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Does Advertising Expenditure Impact Firm Value: A Case of Indian FMCG Industry

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Strictly as per the compliance and regulations of:

Does Advertising Expenditure Impact Firm Value: A Case of Indian FMCG Industry

Mandeep Mahendru [α] & Kalyan K De [σ]

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 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, 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 have been 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 the 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.

I. Introduction

Historically, the advertising has focused largely on sales and profit response of marketing actions. The aim of marketing in past has been formulated from customer perspective which in turn focused on marketing-sales relationship.

Recently, practitioners have started showing keen interest in the financial impact of marketing actions. Marketers are now aiming to achieve better financial returns with the same amount of marketing actions. It is very difficult to justify the relationship between marketing expenditure and firm value with reducing budget, unless it is linked to the stock price. Advertising is directed at increasing the sales of business, which shall further lead to an increase in profits. Increased profits may help increase the market price of the company's share, finally leading to increased firm value and shareholders' wealth.

The paper is organized as follows. Section 1 introduces the idea of the study while also presenting the need for it, section 2 outlines the research objectives, section 3 reviews the empirical literature about the research problem, section 4 presents the research methods put to use in the paper, section 5 summarizes the findings of the study, and section 6 concludes.

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II. Research Objectives

The paper aims at studying the relationship between advertising expenditure and firm value in respect of the Indian FMCG companies. As a first objective, the study targets getting insights into the advertising expenses incurred by the Indian FMCG companies and the firm value of the companies. Secondly, the paper attempts to establish the impact of advertising expenditure incurred during a period on the firm value in that period. Further, the paper also aims to analyze the impact of firm value in one period on the advertising expenses in the next period. Finally, the paper intends to establish if there is a dependency relationship between advertising expenses and market value of firm of Indian FMCG companies.

III. Review of Literature

A number of studies have been conducted in order to find out the relationship between advertising expenditure and firm value through sales and profitability. Very few papers study the direct relationship between advertising expenditure and firm value (Joshi and Hanssens, 2010). Andras and Srinivasn (2003) report positive relationship between Advertising intensity and R&D intensity to the firm's performance. Hirschey and Chauvin (1993) find out that advertising and R&D expenditure have large positive and consistent influence on the market value of the firm, which is why it is considered as investment in intangible assets with predictably positive effects on future cash flows. Margy & Melvin (2005) observe positive relationship between advertising expenditure and promotional spending on market value of firm. Qureshi (2007) studies the relationship between advertising expenditures and the market value of firms by using OLS. The study finds out that advertising expenditures are significantly associated with increases in market value, suggesting that capitalizing advertising expenditures is appropriate. Using OLS reports, Siong (2010) observes a statistically significantly positive relationship between advertising and firm value. Kundu, Murthy and Kulkarni (2010) use the data of 172 firms from 2000-2007 and find positive and significant relationship between advertising expenditure and Tobin's Q accounting for firm size and leverage. Bhattacharya(1994) provides the evidence of positive relationship between advertising expenditure and consumers and firm performance, therefore it indicates the advertising effectiveness have their impact on consumers and firm performance and offer perspectives for the firms in planning for more effective advertising strategies to promote their products or services. Frankenberger(2004) studies 2662 firms to determine the economy-wide and industry effects than averag e advertising spending has on earnings and market value recessionary periods and compared those effects of increased and decreased advertising during recessionary period and indicated that advertising creates a firm asset by contributing and claimed that increasing spending on advertising during a recession leads to benefits that exceed the benefits of increasing advertising during non-recessionary periods. concluded that firms should support advertising budget wherever possible, as advertising in general translates to an asset that is valued by stock market participants. Shah and Stark (2004) investigate the value relevance of the advertising expenditure The results of the study showed a positive influence of advertising expenditure on the market value of firms. Shark and Stark (2004) by splitting the sample into sub-sample of manufacturing and non-manufacturing of Large and small size, find advertising expenditure to be relevant for large and non-manufacturing firms. Shah and Shark (2005) investigate whether advertising expenditure help in forecasting future earning and are associated with market value by using valuation model found that major media advertising expenditure valuation relevant and useful in predicting future value of earnings. Using the OLS method, C'onchar, C'rask and Linkhan (2005)examine the relationship between advertising expenditure on firm market value, future cash flows and boost the shareholder wealth. Merino, Srinivasan and Srivastava (2006) study the relationship between advertising and R&D expenditure on variability of cash flow and intangible cross-sectional to the panel data case to relate a firm's advertising and R&D expenditure to the variability of cash flow and intangible firm value and concluded that advertising impacts on the variability of cash flow and intangible value are different, which advertising expenditure they found that advertising stabilizes both cash flow and intangible value in turbulent and competitive environments. Qureshi (2007) investigates the relationship between advertising expenditure and the market value of firms. Advertising expenses are significantly related with the increase in market value suggested that investment in advertising should be capitalized and then amortized rather than treated as expense item. Gupta (2008) studies the effect of advertisement on the firm performance 10 year (1997-98 to 2006-2007) of Automobile, Textile and Food by applying Least square. This paper notes that results of advertisement certainly affect the firms depending on their nature. It further claims that it is evident that advertisement has positive and significant effect on sales of firms while it has significant adverse effect on profitability. Automobile industry shows positive impact of advertisement on sales as well as profitability along with firm value. Hsu and Jang (2008) study the relationship between advertising expenditure, intangible value, and risk in stock returns of restaurant firms. They suggest that advertising expenditure creates intangible benefit to restaurant firms. They also note that advertising may affect product introduction, positioning, and differentiation which lead to a restaurant firm's success. Wang, Zhang and Ouyang (2008) study the nature and degree of advertising effect on firm intangible values by applying Time series approach. They report that advertising effects on firm's intangible assets are sustainable and accumulative and support the asset or investment like characteristic of advertising expenditure. Using Cointegration model, Leong et al (1996) reveals that a strong positive relationship exists between advertising expenditure and sales. Leach and Reekie (1996) apply Granger causality test and find that advertising expenses cause sales but sales do not simultaneously cause advertising. Metwally (1997) explains the variations in the growth rates of advertising expenditure of consumer goods and services 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.

IV. Research Methodology

The paper studies the impact of advertising expenses on firm value in the FMCG industry of India. The study focuses on a manufacturing industry (in the form of FMCG industry) since the manufacturing companies' advertising spending are higher than 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 study makes sense. 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 are used as the sample for the study.

The sample period for the study is ten years ranging from 2001-02 to 2010-11. The study takes a period of ten years. In a study related to advertisement, a longer period is not suitable as the advertisement patterns of the industry undergo major transformation in a longer period. Further, in the light of the competitive environment in the manufacturing sector of India, every decade witnesses change in the competitive positions of the market players. Therefore, the study uses a sample period of ten years.

The data for sample companies have been collected from the annual reports of the respective companies. Wherever necessary, CMIE Prowess database has also been used for data collection purposes.

The study uses econometric tools for analyzing the data. There are hundred companies for which data of ten years has been taken for advertising expenses as well as of firm value.Ratio 'Q' developed by James Tobin of Yale University, Nobel laureate in economics, has been extensively used as a proxy for firm value. Tobin (1969) hypothesizes that the combined market value of all the companies on the stock market should be about equal to their replacement costs. The Q ratio is calculated as the market value of a company divided by the replacement value of the firm's assets:

$$\text{Q Ratio} = \frac{\text{Total Market Value of Firm}}{\text{Total Asset Value}}$$

A number of improvised models of 'Q' have been developed by the researchers after Tobin giving the 'Q' ratio. These include L-R algorithm and many other improvised methods. The present paper uses the simplified version of approximated 'Q' as suggested by Chung and Pruitt (1994), which seems simpler and more objective as compared to the original 'Q' as given by Tobin –

$$\text{Approximated Tobin's q} = \frac{Market\ Value\ of\ Equity + Book\ Value\ of\ Debt}{Book\ Value\ of\ Total\ Assets}$$

In order to conduct econometric analysis, all the hundred companies have been grouped together and the data for all the ten years has been grouped together as well. In this way, the number of data points rises 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 Firm value of the companies. The study uses indexing as a means to remove this defect. We adjust 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 has been computed in order to find out the change in advertisement expenditure and firm value across various data points. Several methodological works in econometric analysis suggest such direction for grouping together the data points for different cases *[Theil (2008), Anselin (1988), Fair & Shiller (1990), Franses & Van Dijk (1996), Brooks,* Clare and Persand (2000), Arellano (2003), Brooks (2008), Sharma and Bodla (2011).

The analysis of econometrics can only be performed on a series of stationary nature. In order to check whether or not the series are stationary, we prepare the line graph for each of the series. In order to further confirm the (stationary) nature of the series, correlogram is prepared for each of the series. Further, we perform the Augmented Dickey-Fuller test under the unit root test to finally confirm whether or not the series are stationary. For the basic understanding of Unit root testing, we may look at the following equation

$$y_t = \rho y_{t-1} + x_t'\delta + \varepsilon_t \qquad (1.1)$$

where, x_t are optional exogenous regressors which may consist of constant, or a constant and trend, ρ and δ are parameters to be estimated, and the ε_t are assumed to be white noise. If $|\rho| \geq 1$, y is a nonstationary series and the variance of y increases with time and approaches infinity. If $|\rho| < 1$, y is a (trend-)stationary series. Thus, we evaluate the hypothesis of (trend-)stationarity by testing whether the absolute value of $|\rho|$ is strictly less than one.

The Standard Dickey-Fuller test is carried out by estimating equation (1.1) after subtracting y_{t-1} from both sides of the equation.

$$\Delta y_t = \alpha y_{t-1} + x_t'\delta + \varepsilon_t, \qquad (1.2)$$

where $\alpha = \rho - 1$. The null and alternative hypotheses may be written as,

$$H_0 : \alpha = 0$$

$$H1 : \alpha < 0$$

In order to make the series stationary, we take the log of the two series and arrive at the firm value and advertisement of the two series. All the remaining analysis is performed at the firm value & advertisement data companies. We name these variables as rfv, and radv respectively.

At the stationary log series we perform 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 mathematical representation of a VAR is:

$$y_t = A_1 y_{t-1} + \ldots\ldots + A_p y_{t-p} + Bx_t + \varepsilon_t \qquad (1.3)$$

where y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables, $A_1, \ldots\ldots, A_p$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

The Variance Decomposition Analysis in order to finally quantify the extent upto which the three indices are influenced by each other. While 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 are also being tested on the Johansen's Cointegration tests. We have applied VAR-based cointegration tests using the methodology developed in Johansen (1991, 1995) performed using a Group object or an estimated Var object.

Consider a VAR of order *p*:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + \in_t \quad (1.4)$$

where y_t is a k-vector of non-stationary I(1) variables, x_t is a d-vector of deterministic variables, and $\in_t$ is a vector of innovations. We may rewrite this VAR as,

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \epsilon_t \quad (1.5)$$

where:

$$\Pi = \sum_{i=1}^{p} A_i - I, \qquad \Gamma_i = -\sum_{j=i+1}^{p} A_j \quad (1.6)$$

Granger's representation theorem asserts that if the coefficient matrix $\prod$ has reduced rank $r < k$, then there exist $k \times r$ matrices α and β each with rank *r* such that $\prod = \alpha\beta'$ and $\beta' y_t$ is I(0). *r* is the number of cointegrating relations (the *cointegrating rank*) and each column of β is the cointegrating vector. As explained below, the elements of α are known as the adjustment parameters in the VEC model. Johansen's method is to estimate the matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of $\prod$.

The trend assumption in the case of our series applied for cointegration is that the level data and the cointegrating equations have linear trends:

$$H^*(r): \prod y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha \perp \lambda_0 \quad (1.7)$$

Johansen (1995) identifies the part that belongs inside the error correction term by orthogonally projecting the exogenous terms onto the α space so that $\alpha_\perp$ is the null space of $\alpha'\alpha_\perp = 0$. We identify the part inside the error correction term by regressing the cointegrating relations $\beta' y_t$ on a constant (and linear trend).

To determine the number of cointegrating relations *r* conditional on the assumptions made about the trend, we can proceed sequentially from $r = 0$ to $r = k - 1$ until we fail to reject.

The trace statistic for the null hypothesis of *r* cointegrating relations is computed as:

$$LR_{tr}(r/k) = -T \sum_{i=r+1}^{k} \log(1-\lambda_i)\ k \quad (1.8)$$

where λ_t is the i-th largest eigenvalue of the $\prod$ matrix in (1.8).

The maximum eigenvalue statistic is computed as –

$$LR_{\max}(r/r+1) = -T\log(1-\lambda_{r+1}) = LR_{tr}(r/k) - LR_{tr}(r+1/k) \quad (1.9)$$

for $r = 0, 1, \ldots, k-1$

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 longrunbehavior 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.

V. Findings

The paper studies the impact of advertisement expenditure on firm value for 100 FMCG companies under refrence.In a manner to study the impact of advertising expenditure on firm value, econometric analysis has been applied.Before applying the econometric anlysis, it is important to check the series for stationarity.The Econometric analysis has been performed on log of the series rather than the raw data.The line graph for log of advertising, firm value and joint graph for log of advertising and firm value are presented in Figure 1 to 3 respectively.

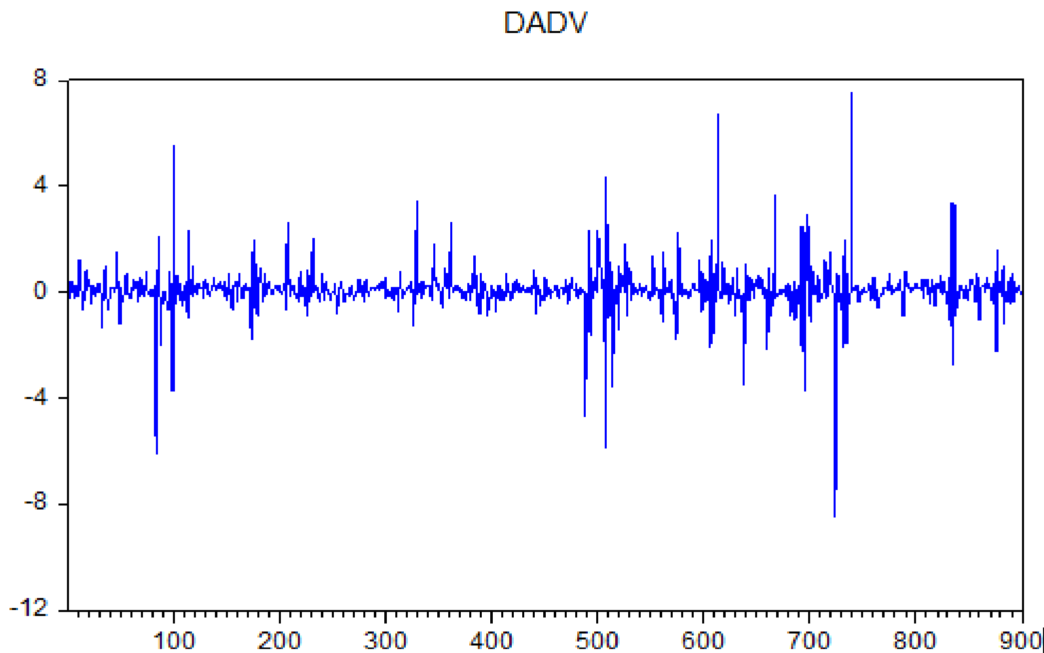

Figure 1

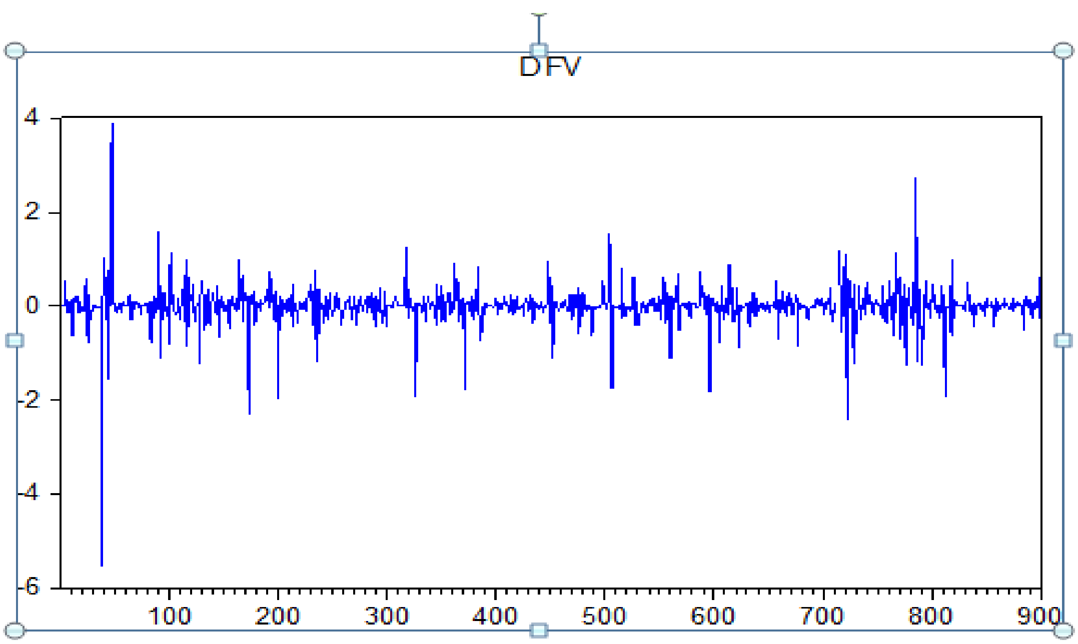

Figure 2

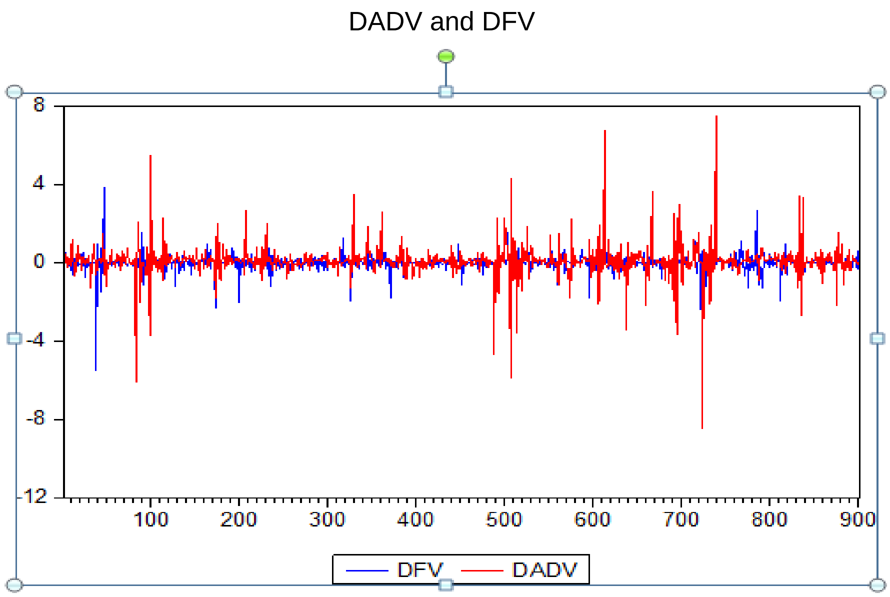

Figure 3

Line graphs presented through figure 1 to 3 show the stationary nature of the log of the two series.

Further, the study tests the unit root of the series by applying the Augmented Dickey-Fuller test on the log of advertising expenses, and log of firm value. The null hypothesis in case of ADF test is that the series under reference has a unit root, which implies that the series are not stationary in nature. A probability value of below 0.05 rejects the null hypothesis at 5% level of significance and implies that the series under reference are stationary at 5% level of significance.

Table 1

Null Hypothesis: DADV has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-34.61871	0.0000
Test critical values:	1% level	-3.437401	
	5% level	-2.864542	
	10% level	-2.568422	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DADV)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DADV(-1)	-1.143790	0.033040	-34.61871	0.0000
C	0.102350	0.029340	3.488384	0.0005

R-squared	0.571931	Mean dependent var	0.000305
Adjusted R-squared	0.571454	S.D. dependent var	1.337030
S.E. of regression	0.875266	Akaike info criterion	2.573645
Sum squared resid	687.1835	Schwarz criterion	2.584326
Log likelihood	-1154.853	Hannan-Quinn criter.	2.577725
F-statistic	1198.455	Durbin-Watson stat	2.016979
Prob(F-statistic)	0.000000		

Table 2

Null Hypothesis: DFV has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=20)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-23.80219	0.0000
Test critical values:	1% level	-3.437475	
	5% level	-2.864574	
	10% level	-2.568439	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DFV)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DFV(-1)	-1.210468	0.050855	-23.80219	0.0000
D(DFV(-1))	0.124910	0.036802	3.394107	0.0007
C	-0.002896	0.014263	-0.203030	0.8392

R-squared	0.545223	Mean dependent var	-5.03E-05
Adjusted R-squared	0.544198	S.D. dependent var	0.630203
S.E. of regression	0.425470	Akaike info criterion	1.132121
Sum squared resid	160.5691	Schwarz criterion	1.148271
Log likelihood	-500.7940	Hannan-Quinn criter.	1.138294
F-statistic	531.7031	Durbin-Watson stat	1.989570
Prob(F-statistic)	0.000000		

The probability value of less than 0.05 for log of advertising expenses and log of firm value as presented in Table 1 and 2 implies that the Null hypothesis is rejected and the variable does not have a unit-root, which confirms that the series is stationary.

The group unit root test involves the Levin, Lin & Chu test; Im, Pesaran and Shin W-stat; ADF-Fisher Chi-square and PP-Fisher Chi Square tests. The findings of the group unit root tests are presented in Table 3.

Table 3

Group unit root test: Summary
Series: DFV, DADV
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-50.6452	0.0000	2	1789
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-45.5047	0.0000	2	1789
ADF - Fisher Chi-square	293.138	0.0000	2	1789
PP - Fisher Chi-square	180.909	0.0000	2	1792

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

The null hypothesis under all of the tests included in Table 3 is that the series has a unit root. It is visible from Table 3 that the p-values for Levin, Lin & Chu; Im, Pesaran and Shin; ADF-Fisher Chi-square and PP-Fisher Chi-square 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 1 and 2) that both the series in question are stationary in nature. Since the series are observed to be stationary in nature, further econometric analysis can be performed on the same.

Table 4

Vector Autoregression Estimates
Standard errors in ( ) & t-statistics in [ ]

	DADV	DFV
DADV(-1)	-0.157438	0.042053
	(0.03354)	(0.01623)
	[-4.69444]	**[2.59056]**
DADV(-2)	-0.066257	-0.006790
	(0.03364)	(0.01628)
	[-1.96988]	[-0.41705]
DFV(-1)	0.106758	-0.086841
	(0.06899)	(0.03339)
	[1.54748]	**[-2.60058]**
DFV(-2)	0.096039	-0.128317
	(0.07589)	(0.03673)
	[1.26548]	**[-3.49310]**
C	0.106614	-0.005964
	(0.02972)	(0.01439)
	[3.58709]	[-0.41454]
R-squared	0.028741	0.027227
Adj. R-squared	0.024351	0.022831
Sum sq. resids	679.6686	159.2424
S.E. equation	0.876349	0.424187
F-statistic	6.547130	6.192630
Log likelihood	-1142.876	-497.1021
Akaike AIC	2.579497	1.128319
Schwarz SC	2.606414	1.155236
Mean dependent	0.086998	-0.003182
S.D. dependent	0.887218	0.429114
Determinant resid covariance (dof adj.)		0.137890
Determinant resid covariance		0.136345
Log likelihood		-1639.017
Akaike information criterion		3.705656
Schwarz criterion		3.759490

By the application of VAR Model, it is observed that the linkage of one series with the other can be established at 5% level of significance if the t-statistic is more than 1.96. The integration of the series is 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. The analysis produced by the Vector Auto-Regression can be interpreted column-wise. It is clear from table 4 that the advertising expenses are influenced by the advertising expenses at the lag of 1 & 2. Conversely, firm value is influenced by advertising expenses at the lag of 1 and firm value at the lag of 1 and 2.

Variance Decomposition Analysis follows the application of Vector Autoregression model. The results from Variance Decomposition Analysis are presented in table 5. The table shows results of variance decomposition analysis which depicts the proportion of movements in the dependent variable that are due to their own shocks versus shocks to other variables.

Table 5 : Variance Decomposition

Variance Decomposition of DADV:

Period	S.E.	DADV	DFV
1	0.876349	100.0000	0.000000
2	0.887971	99.74048	0.259524
3	0.889008	99.62989	0.370110
4	0.889294	99.59588	0.404125
5	0.889302	99.59471	0.405288
6	0.889308	99.59357	0.406431
7	0.889308	99.59357	0.406430
8	0.889308	99.59355	0.406450
9	0.889308	99.59355	0.406450
10	0.889308	99.59355	0.406450

Variance Decomposition of DFV:

Period	S.E.	DADV	DFV
1	0.424187	0.215752	99.78425
2	0.427228	0.889307	99.11069
3	0.430406	1.036740	98.96326
4	0.430534	1.042338	98.95766
5	0.430571	1.048271	98.95173
6	0.430575	1.048257	98.95174
7	0.430575	1.048358	98.95164
8	0.430575	1.048361	98.95164
9	0.430575	1.048361	98.95164
10	0.430575	1.048362	98.95164

Cholesky Ordering: DADV DFV

The variance decomposition analysis shows the proportion of movements in the dependent variable due to their own shocks as well as shocks to other variables. The variance decomposition analysis seems to suggest that advertising and firm value hardly leaves an impact on one another. In case of advertising expenses after 2nd period 99% of influence in advertising are by advertising expenses shock while about 1% is due to firm value shock whereas in case of firm valueafter 2nd period 98% of shock in firm value is due to firm value shock and 2% due to advertising expenses shock.

The study further applies Johansen's cointegration analysis on the series under reference .The results from unrestricted cointegration Rank Test (Trace) unrestricted cointegration Rank test (Maximum Eigenvalue) are presented in table 6. The table compares the Trace static with 0.05 critical value. 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.In the first row that has the Null hypothesis of no cointegrating equation, the Trace statistic (359.884) is more than the critical value (15.49) coupled with probability value of less than 0.05. This enables us to reject the Null Hypothesis. Similarly, while testing the Null hypothesis of at most 1 cointegrating equation, the Trace static (167.37) is more than critical value (3.84).

Table 6 : Johansen's Cointegration Test

Trend assumption: Linear deterministic trend
Series: DADV DFV
Lags interval (in first differences): 1 to 4
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.196290	359.8844	15.49471	0.0001
At most 1 *	0.173023	167.3708	3.841466	0.0000

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.196290	192.5136	14.26460	0.0001
At most 1 *	0.173023	167.3708	3.841466	0.0000

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

DADV	DFV
-3.028193	2.101196
-0.473424	-6.438029

Unrestricted Adjustment Coefficients (alpha):

D(DADV)	0.410713	0.116584
D(DFV)	-0.053286	0.184534

1 Cointegrating Equation(s): Log likelihood -1690.516

Normalized cointegrating coefficients (standard error in parentheses)

DADV	DFV
1.000000	-0.693878
	(0.15137)

Adjustment coefficients (standard error in parentheses)

D(DADV)	-1.243717
	(0.08999)
D(DFV)	0.161361
	(0.04684)

The table leads us to reject the Null Hypothesis that there are none or at most 1 cointegrating equation at 0.05 level.The maximum eigen values statistics as presented in the table complement the findings of the trace statistic. While testing the null hypothesis of none cointegrating equation, it is found the Max-Eigen statistic (192.5)happens to be more than the critical value (14.2).It means that the null hypothesis of no cointegrating equation can be rejected. The max-Eigen statistic while testing the null of having at most 1 cointegrating equation happens to be 167.3 which is more than critical value (3.84).Hence, we arrive at the observation that there are two cointegrating equations in the series under reference.

Table 6 also provides estimates of cointegrating relations β and the adjustment parameters α.As is well known, the cointegrating vector is not identified unless we impose some arbitrary normalize-ation. However, it is sometimes useful to normalise 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 also presented in Table 6.

Table 7 presents the results of Vector Error Correction Model as applied for the series under reference.

Table 7: Vector Error Correction Estimates

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

Cointegrating Eq:	CointEq1	
DADV(-1)	1.000000	
DFV(-1)	-1.050190 (0.11077) [-9.48078]	
C	-0.091906	
Error Correction:	**D(DADV)**	**D(DFV)**
CointEq1	-1.111852 (0.06400) [-17.3727]	0.239993 (0.03455) [6.94654]
D(DADV(-1))	0.017163 (0.05119) [0.33527]	-0.131407 (0.02763) [-4.75519]
D(DADV(-2))	0.007230 (0.03412) [0.21191]	-0.069732 (0.01842) [-3.78635]
D(DFV(-1))	-0.748314 (0.07510) [-9.96444]	-0.513233 (0.04054) [-12.6600]
D(DFV(-2))	-0.285505 (0.06509) [-4.38632]	-0.287667 (0.03514) [-8.18706]
C	-0.006939 (0.03063) [-0.22656]	-0.001519 (0.01653) [-0.09189]
R-squared	0.542249	0.384259
Adj. R-squared	0.539651	0.380764
Sum sq. resids	732.8838	213.5679
S.E. equation	0.912073	0.492357
F-statistic	208.7253	109.9591
Log likelihood	-1173.953	-627.1033
Akaike AIC	2.660548	1.427516
Schwarz SC	2.692935	1.459903
Mean dependent	-0.001086	0.002822
S.D. dependent	1.344268	0.625680
Determinant resid covariance (dof adj.)		0.194855
Determinant resid covariance		0.192227
Log likelihood		-1785.832
Akaike information criterion		4.058245
Schwarz criterion		4.133814

Vector Error Correction Model (VECM) estimates the speed at which the dependent variable Y returns to equilibrium after a change in independent variable X. VECM is particularly useful while dealing with integrated data. VECM adds Error Correction features to the VAR.

In table 7, we are allowing for only one cointegrating relationship. Table 7 shows that the advertising expenses in the current period are impacted by advertising expenses at the lags of 1 and 2. On the other hand, Firm value in the current period are impactted by advertising at the lag of 1 and 2.

VI. Conclusion

The study uses various econometric models in order to find out the cause and effect relationship between advertisement expenditure and firm value. Taking ten-year data of 100 FMCG companies of India, the study aims at testing whether advertisement expenditure impacts the firm value. The study uses log of the advertisement expenses and firm value for finding out the impact of the former on the latter. The Augmented Dickey-Fuller test finds out that both the log series under reference are stationary. The Vector Auto-Regression suggests that advertising expenses are influenced by the advertising expenses at the lag of 1 & 2. Conversely, firm value is influenced by advertising expenses at the lag of 1 and firm value at the lag of 1 and 2. The variance decomposition analysis finds that advertising and firm value hardly leaves an impact on one another. In case of advertising expenses after 2nd period 99% of influence in advertising are by advertising expenses shock while about 1% is due to firm value shock whereas in case of firm value after 2nd period 98% of shock in firm value is due to firm value shock and 2% due to advertising expenses shock. Johansen's cointegration arrives at the observation that there are two cointegrating equations in the series under reference. Lastly, Vector Error Correction estimates leads us to conclude that the advertising expenses in the current period are impacted by advertising expenses at the lags of 1 and 2. On the other hand, Firm value in the current period are impacted by advertising at the lag of 1 and 2.

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