# Multivariate Relation Between Advertisements, Sales, and Profits : A Study on the Indian FMCG Industry

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## Abstract

**This paper builds on the existing literature by studying the linkages between advertising expenditure, sales, and profits in India. The paper takes a sample of 100 FMCG companies in India and studies their advertising expenditure and sales for the period ranging from 2001-02 to 2010-11. The study uses various tools, including mean, standard deviation, coefficient of variation, kurtosis, skewness, correlation, and regression for getting insights into the data. Econometric analysis, including auto-correlation, partial auto-correlation, augmented Dickey-Fuller test, vector auto regression, variance decomposition analysis, Johansen's cointegration, and vector error correction model were employed to find out the bivariate relationship between the variables under reference. The paper points towards the dependency of sales revenue and profit after tax on advertising expenses besides showing an obvious impact of sales revenue on profits. The paper provides significant inputs for further studies that may focus on adding more variables such as profits and firm value and study the multivariate relationship among them.**

***Keywords:*** **FMCG, advertising expenditure, augmented Dickey-Fuller, vector auto regression, variance decomposition analysis, Johansen's cointegration, vector error correction, firm value**

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The business environment throws up dynamic challenges in the form of ever-growing competition. Product and brand extensions pose a challenge in terms of getting the customer's attention. Marketing metrics have become a serious concern for marketers, who apply a variety of tools to overcome competition. Advertising is a vital tool used by marketers to sell their products or services. Advertising is used as a measure to build a long-term competitive edge. Advertising is directed at increasing the sales of a business, which shall further lead to an increase in profits. Increased profits may help increase the market price of a company's shares, finally leading to increased firm value and shareholders' wealth. However, a debate about the usefulness of advertising has been raging for a long time now. On one hand, advertising expenses are viewed as being wasteful altogether, the other school of thought maintains that advertisements have been consistent in their contribution towards increasing the sales revenue. The foremost function of advertising is to increase sales revenue. Advertising helps in generating sales both in the short run and long run (Dekimpe & Hanssens, 1995; Leach & Reekie, 1996 ; Lee, Shin, & Chung, 1996; Leong, Ouliaris, & Franke, 1996). Extensive literature shows the relationship between advertising, sales, and profits, but a large proportion of these studies focused on developed countries. The present study builds on the existing literature by studying the interlinkages between advertising expenses, sales, and profits in India.

The focus of the study - concerning advertising expenses, sales, and profits - is on the manufacturing industry. Among the manufacturing industry, the present study targets the FMCG industry, which happens to be the most diverse industry in terms of product portfolio. Moreover, with a compound annual growth rate (CAGR) of 11%, the FMCG industry in India is among the fastest growing. The industry is characterized by a well-established distribution network, low penetration levels, low operating cost, lower per-capita consumption, and intense

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competition between the organized and unorganized segments. Considering these factors, the study focuses on the relationship between advertising expenses, sales, and profits in the Indian FMCG industry.

## Review of Literature

A number of studies concerning advertising expenditure presume an advertising-sales-profits relationship to start with. This presumption does not seem much realistic though, since the relationship between the three variables is not just one-sided. Besides the impact of advertisements on sales and profits, there is also a possibility of sales and profits impacting advertising expenditure (Abe, 1995; Hsu, Darrat, Zhong, & Absosedra, 2002; Lee et al., 1996; Tellis & Fornell, 1998). The causal relationship between the three variables appears to run in both directions when proper econometric tools are used to detect it (Lee et al., 1996).

The initial evidence of advertising on sales was provided by Hollander Jr. (1949). Afterwards, Jastram (1955), Vidale and Wolfe (1957), Nerlove and Waugh (1961), Palda (1964, 1965), Alexander (1965), Tull (1965) , Khalik (1975), Lambin (1969, 1970, 1976), Clarke (1976), Peles (1970, 1971), Simon (1969), Leone and Schultz (1980), Hanssens (1980), Assmus, Farley, and Lehmann (1984), Jose, Nichols, and Stevens (1986), Sethuraman and Tellis (1991), Baghestani (1991), Simon and Sullivan (1993), Zanias (1994), Dekimpe and Hanssens (1995) reported the positive effect of advertising on sales and/or profits. Khalik (1975) examined the effects of advertising on sales revenues by employing OLS regression with a sample of firms from the food, automobile, tobacco, soap and cleaners, drugs and cosmetics industries in the United States from 1955 to 1973. The paper found long-lived effects of advertising on sales in the food and the drugs and cosmetic industries and short-lived effects for the rest of the groups. The study further argued for different treatments of the promotional cost of firms in different industries.

Baghestani (1991) took annual advertising and sales data from the Lydia Pinkham Company from 1907 to 1960 and found that both were cointegrated and shared a long-term relationship. Zanias (1994) also analyzed the Lydia Pinkham data set and found bivariate granger causality between advertising and sales. The two series were also found to have a valid long-term relationship. Dekimpe and Hanssens (1995) found out that advertising has a strong effect on sales for a chain of home improvement stores.

In more recent studies, Leong et al. (1996), Leach and Reekie (1996), Metwally (1997), Graham Jr. & Frankenberger (2000), Joshi and Hanssens (2002, 2010), Elliot (2001), Pagan, Sethi, and Soydemir (2001), Kamber (2002), Yiannaka, Giannakas, and Tran (2002), Ouyang, Zhou, and Zhou (2002), Kim and Morris (2003), Belch and Belch (2004), Pauwels, Hanssens, and Siddarth, (2004), Esteve and Requena (2006), Shah and Saeed (2008), Okyere, Agyapong, and Nyarku (2011), and Banerjee, Siddhanta, and Bandopadhyay, (2012) provided evidence of the impact of advertising expenditure on sales revenue. Leong et al. (1996) revealed that a strong positive relationship exists between advertising expenditure and sales by applying the cointegration technique. Application of Granger causality test by Leach and Reekie (1996) showed that advertising expenses cause sales, but sales do not simultaneously cause advertising. Metwally (1997) explained the variations in the growth rates of advertising expenditure of consumer goods and services in Australia during the period from 1975-1995 by developing and testing a number of hypotheses. His application of regression results indicated that the growth in advertising expenditure is strongly correlated with the growth in sales, and that movement in market shares exerts a significant effect on the growth in advertising expenditure.

Elliot (2001) found that advertising has a significant positive effect on the sales of the food industry, and he concluded this relationship to be stable. Pagan et al. (2001) used the bivariate vector auto regression model to study the effectiveness of advertising on sales and revealed that a one time increase in advertising expenditure lead to an increase in the sales of oranges with a one month lag. Kamber (2002) found a measurable relationship between advertising expenditures and sales, even after controlling factors like company size, past sales growth, and so forth. Examining the effectiveness of advertising for an unbalanced panel data set of 34 meat-processing firms in Greece over 1983 - 1997, Yiannaka et al. (2002) indicated that total advertising by the firms of the sector is a very important determinant of their sales. Ouyang et al. (2002) observed a long-term impact of advertising on the sales of consumer durables in China. Pauwels et al. (2002) studied stock market performance in the United States by

using the data period from 1996 to 2001. The study claimed that advertising expenditure affects sales revenue in the short and long term. Esteve and Requena (2006) established a long run relationship between advertising and sales across different markets over the period from 1971 - 2001 in the U.K. car industry and found out two structural breaks during the recession periods. Okyere et al. (2011) found a strong relationship between marketing communication and sales performance of Vodafone in Ghana. Banerjee et al. (2012) found evidence of cointegration between marketing communication and sales in the personal care industry in India.

Some of the studies found only a minor or no relationship between advertising, sales, and profits. These include Beckwith (1972), Hamilton (1972), Aaker, Carmen, and Jacobson, (1982), Bass and Pilon (1980), Hanssens (1980), Jagpal (1981), Leone (1983), Connolly and Hirschey (1984), Baltagi and Levin (1986), Bublitz and Ettredge (1989), Aaker (1991), Tschoel and Yu (1991), Erikson and Jacobson (1992), Chauvin and Hirschey (1993, 1994), Aaker and Jacobson (1994), Blattberg, Briesch, and Fox (1995), Doyle (2000), Andras and Srinivasan (2003), and Sharma and Sharma (2009).

Studying the sales of a commercial bank, Jagpal (1981) observed that radio advertising was ineffective in generating sales (number of savings and checking accounts). Baltagi and Levin (1986) investigated the relationship between advertisement expenditure and sales by considering dynamic demand tier cigarettes which used a pooled data of 46 states from year 1963 to 1980. Running an empirical analysis using panel data analysis and Hausman-Taylor estimators, the paper claimed that a negative relationship between advertisement expenditure and sales indicated insignificant income elasticity and significant low price elasticity. Their findings were consistent with Hamilton (1972), that there is a negative relationship between advertising expenditure and sales, which was worked out in the U.S. cigarette industry.

Advertising serves primarily to transmit information, not to create entry barriers. Sharma and Sharma (2009) revealed that the effect of advertisements on sales is more for manufacturing companies and less for non-manufacturing companies. This finding is consistent with the findings of Andras and Srinivasan (2003). Conversely, non-manufacturing companies need to spend more on advertisements to have the same level of sales revenue. This explains why non-manufacturing companies spend more on advertisements as compared to the manufacturing companies.

## Research Objectives

The paper is aimed at studying the relationship between advertising expenses, sales, and profits with respect to the Indian FMCG companies. As a first objective, the study aims at getting insights into the advertising expenses incurred by the Indian FMCG companies, the sales revenues earned, and the profits generated by them. Secondly, the paper attempts to establish the impact of advertising expenses incurred during the period on the sales and profits in that period. Furthermore, the paper also aims to analyze the impact of sales and profits in one period on the advertising expenses in the next period. The paper also brings forth the relationship between sales and profit inter-se. Finally, the paper intends to establish if there is a dependency relationship between advertising expenses, sales, and profits of Indian FMCG companies.

## Research Methodology

The paper studies the impact of advertising expenses on sales and profits and vice versa. Usually, advertising spending of manufacturing companies is higher than that of the service companies. Besides, the sales in currency as well as sales in units are both visible in case of manufacturing companies, as against the service companies, where only the sales in currency are visible and sales in units are not. Therefore, choosing a manufacturing industry for the purpose of such a study makes sense. The FMCG industry, being one of the most diverse manufacturing industries, forms the scope of the paper. One hundred BSE-listed companies from the FMCG industry (selected randomly) were used as the sample for the study (refer to Annexure 1A).

The sample time period of the study is 10 years, ranging from 2001-02 to 2010-11. In a study related to

advertisements, a longer period is not suitable as the advertisement patterns of the industry undergo major transformation over the course of time. Furthermore, in the light of the competitive environment in the manufacturing sector of India, every decade witnesses change in the competitive position of the market players. Therefore, the study uses a sample period of 10 years.

The data for the sample companies were collected from the annual reports of the respective companies. Wherever necessary, CMIE Prowess database was used for the data collection purposes. The study uses descriptive statistics and econometric tools for analyzing the data. While the descriptive statistics are presented individually for the sample companies; for the econometric analysis, the procedure adopted is not the same. In the case of econometric analysis, all the hundred companies were grouped together and the data for the entire 10 years were grouped together as well. In this way, the number of data points rose to 1000 (10 x 100). However, there is a threat while grouping different companies into one group because of the difference in magnitude of advertisement expenditure and sales revenue of the companies. The study used indexing as a means to remove this defect. We adjusted the data for all the companies with an index of 100 in order to ensure uniformity across the companies. Afterwards, the log of the series was computed in order to find out the changes in advertisement expenditure, sales revenue, and profit across various data points. We named these variables as *rsales*, *radver,* and *rprofit* respectively. Methodological works in econometric analysis suggest such direction for grouping together the data points for different cases (Sharma & Bodla, 2011).

Among the descriptive statistics, the study used mean, standard deviation, variance, coefficient of variation, skewness, and kurtosis. The paper further applied Karl Pearson's coefficient of correlation in order to check the correlation among the variables. Furthermore, the data were analyzed using econometric tools as well. The analysis of econometrics can only be performed on a series of stationary nature. In order to check whether or not the series were stationary, we prepared the line graph for each of the series. In order to further confirm the (stationary) nature of the series, a correlogram was prepared for each of the series. Furthermore, we applied the Augmented Dickey-Fuller test under the unit root test to finally confirm whether or not the series were stationary.

At the stationary log series, we applied the vector auto regression (VAR) model. The vector auto regression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system of variables. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system. The variance decomposition analysis was conducted in order to finally quantify the extent upto which the three indices are influenced by each other. While the impulse response functions trace the effects of a shock to one endogenous variable on to the other variables in the VAR, variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR.

The series were also tested using the Johansen's cointegration tests. We applied the VAR-based cointegration test using the methodology developed by Johansen using a group object or an estimated VaR object. A vector error correction (VEC) model is a restricted VAR designed for use with non-stationary series that are known to be cointegrated. The VEC has cointegration relations built into the specification so that it restricts the longrun behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

## Analysis and Results

The paper studies the impact of advertising expenses on sales and profits, and the impact of sales and profits on advertising expenses for 100 FMCG companies under reference. For the purpose of getting insights into the advertising, sales, and profit data, the descriptive statistics of the series are presented in Table 1. The Table 1 shows that the average sales, advertising expenses, and profit after tax of 100 sample FMCG companies were ₹ 6393.45 million, ₹ 592.42 million, and ₹ 562.73 million respectively. The standard deviation of sales, advertising expenses,

and profit after tax happens to be ₹ 24648.21 million, ₹ 2545.95 million, and ₹ 3546.81 million respectively. The standard deviation happens to be much higher since the sample 100 companies are quite different in terms of size. The skewness of the three series shows the series to be positively skewed. High kurtosis for the series implies that the series are non-normal and are leptokurtic. The coefficient of variation demonstrates the variation in respect of both the series while also taking the mean into account.

The results with regard to Karl Pearson's coefficient of correlation are presented in Table 2. The Table 2 exhibits a significant correlation between the three variables under reference, that is, sales, profits, and advertising expenditure. The Karl Pearson's coefficient of correlation between sales and advertising, between sales and profit, and between advertising and profit came out to be 0.847, 0.966, and 0.776, which shows that the figures are highly positive. The correlation is significant at the 1% level of significance, since the significance is computed at 0.000 between the three variables. Highly positive correlation between the variables renders importance to the relationship between the variables under reference.

After performing the correlation analysis, the study further moves to conduct an econometric analysis. Before performing the econometric analysis, it is important to check the series for stationarity. The econometric analysis was undertaken on the log of the series, rather than the raw series. The line graph for log of advertising expenses, sales, and profits are presented individually and jointly in Figures 1 to 4. Line graphs as presented in Figure 1 through Figure 4 indicate that the series under reference are stationary. The study also tested the unit root of the series by applying the Augmented Dickey-Fuller test on the log of sales, log of profit, and log of advertising expenses. The null hypothesis in case of the ADF test is that the series under reference has a unit root, which implies that the series are not stationary in nature.

The Table 3 summarizes the results of the ADF unit-root test. The probability value of less than 0.05 for the three variables in Table 3 implies that the null hypothesis is rejected, and the variable does not have a unit-root, which confirms that all the three series are stationary. We further performed group ADF unit-root tests on log of the three series, that is, sales, profit, and advertising expenses. The group unit root test involves the Levin, Lin & Chu test; Im, Pesaran, and Shin W-stat; ADF-Fisher Chi-square tests, and PP-Fisher Chi Square tests. The findings of the group unit root tests are presented in the Table 4.

The null hypothesis under all the tests included in Table 4 is that the three series have a unit root. It is visible from the Table 4 that the *p* - values for the ADF-Fisher Chi-square and ADF-Choi Z-stat are all significant, and hence we can reject the null hypothesis. This further confirms the results put forth by the ADF unit root test (Table 3) that the series under reference are stationary in nature.

**Table 1. Descriptive Statistics**

| | Sales ( ₹ Million) | Advertising Expenses (₹ Million) | Profit after tax (₹ Million) |
|---|---|---|---|
| Mean | 6393.45 | 592.42 | 562.73 |
| Standard Deviation | 24648.21 | 2545.95 | 3546.81 |
| Skewness | 7.74 | 9.48 | 7.95 |
| Kurtosis | 67.00 | 109.35 | 78.70 |
| Co-efficient of Variation | 385.52 | 429.75 | 630.29 |

**Table 2. Karl Pearson's Coefficient of Correlation**

| | | Sales | Advertisement | PAT |
|---|---|---|---|---|
| Sales | Karl Pearson Correlation | 1 | .847** | .966** |
| | Sig. (2-tailed) | | .000 | .000 |
| Advertisement | Pearson Correlation | .847** | 1 | .776** |
| | Sig. (2-tailed) | .000 | | .000 |
| PAT | Pearson Correlation | .966** | .776** | 1 |
| | Sig. (2-tailed) | .000 | .000 | |

By the application of the VAR model, it was observed that the linkage of one series with the other can be established if the *t*-statistic is more than 1.96. The integration of the series was tested at the lag of 1 and 2. The result at lag 0 is taken in the columns, while the results in all the companies at lag 1 and lag 2 are taken in the rows. For

**Figure 1 . Line Graph of DADV (Log of Advertising Expenses)**

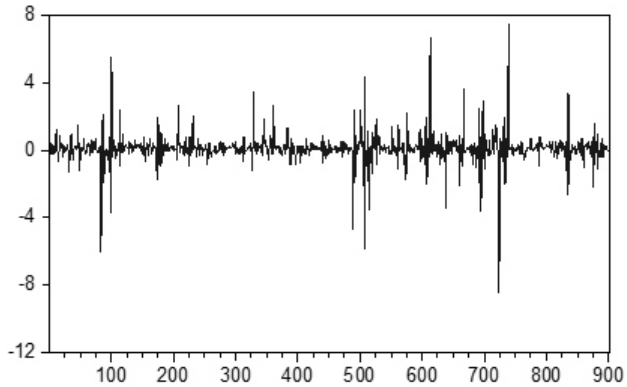



**Figure 2. Line Graph of DSALES (Log of Sales)**

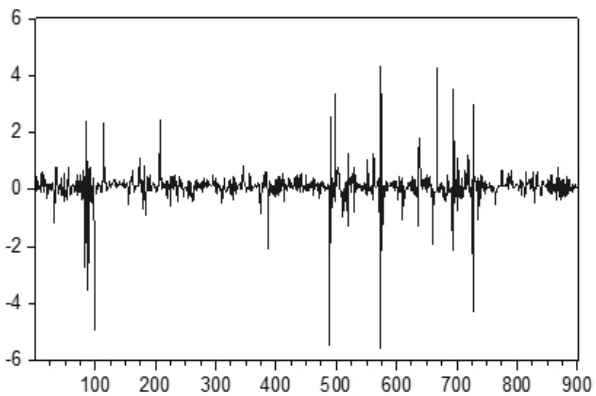



**Figure 3. Line Graph of DPAT (Log of Profit)**

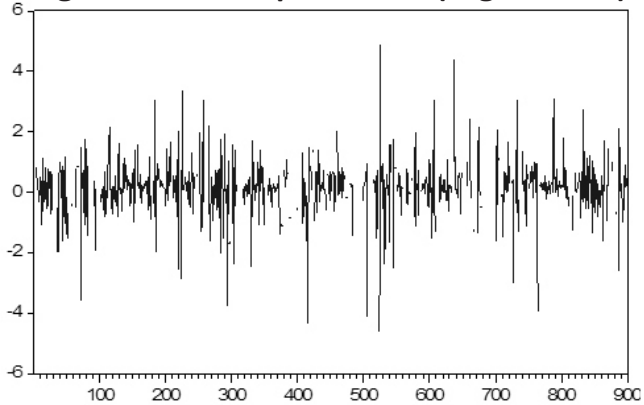
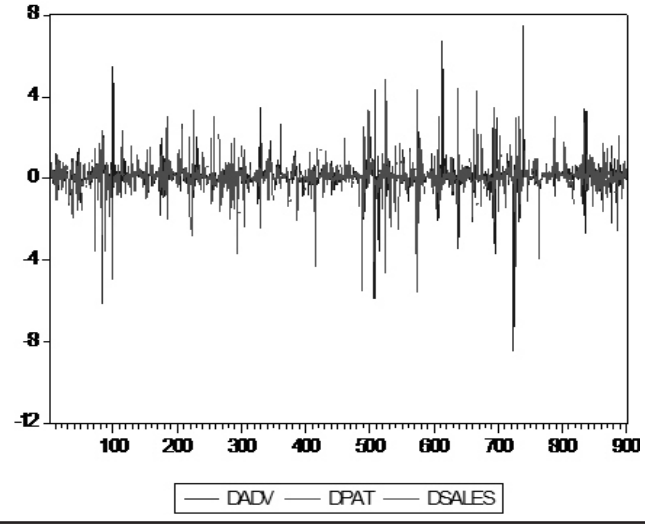



**Figure 4. Common Line Graph of DADV, DPAT, and DSALES**



understanding the analysis produced by vector auto- regression, we move column-wise. It is clear from the Table 5 that the advertising expenses are influenced by advertising expenses at the lag of 1 and 2. On the other hand, profits are influenced by advertising expenses, sales, and profit only at lag 1. Finally, sales are influenced by the sales as well as by advertising expenses at the lag of 1 & 2 and sales at the lag of 1.

Variance decomposition analysis follows the application of the vector autoregression model. The results from the variance decomposition analysis are presented in the Table 6. The Table 6 shows the results of the variance decomposition analysis, which depicts that the proportion of movements in the dependent variable are due to their own shocks versus shocks to other variables. The variance decomposition analysis, which shows the proportion of movements in the dependent variable due to their own shocks versus shocks to other variables, seems to suggest that advertising, profits, and sales have, to a certain extent, an impact on one-another. This implies that a part of the movement in advertising expenses, profits, and sales can be explained by the movements in other variables than themselves. In case of profits, after the 2nd period, only 90% of the influences in profits are by profit shocks, while about 6% are due to the sales shocks and around 4% are for shocks in the advertising expenses. Whereas, in case of sales, after the 2nd period, only 77% of the influences in sales are due to sales shocks. The sales are observed to be particularly influenced by advertising (14% from 2nd Period) and profits (7% from 2nd period ) shocks. It depicts that advertising has a significant impact on sales. Advertising expenses, however, appear to be influenced by the shocks in advertising expenses themselves for all the periods.

The study further applied Johansen's cointegration analysis on the series under reference. The results from the unrestricted cointegration rank test (Trace) and unrestricted cointegration rank test (maximum Eigenvalue) are presented in the Table 7 and Table 8. In Table 7, we compare the trace statistic with the 0.05 critical value. The second column in the table presents the ordered eigenvalues, the third column presents the test statistic, the fourth column, the critical value and the final column, the *p*-value. In the first row that has the null hypothesis of no cointegrating equation, the trace statistic (238.3827) is more than the critical value (29.79707). This coupled with the probability value of less than 0.05 enables us to reject the null hypothesis. Similarly, while testing the null hypothesis of at most 1 cointegrating equation leads us to reject the null hypothesis. The case with the values for the hypothesis of having at most 2 cointegrating equations is rejected since the trace statistic value (55.99965) is higher than the critical value (3.841666).

The maximum eigenvalue statistics as presented in the Table 8 complement the findings of the trace statistic as

**Table 3. Unit- Root Test**

**Exogenous: Constant**
**Lag Length: 3 (Automatic - based on SIC, maxlag=25)**

| | | ***t* - Statistic** | **Prob.*** |
|---|---|---|---|
| DADV has a unit root | | -34.61871 | 0.0000 |
| DSALES has a unit root | | -31.81259 | 0.0000 |
| DPAT has a unit root | | -31.55067 | 0.0000 |
| Test critical values: | 1% level | -3.433144 | |
| | 5% level | -2.864542 | |
| | 10% level | -2.568422 | |

**Table 4. Group Unit- Root Test: Summary**

Null Hypothesis: Unit root (individual unit root process)

| **Method** | **Statistic** | **Prob.**** |
|---|---|---|
| ADF - Fisher Chi-square | 343.473 | 0.0000 |
| ADF - Choi Z-stat | -17.9536 | 0.0000 |

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

**Table 5. VAR Estimates**

**Standard errors in ( ) & *t* - statistics in [ ]**

| | DADV | DPAT | DSALES |
|---|---|---|---|
| DADV(-1) | -0.268697 | -0.263807 | -0.090807 |
| | (0.04516) | (0.06817) | (0.02819) |
| | **[-5.94995]** | **[-3.86996]** | **[-3.22118]** |
| DADV(-2) | -0.073759 | 0.000248 | 0.053970 |
| | (0.03760) | (0.05675) | (0.02347) |
| | **[-1.96193]** | [0.00437] | **[2.29967]** |
| DPAT(-1) | 0.028202 | -0.223539 | 0.024381 |
| | (0.03086) | (0.04658) | (0.01926) |
| | [0.91393] | **[-4.79907]** | [1.26568] |
| DPAT(-2) | -0.021719 | -0.042869 | 0.024814 |
| | (0.02995) | (0.04522) | (0.01870) |
| | [-0.72506] | [-0.94810] | [1.32703] |
| DSALES(-1) | 0.143899 | 0.688880 | 0.169063 |
| | (0.09508) | (0.14353) | (0.05935) |
| | [1.51342] | **[4.79970]** | **[2.84835]** |
| DSALES(-2) | 0.128867 | 0.169285 | -0.018100 |
| | (0.09790) | (0.14778) | (0.06111) |
| | [ 1.31630] | [ 1.14552] | [-0.29617] |
| C | 0.164940 | 0.105314 | 0.117604 |
| | (0.02981) | (0.04500) | (0.01861) |
| | [ 5.53233] | [ 2.34014] | [ 6.31898] |

presented in the Table 7. The second column in the table presents the ordered eigenvalues, the third column, the test statistic, the fourth column, the critical value, and the final column, the *p*-value. While testing the null hypothesis of none cointegrating equation, it is found that the max-Eigen statistic (118.1846) happens to be more than the critical value (21.13162). It means that the null hypothesis of no cointegrating equation can be rejected. Hence, we arrive at the observation that there are three cointegrating equations in the series under reference.

The Tables 9 and 10 provide estimates of the cointegrating relations β and the adjustment parameters α. As is well known, the cointegrating vector β is not identified unless we impose some arbitrary normalization. However, it is sometimes useful to normalize the coefficient values to set the coefficient value on one of them to unity, as would be the case in the cointegrating regression under the Engle-Granger approach. The unrestricted coefficient values are the estimated values of coefficients in the cointegrating vector, and these are presented in the Table 9. The Tables 11 and 12 draw the three cointegrating equations that are reported by Tables 7 and 8. While the first two equations take *dsales* as unity, the third equation takes *dadv* as unity.

The vector error correction model (VECM) estimates the speed at which the dependent variable *Y* returns to equilibrium after a change in the independent variable *X*. VECM is particularly useful while dealing with integrated data. VECM adds error correction features to the VAR. In the Table 13, we are allowing for only one cointegrating relationship. VECM, as applied in Table 13, found that the sales in the current period are impacted by sales as well as advertising expenses at the lags of 1, 2, and 3. On the other hand, advertising expenses in the current period are impacted by sales at the lag of 1, 2, and 3; by advertising expenses at the lags of 2; and by profits at the lag of 1 and 2. Profits after tax in the current period are impacted by the sales, advertising expenses, and profits at the lag of 1, 2, and 3.

**Table 6. Variance Decomposition Analysis**

| Explaining Movements in | Period | Explain by movements in Adv | Sales | Profit |
|---|---|---|---|---|
| Advertisement | 1 | 100.0000 | 0.000000 | 0.000000 |
| | 2 | 99.00184 | 0.601616 | 0.396549 |
| | 3 | 98.42368 | 1.116415 | 0.459900 |
| | 4 | 98.34818 | 1.150367 | 0.501457 |
| | 5 | 98.34791 | 1.150364 | 0.501727 |
| | 6 | 98.34543 | 1.152274 | 0.502300 |
| | 7 | 98.34535 | 1.152294 | 0.502357 |
| | 8 | 98.34533 | 1.152307 | 0.502366 |
| | 9 | 98.34532 | 1.152312 | 0.502368 |
| | 10 | 98.34532 | 1.152312 | 0.502368 |
| Profits | 1 | 2.601915 | 0.000000 | 97.39809 |
| | 2 | 3.342436 | 5.861812 | 90.79575 |
| | 3 | 3.674422 | 5.939474 | 90.38610 |
| | 4 | 3.690124 | 5.960152 | 90.34972 |
| | 5 | 3.691258 | 5.969080 | 90.33966 |
| | 6 | 3.691239 | 5.969749 | 90.33901 |
| | 7 | 3.691408 | 5.969830 | 90.33876 |
| | 8 | 3.691409 | 5.969832 | 90.33876 |
| | 9 | 3.691410 | 5.969836 | 90.33875 |
| | 10 | 3.691411 | 5.969836 | 90.33875 |
| Sales | 1 | 14.28233 | 79.21971 | 6.497962 |
| | 2 | 14.25851 | 78.49387 | 7.247617 |
| | 3 | 15.10206 | 77.47328 | 7.424660 |
| | 4 | 15.09950 | 77.46939 | 7.431111 |
| | 5 | 15.09750 | 77.47224 | 7.430257 |
| | 6 | 15.09802 | 77.47121 | 7.430767 |
| | 7 | 15.09804 | 77.47115 | 7.430806 |
| | 8 | 15.09804 | 77.47115 | 7.430806 |
| | 9 | 15.09804 | 77.47115 | 7.430807 |
| | 10 | 15.09804 | 77.47115 | 7.430807 |

**Table 7. Unrestricted Cointegration Rank Test (Trace)**

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob. |
|---|---|---|---|---|
| None * | 0.258030 | 238.3827 | 29.79707 | 0.0001 |
| At most 1 * | 0.149659 | 120.1981 | 15.49471 | 0.0001 |
| At most 2 * | 0.131870 | 55.99965 | 3.841666 | 0.0000 |

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

**Table 8. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob. |
|---|---|---|---|---|
| None * | 0.258030 | 118.1846 | 21.13162 | 0.0001 |
| At most 1 * | 0.149659 | 64.19844 | 14.26460 | 0.0000 |
| At most 2 * | 0.131870 | 55.99965 | 3.841666 | 0.0000 |

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

**Table 9. Unrestricted Cointegrating Coefficients (normalized by $\beta' * S_{11} * \beta = I$)**

| DSALES | DADV | DPAT |
|---|---|---|
| 4.707406 | -4.628700 | 1.562689 |
| 9.125275 | -0.435992 | -3.214975 |
| 0.303286 | 3.502402 | 2.348022 |

**Table 10. Unrestricted Adjustment Coefficients (alpha)**

| | | | |
|---|---|---|---|
| D(SALES) | -0.045731 | -0.079366 | -0.067009 |
| D(DADV) | 0.196643 | -0.068423 | -0.145424 |
| D(PAT) | -0.193416 | 0.136203 | -0.245101 |

**Table 11. Normalized Cointegrating Coefficients - I**

Cointegrating Equation(s): Log likelihood -790.43

Normalized cointegrating coefficients (standard error in parentheses)

| DSALES | DADV | DPAT |
|---|---|---|
| 1.000000 | -0.98328 | 0.331964 |
| | (-0.0977) | (-0.06897) |

Adjustment coefficients (standard error in parentheses)

| | |
|---|---|
| D(DSALES) | -0.215276 |
| | (-0.06903) |
| D(DADV) | 0.925677 |
| | (-0.13254) |
| D(PAT) | -0.910486 |
| | (-0.19964) |

**Equation 1: dsales - 0.98328 dadv + 0.331964 dpat = 0**

## Managerial Implications

For long, the issue of advertising expenses being a waste has been debated by managers, corporate professionals, and researchers. The paper addresses this critical issue and finds that sales and profit are impacted by advertising expenses. This repudiates the belief of advertising expenses being a waste. This is a significant strategic input for managers since they can bank on the tool of advertising in order to push their sales and profits. However, this in no way conveys that every kind of advertising will lead to a rise in sales and profits. The managers need to evaluate various advertising appeals in order to zero-in on the most-suitable appeal that addresses potential consumer group. As suggested by the marketing literature available already, there is no 'one size fits all' marketing appeal that clicks for all consumer groups.

**Table 12. Normalized Cointegrating Coefficients - II**

Cointegrating Equation(s): Log likelihood -758.3352
Normalized cointegrating coefficients (standard error in parentheses)

| DSALES | DADV | DPAT |
|---|---|---|
| 1.000000 | 0.000000 | -0.387263 |
| | | (-0.05224) |
| 0.000000 | 1.000000 | 0.731457 |
| | | (-0.09029) |
| Adjustment coefficients (standard error in parentheses) | | |
| D(DSALES) | -0.93951 | 0.246279 |
| | -0.14469 | (-0.06551) |
| D(DADV) | 0.301296 | -0.880368 |
| | -0.28687 | (-0.12989) |
| D(PAT) | 0.332405 | 0.83588 |
| | -0.42955 | (-0.19449) |

**Equation 2: dsales + 0 dadv - 0.387263 dpat = 0**
**Equation 3: 0 dsales + dadv - 0.731457 dpat = 0**

## Conclusion

The study uses various statistical and econometric models in order to get insights into the advertising expenses, sales revenue, and profit after tax data of 100 Indian FMCG companies over the period from 2001-02 to 2010-11. The descriptive statistics lead to the conclusion that the sample companies differ significantly from each other in terms of sales revenue, profit after tax, and advertising expenses. The series under reference are found to be positively skewed and leptokurtic. A significant positive correlation is observed between the three variables. The study further applies econometric tools on the log of the three series. The line graph, autocorrelation and partial autocorrelation, and ADF unit-root testing drive home the point that the series are stationary in nature. Application of vector auto regression shows that the advertising expenses are influenced by advertising expenses at the lag of 1 and 2. On the other hand, profits are influenced by advertising expenses, sales, and profit only at lag 1. Finally, sales are influenced by sales as well as by advertising expenses at the lag of 1 and 2 and sales at the lag of 1. On similar lines, variance decomposition analysis observes that the advertising expenses are slightly impacted by the sales in previous periods, while profit is impacted by both sales revenue and advertising expenses, and sales are impacted by the advertising expenses to a large extent. The application of Johansen's cointegration analysis and vector error correction model indicate that there are three cointegrating equations in the series.

In a nutshell, the paper points towards the dependency of sales revenue and profit after tax on advertising expenses besides showing an obvious impact of sales revenue on profits. Contradicting the findings of Beckwith (1972), Hamilton (1972), Aaker et al. (1982), Bass and Pilon (1980), Hanssens (1980), Jagpal (1981), Leone (1983), Baltagi and Levin (1986), Tschoel and Yu (1991), Kwoka (1993), Andras and Srinivasan (2003), Sharma and Sharma (2009), this paper indicates a need for corporates to increase their advertising expenses in order to attain higher sales and profits. The findings of the paper support the conclusions drawn by Leong et al. (1996), Leach and Reekie (1996), Metwally (1997), Elliot (2001), Pagan et al. (2001), Kamber (2002), Yiannaka et al. (2002), Ouyang et al. (2002), Zhou et al. (2003), Pauwels et al. (2002), Esteve and Requena (2006), Okyere et al. (2011), and Banerjee et al. (2012).

## Limitations of the Study and Scope for Further Research

The major limitation of the present study is that it is limited to Indian FMCG companies only. Researchers in the

**Table 13. Vector Error Correction Estimates**

**Standard errors in ( ) & *t* - statistics in [ ]**

| **Cointegrating Eq:** | **CointEq1** | | |
|---|---|---|---|
| DSALES(-1) | 1.000000 | | |
| DADV(-1) | -1.138522 | | |
| | (0.08879) | | |
| | [-12.8221] | | |
| DPAT(-1) | 0.235679 | | |
| | (0.06228) | | |
| | [ 3.78418] | | |
| C | -0.012401 | | |
| **Error Correction:** | **D(DSALES)** | **D(DADV)** | **D(DPAT)** |
| CointEq1 | -0.110716 | 0.975093 | -0.560840 |
| | (0.05743) | (0.10417) | (0.15886) |
| | [-1.92776] | **[9.36088]** | **[-3.53040]** |
| D(DSALES(-1)) | -0.631457 | -0.582140 | 1.136848 |
| | (0.06570) | (0.11916) | (0.18173) |
| | **[-9.61131]** | **[-4.88536]** | **[6.25584]** |
| D(DSALES(-2)) | -0.385591 | -0.348166 | 0.992308 |
| | (0.06803) | (0.12339) | (0.18817) |
| | **[-5.66790]** | **[-2.82171]** | **[5.27335]** |
| D(DSALES(-3)) | -0.122769 | -0.322903 | 0.575326 |
| | (0.06013) | (0.10907) | (0.16633) |
| | **[-2.04157]** | **[-2.96060]** | **[3.45889]** |
| D(DADV(-1)) | -0.150083 | -0.167199 | -0.756629 |
| | (0.05336) | (0.09678) | (0.14759) |
| | **[-2.81274]** | **[-1.72767]** | **[-5.12653]** |
| D(DADV(-2)) | -0.101634 | -0.220812 | -0.505267 |
| | (0.03990) | (0.07236) | (0.11035) |
| | **[-2.54747]** | **[-3.05156]** | **[-4.57862]** |
| D(DADV(-3)) | -0.060670 | -0.093972 | -0.284492 |
| | (0.02845) | (0.05161) | (0.07870) |
| | **[-2.13225]** | [-1.82093] | **[-3.61476]** |
| D(DPAT(-1)) | 0.021745 | -0.177210 | -0.846251 |
| | (0.02134) | (0.03871) | (0.05904) |
| | [ 1.01877] | **[-4.57766]** | **[-14.3341]** |
| D(DPAT(-2)) | 0.024286 | -0.120218 | -0.597915 |
| | (0.02355) | (0.04271) | (0.06513) |
| | [ 1.03133] | **[-2.81480]** | **[-9.17975]** |
| D(DPAT(-3)) | 0.002843 | -0.057166 | -0.301121 |
| | (0.01671) | (0.03030) | (0.04621) |
| | [ 0.17020] | [-1.88662] | **[-6.51632]** |
| C | 9.08E-07 | -0.007328 | -0.057203 |
| | (0.01482) | (0.02688) | (0.04099) |
| | [ 6.1e-05] | [-0.27265] | [-1.39561] |
| *R*- squared | 0.386456 | 0.604552 | 0.478226 |
| Adj. *R* -squared | 0.371917 | 0.595181 | 0.465862 |

future can consider other industries (other than the FMCG industry) in the manufacturing sector. The study may even be extended to the services sectors since advertisements are one of the important factors influencing sales and profitability in the services sector too. Besides, future research efforts may also be directed at establishing a direct relationship between advertising expenditure and firm value.

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**Annexure - 1A . List of Companies**

ADF FOODS LIMITED.
ADOR MULTIPRODUCTS LTD.
ADVANCE PETROCHEMICALS LTD.
AGRO DUTCH INDUSTRIES LTD.
AJANTA SOYA LIMITED
ASIAN TEA & EXPORTS LTD.
ASSAM COMPANY (INDIA) LIMITED
ASSAMBROOK LIMITED
ASSOCIATED ALCOHOLS & BREWERIES LTD.
AVANTI FEEDS LTD.
AVT NATURAL PRODUCTS LTD.
B & A LTD.
BAMBINO AGRO INDUSTRIES LTD.
BEEYU OVERSEAS LTD.
BHARTIYA INTERNATIONAL LTD.
BHATINDA CHEMICALS LTD.
BKV INDUSTRIES LTD.
BLISS GVS PHARMA LIMITED
BRITANNIA INDUSTRIES LTD.
CCL PRODUCTS (INDIA) LTD.
CERA SANITARYWARE LTD.
CHAMAN LAL SETIA EXPORTS LTD.
CHOKSI IMAGING LTD.
COLGATE-PALMOLIVE (INDIA) LTD.
CUPID LIMITED
DABUR INDIA LTD.
DAIRYFIELD LTD.
DFM FOODS LTD.
DHUNSERI PETROCHEM & TEA LIMITED
DIANA TEA CO. LTD.
DIVYA JYOTI INDUSTRIES LTD.
EMAMI LTD.
EMPEE DISTILLERIES LTD.
EVEREADY INDUSTRIES INDIA LTD.
HERITAGE FOODS (INDIA) LTD.
HILLOCK AGRO FOODS (INDIA) LTD.
HIND INDUSTRIES LTD.
HINDUSTAN PHOTO FILMS MFG. CO. LTD.
HINDUSTAN UNILEVER LTD.
HIPOLIN LTD.
IFB AGRO INDUSTRIES LTD.
INDAGE VINTNERS LTD.
INDIAN EXTRACTIONS LTD.
INDO BIOTECH FOODS LTD.
IOL CHEMICALS & PHARMACEUTICALS LTD.
ITC LTD.
IVP LTD.
J.L. MORISON (INDIA) LTD.
JAGATJIT INDUSTRIES LTD.
JAGDAMBA FOODS LTD.
JAY SHREE TEA & INDUSTRIES LTD.
JK SUGAR LIMITED
JVL AGRO INDUSTRIES LIMITED
JYOTHY LABORATORIES LIMITED
KHODAY INDIA LTD.
KLRF LTD.
KOHINOOR FOODS LTD.
KOTHARI GLOBAL LIMITED
KRBL LTD.
KWALITY DAIRY (INDIA) LTD.
LAKHANI INDIA LTD.
LAKSHMI OVERSEAS INDUSTRIES LTD.
LAWRESHWAR POLYMERS LIMITED
LEDO TEA CO. LTD.
LIBERTY SHOES LTD.
LOTUS CHOCOLATE CO. LTD.
MADHUSUDAN INDUSTRIES LTD.
MAHAAN FOODS LTD.

## Annexure - 1A . List of Companies (Contd.)

| | |
|---|---|
| FLEX FOODS LTD. | MARICO LIMITED |
| FOODS & INNS LTD. | MAYA AGRO PRODUCTS LTD. |
| G.M. BREWERIES LTD. | MAYUR LEATHER PRODUCTS LTD. |
| GAYATRI BIOORGANICS LTD. | VIJAY SOLVEX LTD. |
| GILLETTE INDIA LTD. | VIKAS GRANARIES LIMITED |
| GLAXOSMITHKLINE CONSUMER HEALTHCARE LTD. | VIMAL OIL & FOODS LTD. |
| GLOBUS SPIRITS LIMITED | VIPPY INDUSTRIES LTD. |
| GODFREY PHILLIPS INDIA LTD. | VIRAT CRANE INDUSTRIES LTD. |
| GODREJ CONSUMER PRODUCTS LTD. | VST INDUSTRIES LTD. |
| GOLDEN TOBACCO LTD. | WADALA COMMODITIES LIMITED |
| GOODRICKE GROUP LTD. | WARREN TEA LTD. |
| GRM OVERSEAS LTD. | WATERBASE LIMITED |
| GUJARAT AMBUJA EXPORTS LTD. | WELTERMAN INTERNATIONAL LTD. |
| HANUMAN TEA CO. LTD. | WINSOME BREWERIES LTD. |
| HARYANA LEATHER CHEMICALS LTD. | WORLDWIDE LEATHER EXPORTS LTD. |
| HATSUN AGRO PRODUCTS LTD. | ZYDUS WELLNESS LIMITED |