt to fill up these gaps.

For decision making and policy formulation, specific industry studies are needed. But most of the earlier studies Buzzell et al. (1975), Newton (1983), Lynn (1986), Henry (1991), Schwalbach (1991), Lambkin (1992) and Hadi (1992), have focused on various group of industries and not on specific industries.

Sathien (1986), Battice (1986), John (1990), and Hellofs and Jacobson (1999) have reported that variables such as product quality, product usage, cost, franchising etc. influence market share. Erickson and Finkler (1985), Proussaloglou and Koppelman (1994),
Mixon Jr. and Yu Hsing (1997), Golias and Yannis. J (1998), Craig and Dunbar (1999) and Raghavendra Rau (2005) had conducted studies on determinants of market share in specific service industries. But theoretically important marketing variables such as marketing expenses, advertising expenses, distribution expenses, selling expenses, research and development expenses and prices do have a significant influence over the market share movements which were not considered by the earlier studies.


Metwally (1975) and Roberts and Samuelson (1988) found that advertising is relatively long-lived, while Thomas (1989), Boyd and Seldon (1990) and Landes and Rosenfield (1994) found that advertising appears to be short lived. Empirical studies testing the advertising durability hypothesis have reported mixed results.


**Conclusions from Sankaranarayanan’s (2006) study:**

- Highest growth rate of sales was recorded by washing machine.
- Price elasticity was relatively elastic and highly price sensitive.
- Advertising expenses and prices were the most significant variables which determine the market share of Indian consumer durable products.
- A weak and statistically insignificant relationship found between market share and profitability.
Gaps found in Sankaranarayanan’s (2006) study:

- Tests for unit root and cointegration was not carried out.
- Cross elasticity and advertising elasticities were not estimated.
- Marketing expenses and R&D expenses do have significant influence over market share of Indian consumer durable products. These variables were not considered in his study.
- A weak and insignificant relationship found between market share and profitability.
- Advertising and market share dynamics and durability of advertising effect on sales were not examined.

Keeping the research gaps at the backdrop, the following problems have been identified for further research consideration.

1.3 Problem Formulation

A number of researchers in the marketing, management and economics disciplines have expressed reservations regarding the validity and generalisability of the reported relationships between market share and profitability.

Buzzell et al. (1975), Macmillan et al. (1982) and Smirlock (1985) concluded that the relationship between market share and profitability was strongly positive. Newton (1983) and Shanklin (1988) reported that the relationship between these two was weakly positive and Hergert (1984) found that the relationship was positive but insignificant. Wernerfelt (1986) recorded that this relationship was positive only in introduction and growth stages of the product. Markell et al. (1988) found that the relationship was significant only in plastics industries. Kurtz and Rhodes (1992) and Kevin J. Laverty (2001) had revealed that the association between market share and profit was direct under restrictive assumption. On the other hand Jacobson (1988), Schwalbach (1991) and McDonald (1999) concluded that there was no relationship between these two variables and Bourantas and Mandes (1987) reported spurious relationship. Sankaranarayanan (2006) reported that the causal relationship between market share and profitability and their inverse relationship were weak and statistically insignificant in most of the reference companies in Indian consumer durable products. Thus it is evident that there is no unanimity among the researchers as to the exact nature of relationship between market share and profitability.
Sathien (1986) reported that cost and product usage were the factors determining market share of consumer durable. John (1990) found that the franchising emerged as a significant determinant of market share. Hellofs and Jacobson (1999) recorded that perceived quality was a determinant of market share and Battice (1986) found that product quality had strong impact on market share. Sankaranarayanan (2006) found that the advertising expenses and prices are the most significant determinants of market share of selected Indian consumer durable products.

Studies have been conducted between 1985 and 2006 by researchers to find out the determinants of market share in service industries. The determinants identified were very much restricted to each type of service industry. The efficient conduct of all consumer based enterprise requires an understanding of the relationships between consumer behaviour and the short-term movements of a firm’s market share. Changes in market share are a function of consumer-purchasing decisions, influenced by a variety of factors, both economic and psychological. In this study, similar attempt is made to identify the factors that determine market share of consumer durable products. Theoretically, advertising expenses, marketing expenses, distribution expenses, selling expenses, research and development expenses and realised price have a significant influence over the market share. But the influence of these factors on the market share was not yet established conclusively.

All advertising is not designed to lead directly to sales. For example, some advertising may be aiming for long-term brand-image building. Whether it is designed for short-term or long-term purposes, advertising’s effectiveness lies in its capability to help stimulate or maintain sales (Eachambadi, 1994; Mantrala, Sinha and Zoltners 1992; Naik, Mantrala and Sawyer, 1998; Vidale and Wolfe 1957).

The motivation for these studies has been provided by the advertising durability hypothesis. This hypothesis asserts that periodic advertising contributes to a long lived asset called goodwill which positively affects future market share (Martin, 1993).

Abdel-Khalik (1975), Metwally (1975) and Roberts and Samuelson (1988) found that advertising is relatively long-lived, while Thomas (1989), Boyd and Seldon (1990) and Landes and Rosenfield (1994) found that advertising appears to be short lived.
Kelly Bird (2002) found that the effect of advertising on market share is relatively short lived; appearing to be substantially depreciated within one year for all firms and advertising is less effective for foreign firms in the domestic market. Empirical studies testing the advertising durability hypothesis have reported mixed results. Darral G.Clarke (1976) after reviewing 70 articles reported that none of the papers gave a satisfactory answer to the question of how long advertising affects sales.

Market share information, advertising and market share dynamics and durability of advertising effect on sales are the base for corporate planning, profit planning, strategy formulation, capital budgeting and investment decisions. Even though market share information is very vital for decision making and forward planning, market share forecasting exercise is riddled with uncertainties and complexities.

Hence the present study seeks to answer the following questions.

1.4 Research Questions

1. Who are the major players in the Indian consumer durable products market and what are their market shares?

2. What are the inter and intra company variations in market share over a period of time?

3. What are the price elasticities of market share in the selected products?

4. What are the cross elasticities of market share in the selected products?

5. What are the advertising elasticities of market share in the selected products?

6. What are the determinants of market share?

7. What is the nature and extent of relationship between market share and profitability?

8. What are the advertising and market share dynamics?

9. What is the durability of advertising effect on sales?

10. What are the suggestions and recommendations for policy formulation?

With the above questions in the background, the study focuses on market share analysis of the selected Indian consumer durable products with reference to the following objectives:
1.5 Objectives of the Study

The broad objectives of the study are

1. To review the literature and theoretical framework relating to various aspects of market share analyses,
2. To study the market shares held by the Indian companies in the selected consumer durable goods market during the period of study,
3. To study the inter and intra company market share variations,
4. To estimate price elasticities of market share,
5. To estimate cross elasticities,
6. To estimate advertising elasticities of market share,
7. To identify the determinants of market share and
8. To examine the relationship between market share and profitability.
9. To analyse the advertising and market share dynamics
10. To examine the durability of advertising effect on sales.

1.6 Methodology
1.6.1 Scope

The study covers the period 1991-2006. The sample includes the consumer durable products such as television, refrigerator, washing machine, and air conditioner. Buzzell et al. (1975) is of the firm view that market share is important for infrequently purchased products than frequently purchased because infrequently purchased products tend to be durable, higher in unit cost, and are often complex and difficult for buyers to evaluate, as there is a bigger risk in wrong choice. Further market share is more important to businesses when buyers are fragmented rather than concentrated. We fully agree with Buzzell et al.’s opinion and therefore we have focused our study on the consumer durable products mentioned above. Among the consumer durable products we have selected Colour Television, Refrigerator, Washing Machine and Air Conditioner. These products are purchased wider and nowadays preferred by all class of people and hence, we have selected these 4 products for our analysis. Most of the appliances selected are not
homogenous and there were quality differences: both physical and technical across the products. We have taken care of physical quality in a comparative analysis but technical quality has been left out. The companies which are in the market for a reasonable period are considered for the purpose of analysis.

1.6.2 Data Source

The main source of data for the study is the database called “prowess” developed by the Centre for Monitoring Indian Economy (CMIE) which is a compilation of the information relating to income and expenditure of the companies based on annual report and balance sheets. Information on selected variables relating to inputs and output is extracted from this database for all the firms that are classified under the category of consumer durable products based on the main output of the firms.

The CMIE database contains, among several other things, the product-wise details presented by companies in their Annual Accounts pursuant to paragraphs 3 and 4C of Part II of Schedule VI to the Companies Act, 1956. These paragraphs govern the corporate disclosures pertaining to licensed and installed capacities, production, purchases, changes in stock and sales in terms of quantity and value for the major groups of products manufactured and/or traded by a company.

In CMIE database, the information on total sales and market size is the estimated sales of all the domestic entities. Usually, the sales were estimated as the product of the production and the average unit value of sales of the sample companies for which information was available. This method was used when the unit value were consistent across companies. Market shares were calculated on the basis of the total market size i.e. total sales of domestic companies and imports.

The variables for which data are extracted for the study are:

1. Market share
2. Advertising expenses
3. Marketing expenses
4. Distribution expenses
5. Selling expenses
6. R&D expenses and Profits
All the above data are obtained for the selected firms during the period from 1991-2006. However, this study does not include the multinational companies which are having their headquarters and listed in stock markets outside India.

In order to proceed with the estimation of the relationships, the data above need to be processed further. For want of suitable index we have not deflated the data for price changes.

1.6.3. Data Analysis

To analyse the data, all conventional statistical, mathematical and econometric tools have been used. To detect the existence of autocorrelation, we have applied Durbin-Watson test.

1.6.3.1 Autocorrelation

The Durbin-Watson statistic computed confirmed the presence of autocorrelation. Autocorrelation is a special case of correlation. It refers to the relationship not between two (or more) different variables but between the successive values of the same variable.

(i) The Durbin-Watson Test

Durbin and Watson suggested a test which is applicable to small samples. However, the test is appropriate only for the first order autoregressive scheme \( u_t = \rho u_{t-1} + u_t \). The test may be outlined as follows:

The null hypothesis \( H_0 : \rho = 0 \) (i.e., the \( u \)'s are not autocorrelated with the first order scheme) is tested against the alternative hypothesis \( H_1 : \rho = 0 \) (the \( u \)'s are autocorrelated with a first order scheme).

To test the null hypothesis we use the Durbin-Watson Statistic, i.e.,

\[
\frac{\sum_{t=2}^{n} (e_t - e_{t-1})^2}{\sum_{t=1}^{n} e_t^2}
\]

and the value of \( d \) lie between 0 and 4.

10b
Firstly, if there is no autocorrelation \( \rho = 0 \) and \( d = 2 \). Thus if from the sample data we find \( d^* = 2 \), we accept that there is no autocorrelation in the function.

Secondly, if \( \rho = +1, \ d = 0 \) and we have perfect positive autocorrelation. Therefore, if \( 0 < d^* < 2 \), there is some degree of positive autocorrelation, which is stronger the closer \( d^* \) is to zero.

Thirdly, if \( \rho = -1, \ d = 4 \) we have perfect negative correlation. Therefore, if \( 2 < d^* < 4 \), there is some degree of negative autocorrelation, which is stronger the higher the value of \( d^* \).

Finally, the empirical \( d^* \) must be compared with the theoretical values of \( d \), i.e., the values of \( d \) which define the critical region of test. Durbin-Watson has established upper (\( d_u \)) and lower (\( d_L \)) limits for the significance levels of \( d \) with 5% and 1% level of significance.

The test compares the empirical \( d^* \) values, calculated from the regression residuals, with the \( d_L \) and \( d_u \) in the Durbin-Watson tables, \( (4- d_L) \) and \( (4- d_u) \). i.e.,

1. If \( d^* < d_L \) reject the null hypothesis of no autocorrelation and accept that there is positive autocorrelation of the first.

2. If \( d^* > (4- d_L) \) we reject the null hypothesis of no autocorrelation and accept that there is negative autocorrelation of first order.

3. If \( d_u < d^* < (4- d_u) \) we accept the null hypothesis of no autocorrelation.

4. If \( d_L < d^* < d_u \) or if \( (4- d_u) < d^* < (4- d_L) \) the test is inconclusive.

(ii) Detection of Autocorrelation:

The most celebrated test for detecting autocorrelation is Durbin-Watson 'd' statistic which is defined as

\[
d = \frac{n \sum_{t=2}^{n} (e_t - e_{t-1})^2}{n \sum_{t=1}^{n} e_t^2}
\]
i.e.,
\[ \log M_{St} = \log b_0 + b_1 \log A_{Et} + b_2 \log M_{Et} + b_3 \log D_{Et} + b_4 \log S_{Et} + b_5 \log RDE_t - b_6 \log PR_t + u \]

(iii) Estimation of \( \rho \)

With the help of ochrane-Orcut iterative method, the \( \rho \) value is found out for the autocorrelative infested companies as explained below:

**Step: 1 Estimate** \( u_t \)

\[ e_t = M_{St} - (b_0 + b_1 A_{Et} + b_2 M_{Et} + b_3 D_{Et} + b_4 S_{Et} + b_5 RDE_t - b_6 PR_t) \]

\((t=1, 2, 3, 4 \ldots)\)

In terms of the given \( u \) is again regressed with \( u_{t-1} \) and the \( \rho \) values are found out.

**Step: 2**

With the help of \( \rho \) values, the original data was transformed as shown below:

\[(M_{St} - \rho M_{St-1}) = b_0 (1-\rho) + b_1 (A_{Et} - \rho A_{Et}) + b_2 (M_{Et} - \rho M_{Et}) + b_3 (D_{Et} - \rho D_{Et}) + b_4 (S_{Et} - \rho S_{Et}) + b_5 (RDE_t - \rho RDE_t) - b_6 (PR_t - \rho PR_t)\]

Where,

\( M_{St} - \rho M_{St-1} = M_{St}^* \)
\( A_{Et} - \rho A_{Et} = A_{Et}^* \)
\( M_{Et} - \rho M_{Et} = M_{Et}^* \)
\( D_{Et} - \rho D_{Et} = D_{Et}^* \)
\( S_{Et} - \rho S_{Et} = S_{Et}^* \)
\( RDE_t - \rho RDE_t = RDE_t^* \)
\( PR_t - \rho PR_t = PR_t^* \)

\( \nu_t = u_t \rho u_{t-1} \)
Step: 2

OLS method was applied to the transformed data to obtain the parameters of the production function as indicated below:

$$\text{MS}_t^* = b_0 + b_1 \text{AE}_t^* + b_2 \text{DE}_t^* + b_3 \text{SE}_t^* + b_4 \text{RDE}_t^* - b_5 \text{PR}_t^* + u^*$$

1.6.3.2 Unit root tests

The stationary of the data were checked using unit root test.

ADF test is used for cointegrating the data. According to Engle-Granger test, even though the regression parameters are individually non-stationary, the unit root test performed on residuals is stationary means then the regression result is not spurious (Damodar N. Gujarati, P-823). Therefore the results of unit root tests on residuals are presented in the following tables.

It is evident from the table 1.1 that the Engle-Granger 1 percent $\tau$ values are -2.7411 and -2.7570 respectively. Since the computed $\tau (= t)$ values are much more negative than this except in Videocon Group. It is concluded that the residuals from the regression are $I(0)$; that is they are stationary. In Videocon group the residual is stationary at 5 percent level.

### Table 1.1

<table>
<thead>
<tr>
<th>Company Name</th>
<th>UT (-1) $\tau$</th>
<th>Critical Value (1%)</th>
<th>Critical Value (5%)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bestavision</td>
<td>-3.1025</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>BPL</td>
<td>-2.4820</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
<tr>
<td>Sharp India</td>
<td>-3.4614</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Philips</td>
<td>-4.9714</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Onida group</td>
<td>-3.8244</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Videocon group</td>
<td>-2.2657</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
</tbody>
</table>
Table 1.2 presents the unit root tests results in Refrigerator. It is evident that the Engle-Granger 1 percent $\tau$ values are -2.7570 and -2.7411 respectively. Since the computed $\tau (= t)$ values are much more negative than this, and it is concluded that the residuals from the regression are $I(0)$; that is they are stationary in all companies in Refrigerator cases.

**Table 1.2**

Unit Root/Cointegration results in Refrigerator

<table>
<thead>
<tr>
<th>Company Name</th>
<th>UT (-1) ($\tau$)</th>
<th>Critical Value (1%)</th>
<th>Critical Value (5%)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPL refrigeration</td>
<td>-4.2687</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
<tr>
<td>Electrolux Kelvinator</td>
<td>-2.6358</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
<tr>
<td>Voltas</td>
<td>-5.1621</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Whirlpool India</td>
<td>-3.7304</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Godrej group</td>
<td>-4.1108</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Table 1.3 presents the unit root tests results of residuals in Washing Machine. It is evident that the Engle-Granger 1 percent $\tau$ values are -2.7570 and -2.7411 respectively. Since the computed $\tau (= t)$ values are much more negative than this, and it is concluded that the residuals from the regression are $I(0)$; that is they are stationary in all companies.

**Table 1.3**

Unit Root/Cointegration results in Washing Machine

<table>
<thead>
<tr>
<th>Company Name</th>
<th>UT(-1) ($\tau$)</th>
<th>Critical Value (1%)</th>
<th>Critical Value (5%)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPL Sanyo</td>
<td>-2.9360</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
<tr>
<td>IFB</td>
<td>-3.7587</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Electrolux Kelvinator</td>
<td>-2.8277</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
<tr>
<td>Videocon Appliances</td>
<td>-4.1114</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Whirlpool group</td>
<td>-3.5661</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Onida savak</td>
<td>-2.9258</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
</tr>
</tbody>
</table>
Table 1.4 presents the unit root tests results of residuals in Air conditioner cases. It is evident that the Engle-Granger 1 percent $\tau$ values are -2.7411 and -2.7570 respectively. Since the computed $\tau (= t)$ values are much more negative than this, and it is concluded that the residuals from the regression are $I(0)$; that is they are stationary.

Table 1.4
Unit Root/Cointegration results in Air Conditioner

<table>
<thead>
<tr>
<th>Company Name</th>
<th>UT (-1) ($\tau$)</th>
<th>Critical Value (1%)</th>
<th>Critical Value (5%)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltas</td>
<td>-3.1875</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Videocon international</td>
<td>-3.5608</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Amtrex Hitachi</td>
<td>-3.2228</td>
<td>-2.7411</td>
<td>-1.9658</td>
<td>Stationary</td>
</tr>
<tr>
<td>Carrier Aircon</td>
<td>-3.1229</td>
<td>-2.7570</td>
<td>-1.9677</td>
<td>Stationary</td>
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<td>-1.9658</td>
<td>Stationary</td>
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</tbody>
</table>

1.6.3.3 Techniques Identified

The important techniques identified for application in the study are as follows:

(i) Growth Rate

To compute the annual growth rates, the formula used by the World Bank (2000) is adopted. The least squares growth rate “r” is estimated by fitting a linear regression trend line to the logarithmic annual values of variable in the relevant period. The regression equation takes the form

$$1_n X_t = a + b_t$$

which is equivalent to the logarithmic transformation of the compound growth equation

$$x_t = x_o (1+r)^t$$

In this equation, $x$ is the variable,

‘t’ is time

$a = \log x_o$ and

$b = 1_n (1+r)$ are the parameters to be estimated.
If \( b^* \) is the least square estimate of \( b \), the average annual growth rate \( r \) is obtained as \( \exp (b^*) - 1 \) and is multiplied by 100 to express it as a percentage.

(ii) Price Elasticity of Market Share

To calculate the price elasticity of market share, the following equation is used.

\[
\frac{\Delta MS_i}{\Delta PR_j} = \frac{PR_j}{MS_i} \quad X \quad \frac{e_{ij}}{e_{ij}}
\]

where \( MS = \) Market Share; \( PR = \) Price realised

(ii) Cross Elasticity of Market Share

To calculate the cross elasticity of market share, the following equation is used.

\[
\frac{\Delta MS_x}{\Delta PR_y} = \frac{PR_y}{MS_x} \quad X \quad \frac{e_{xy}}{e_{xy}}
\]

where \( MS_x = \) Market Share of \( x \) commodity; \( PR_y = \) Price of \( y \) commodity

(iii) Advertising elasticity

The advertising elasticity \( e_A \), is the ratio of proportionate change in \( MS \) to proportionate change in advertising expenditure.

\[
\frac{\Delta MS}{\Delta AE} = \frac{AE}{MS} \quad X \quad \frac{e_A}{e_A}
\]

Theoretically,

- \( e_a > 1 \) - proportionately greater percentage change in market share than expenditure on advertising.
- \( e_a < 1 \) - proportionately lesser percentage change in market share than expenditure on advertising.
- \( e_a < 0 \) - Advertising results in counter productive market share.
- \( e = 0 \) - Ineffective advertising.
(iv) Determinants of Market Share

\[ MS_t = f(AE_t, ME_t, DE_t, SE_t, RDE_t, P_t) \]

Where

- \( MS_t = \) Market share in period \( t \)
- \( AE_t = \) Advertising expenses in period \( t \)
- \( ME_t = \) Marketing expenses in period \( t \)
- \( DE_t = \) Distribution expenses in period \( t \)
- \( SE_t = \) Selling expenses in period \( t \)
- \( RDE_t = \) Research and development expenses in period \( t \)
- \( PR_t = \) Price in period \( t \)
- \( u = \) Stochastic term

Variables included in the Model

Market Share

Market share of a company in a particular product market. This is calculated as the ratio of a company’s actual sales to the total industry sales of a particular product.

Advertising Expenses

Advertising expenses spent for promoting a particular product. This is calculated by appropriating a company’s total advertising expenses based on the product sales. It is hypothesized that higher the advertising expenses, higher will be the market share and hence the expectation is positive relationship between market share and the advertising expenses in a particular product market.

Marketing expenses

Higher the marketing expenses, higher will be the market share and hence a positive relationship is expected between market share and marketing expenses.

Distribution Expenses

The distribution expenses and commissions paid to the dealers by a company in marketing a particular product. A company’s total distribution expenses are apportioned
based on the product sales and company's total sales. It is hypothesized that higher the
distribution expenses, higher will be the market share and hence a positive relationship
between market share and distribution expenses is expected.

**Selling Expenses**

All promotional and selling, administrative expenses except advertising,
marketing and distribution expenses of a company in marketing a product. Higher the
selling expenses, higher will be the market share and hence a positive relationship is
expected between market share and selling expenses.

**Research and Development Expenses**

When the research and development expenses increase, the market share may also
increase and hence a positive relationship is expected between market share and product
development expenses.

**Price**

When the price realised is lower, the market share increases and hence a negative
relationship is expected between market share and realised price.

**Specification of Model**

**Model - I**

To identify the determinants of market share, we have developed the following model.

\[ MS_t = f(AE_t, ME_t, DE_t, SE_t, RDE_t, PR_t) \]

Where

- \( MS_t \) = Market share in period \( t \)
- \( AE_t \) = Advertising expenses in period \( t \)
- \( ME_t \) = Marketing expenses in period \( t \)
- \( DE_t \) = Distribution expenses in period \( t \)
- \( SE_t \) = Selling expenses in period \( t \)
- \( RDE_t \) = Research and development expenses in period \( t \)
- \( PR_t \) = Price in period \( t \)
- \( u \) = Stochastic term
b₀, b₁, b₂, b₃, b₄, b₅ and b₆ are the parameters to be estimated where b₁, b₂, b₃, b₄, b₅ > 0 and b₆ < 0.

When all the explanatory variables are zero, we expect b₀ to be zero or positive.

We haven’t come across a categorical empirical evidence regarding the nature of mathematical relationship between market share and its determinants. Hence we have estimated both linear as well as non-linear equations of the following form for the above model.

Linear :

\[ MS_t = b_0 + b_1 AE_t + b_2 ME_t + b_3 DE_t + b_4 SE_t + b_5 RDE_t - b_6 P_t + u \]

Non-Linear :

\[ MS_t = b_0 \cdot AE_t^{b_1} \cdot ME_t^{b_2} \cdot DE_t^{b_3} \cdot SE_t^{b_4} \cdot RDE_t^{b_5} \cdot e^{b_6} + u \]

Taking logarithm of the above model, the Log Linear equation is

\[ \log MS_t = \log b_0 + b_1 \log AE_t + b_2 \log ME_t + b_3 \log DE_t + b_4 \log SE_t + b_5 \log RDE_t - b_6 \log P_t + u \]

**Model – II**

**Lag Models:**

\[ MS_t = f(MS_{t-1}, AE_{t-1}, ME_{t-1}, DE_t, SE_{t-1}, RDE_{t-1}, P_t) \]

Where

- MSₜ : Market share in period t
- MSₜ₋₁ : Market share in period t-1
- AEₜ₋₁ : Advertising expenses in period t-1
- MEₜ₋₁ : Marketing expenses in period t-1
- DEₜ : Distribution expenses in period t
- SEₜ₋₁ : Selling expenses in period t-1
- RDEₜ₋₁ : Research and development expenses in period t-1
- PRₜ : Price in period t

and the estimated linear equation is
Non-Linear Model:
\[ MS_t = b_0 + b_1 M_{S_{t-1}} + b_2 A_{E_{t-1}} + b_3 M_{E_{t-1}} + b_4 D_{E_t} + b_5 S_{E_{t-1}} + b_6 R_{DE_{t-1}} - b_7 P_{R_{t}} + u \]

Log Linear equation:
\[ \log MS_t = \log b_0 + b_1 \log M_{S_{t-1}} + b_2 \log A_{E_{t-1}} + b_3 \log M_{E_{t-1}} + b_4 \log D_{E_t} + b_5 \log S_{E_{t-1}} + b_6 \log R_{DE_{t-1}} - b_7 \log P_{R_{t}} + u \]

\( b_0, b_1, b_2, b_3, b_4, b_5, b_6 \) and \( b_7 \) are the parameters to be estimated where \( b_1, b_2, b_3, b_4, b_5, b_6 > 0 \) and \( b_7 < 0 \).

\( b_0 \) will be zero or positive.

(v) Test of Causality

The familiar causality tests as proposed by Granger (1969) are employed to find out the nature of causation between market share and profitability. The following hypotheses are formulated.

\( H_1 = \) Market share determines the profitability of a company

\( H_2 = \) Profitability determines the market share of a company

Model Specification

\( H_1 = MS \rightarrow PF \)

\[ MS_t = \sum_{i=1}^{n} a_j M_{S_{t-i}} + \sum_{j=1}^{n} b_j P_{F_{t-j}} + V_t \]

\( H_2 = PF \rightarrow MS \)

\[ P_{F_t} = \sum_{i=1}^{n} c_i P_{F_{t-i}} + \sum_{j=1}^{n} d_j M_{S_{t-j}} + V_t \]
(vi) Koyck lag model

The Koyck model relates a firm’s market share to current period advertising expenditure and lagged period market share. The model is estimated using double logarithmic data for the period 1991-2006.

\[ \text{MS}_t = f(A_t, \text{MS}_{t-1}) \]

Where

\[ \text{MS}_t = \text{market share in period } t \]

\[ \text{MS}_{t-1} = \text{market share in period } t-1 \]

\[ A_t = \text{advertising expenditure in period } t \]

The estimated equation is

\[ \text{MS}_t = b_0 + b_1 \text{MS}_{t-1} + b_2 A_t + u_t \]

\( b_0, b_1, \text{ and } b_2 \) are the parameters to be estimated where \( b_1, b_2, > 0 \) and \( b_0 \) will be zero or positive.

1.7. Limitations of the Study

1. The results reported in the study are with reference to only selected Indian companies in each product group and not all the players in the respective market. Therefore while generalizing the result it has to be done with caution.

2. We have not considered foreign companies due to calendar variation because of their late entry in to the market. Hence the results of this study would need to be adjusted accordingly for policy formulation in these companies.

3. We have not carried out brand-wise analysis which is another limitation of our study.
1.8. Chapter Scheme

The whole study has been divided into six chapters. The first chapter deals with introduction covering the need for the study, statement of the problem, research questions raised, objectives, methodology, scope, data source, data analysis, limitations of the study and chapter scheme.

Chapter two presents the review of earlier studies.

Chapter three covers the product wise inter and intra company market share analysis and cross elasticity.

Chapter four deals with the determinants of market share.

Chapter five includes the test of causality between market share and profitability, and inter company market share variance.

Chapter six deals with advertising and market share dynamics and durability of advertising effect on sales.

Chapter seven summarises the findings, inferences and, suggestions for policy formulations and direction for future research.
References


