

The Relationship between Advertising and Consumption in India: An Analysis of Causality

Dr. Abey P. Philip*

Abstract

This article extends cointegration methodology to validate the evidence of soundness of advertising and consumption pattern of India during the period of 1980-2006. Augmented Dickey-Fuller test, Philips- Peron Test, Cointegration technique and Error Correction Models were employed to examine association between advertising and consumption. The analysis reveals that there is strong bi-directional relationship between advertising and consumption pattern in India.

Introduction

India is going through extraordinary alteration. It is one of the aggressive large economies in the world, with a population of more than one billion people, with huge human and natural resources, and with costs that are at the very low end of the global average. India has its dominance in the IT industry with this being a base for almost all the leading IT companies in the world. India's large English-speaking population for certain boosts it as a magnetic business destination. India comprises an economic prospect on an immense scale, both as a global base and as a domestic market. This article tries to find out the answer for the question of does advertising affect the consumption pattern of India?

Indian consumers are seemly more and more doctored and enlightened about products; media channels that provide companies to convey with consumers are adopting in diversity and reach. Consumers are getting richer, leading to competition in the market place for consumer products. The result is that consumer companies are increasingly pertained with marketing issues, as they seek to tell apart their products and communicate their appraises to potential customers.

Various consumer companies are mad about Indian sheer market size. The companies say the growth in media channels brought about by economic liberalization has made people increasingly aware of brand values. A smaller number of companies believe that India offers significant opportunities on selective brands, which provide higher margins.

Companies also say that groundbreaking marketing can be the solution to tackling the fragmentation and relative poverty of much of the Indian market. A senior manager at a consumer goods company points to the recent success of very small packages or sachets of personal care products, "The sachet phenomenon is an case of accomplishing to the bottom of the pyramid. It was identification that a lot of people in India are just not willing to buy a whole bottle of shampoo. That doesn't mean they won't buy shampoo."(KPMG Research, May 2005)

Advertising is of changing apprehension to companies, as channels burgeon and product offerings become more advanced and bigger and bigger part of the marketing mix. Companies do not have any other option except advertise. The biggest challenges in the front of companies are recognize consumer insights and hit the target. Measurement of advertising and promotional activities is the biggest challenge of companies with in limited time and money. Years ago you could run an ad on TV and know 80 percent of TV owners would see it. Now we have so many channels that you don't know how to focus.

Some companies express concern that advertising messages can only travel limited distances in the Indian market. "A lot of companies are not able to reach further down, towards the bottom of the 'consumer pyramid'". "Price is one issue. But there is also communication. How do you talk to someone who is illiterate, who doesn't have access to a TV or a radio?" And another important

issue believes that increasingly companies will have to seek multiple advertising channels: “Mass media is becoming less and less effective,” the company says.” You can pour money into TV these days and see absolutely no effect on your sales.”

It is believed that increase in the advertising is positively associated with increase in the consumption of firm’s goods. It can have negative impact on the competitor’s goods. It is fixed that in literature, if increased advertising levels for the economy are associated with increased in consumption, this suggests that consumer are increasing current consumption at the expense of future consumption. Therefore advertising affects aggregate consumption and business cycle.

In this paper, it is important to consider the relationship between advertising and consumption. Ekelund and Gramm (1969) analysed the relationship between advertising and aggregate consumption and they could not establish the positive relationship between advertising and consumption. While, Tylor and Weiserbs (1972) found that there is a positive relationship between aggregate demand and aggregate consumption. While other studies reject the hypothesis that advertising affect consumption Granger etal, suggests that consumption affects advertising. Verdon and McConnell (1968) studies the relationship between advertising and aggregate demand, they found that advertising have a positive relation with aggregate demand.

Ashely , Grange and Schmalansee (1980) argued that annual data may not give exact picture about the direction of causation between advertising and consumption because advertising effects to depreciate rapidly with most of the advertising effect depreciating with in one year. They found that consumption might affect advertising but aggregate advertising does not affect aggregate consumption.

Simon argues that aggregate advertising lags the rest of the economy. The aggregate advertising can affect the consumption pattern of the society. McConnell et.al (1968) tried to find out the correlation between advertising spending and GNP, industrial production. They could not establish the link between these variable.

Chowdhury (1994), a more closely related study considered the relationship between advertising and several macro economic factors during the period of 1960-91 in U.K. He could not able to find the relation between advertising and consumption, while he could able to find relation between advertising and employment.

In this article examining the relationship between advertising and consumption in India during the period of 1980-2006.Causality tests used to find out the relationship between advertising and consumption. It is important to clarify whether these variables might affect each other before analysis.

On the above background, the present article attempt to investigate the validity of advertising on consumption pattern of India during the period of 1980-2006. The rest of the article discusses the methodology of the study, empirical results and concluding remarks.

Data used in the present study

The annual long-run time series data on consumption and advertising expenditure for the period 1980- 06 obtained the National Accounts Statistics (2006) and the Economic Survey published by the Government of India.

Methodology used in the paper

Tests for stationarity

Before we perform a causality test between consumption and advertising, we need to test for the stationarity of the two variables for the presence of a unit root. If variables follow a unit root process, it can lead to spurious relation because of the variance of the process become infinite. In that case the least square estimation with level variable is clearly inappropriate. As Granger pointed out a set of variables, all of which are stationary only after differencing, may have linear combinations which are stationary without differencing. In such a case the variables are said to be co integrated.

Suppose y_t and x_t are $I(1)$ and not cointegrated. Then there is not a stable long-run relationship between these two series (though there may be a stable relationship between their first differences).

If, on the other hand, y_t and x_t are cointegrated then there exists a unique β_0 and β_1 such that

$$y_t - \beta_0 - \beta_1 x_t = \varepsilon_t \sim I(0)$$

The OLS estimator of β from the regression of y on $1, x$ is a super-consistent estimator (even if y and x are jointly determined, i.e., even if $E(x_t \varepsilon_t)$ is nonzero).

Stage one of any time series analysis is to check whether or not the variables under consideration are stationary. Tests for stationarity are well known in the literature as Augmented Dicker Fuller (ADF) tests. They test for the existence of unit roots in a time series. The estimating equation for unit root tests for a series Y_t for example, can be written as

The Augmented Dickey Fuller (ADF) and Phillips -Perron (PP) tests are used for this purpose.

The ADF regression equations are

$$\Delta X_t = \alpha_1 + (\rho-1)X_{t-1} + \sum_{i=1}^m \gamma_i \Delta X_{t-i} + u_t \quad \text{----- (1)}$$

Where X_t is a variable, u_t is the white noise, Δ is difference operator and m indicates the number of differenced terms used. The additional lagged terms include ensuring the errors are uncorrelated. It is the presence of these differenced terms that distinguishes the augmented Dickey Fuller test from the ordinary Fuller Test. However the ADF test are unable to discriminate well between non-stationary series with a high degree of auto regression. It is there fore possible that advertising, which is likely to be highly auto correlated, is in fact stationary although the ADF test shows that it is non- stationary (see Culver and Papell, (1997).

The ADF and PP tests are known to have low power against the alternative hypothesis that the series is stationary (or TS) with a large autoregressive root. (See, e.g., DeJong, et al, J. of Econometrics, 1992.) In consequence the Phillips – Perron (PP) test (Phillips and Perron, 1988) is applied. The PP test has an advantage over the ADF test as it gives robust estimates when the series has spurious correlation and time dependent hetroscedasticity. The PP test regression

$$\Delta \text{ADV}_t = \alpha + \Pi_1 X_{t-1} + \Phi(t - \frac{T}{2}) + \sum_{i=1}^M \phi_i \Delta \text{ADV}_{t-i} + u_{1t} \quad \text{----- (2)}$$

In this equation Δ is the first difference operator and u_{1t} are stationary random error term. Akioka's determines the lag length 'n' information to ensure serially uncorrelated residuals and M is decided according to the Newley- West's (Newley and West, 1997) suggestions.

After confirming the order of the series is $I(i)$, we estimated the following cointegration regression equation:

$$\Delta \text{ADV}_t = \lambda_1 + \sum_{i=1}^p \alpha_{i1} \Delta \text{ADV}_{t-i} + \sum_{i=1}^q \beta_{i1} \Delta \text{CON}_{t-i} + U_t \quad \text{----- (3)}$$

$I(0)$ is rejected in favour of the alternative hypothesis that is X_t IS $I(i)$, provided b is negative and statistically significant. Granger and Newbold [1974] provided examples of spurious significance in a random walk context. This has been extended by various authors to number of other persistent processes. Granger and Newbold suggested that the DW statistic could be used to test the autocorrelation in the residuals, giving a test that could be used in a relatively unsupervised way to check for spurious relationships.

Granger and Newbold concluded that time series regressions that yield high R^2 and low DW values should be viewed with caution, because this combination could reflect a spurious regression.

Error Correction Model

After confirming the cointegration between X_t and Y_t one should search for proper error correction model, using the definition of co integration, the Granger representation Theorem (Granger 1983) states that if a set of variables are cointegrated, there exists a valid error correction representation of the data. It captures the short run dynamic adjustment of the variables (Eagle and Granger, 1987). According to Granger’s (1986) representation theorem, a system of cointegrated variables can be represented by a dynamic error correction model (ECM). Residuals, lagged once and derived from the underlying cointegrating (long-run) relation, are added to a model with stationary variables. These residuals represent the error correction (EC) term, the estimated coefficient of which reflects the process by which the dependent variable adjusts in the short run to its long-run equilibrium path. The EC term is also another channel through which Granger causality can occur (see Granger and Lin 1995; Jones and Joulfaian 1991). The EC term represents long-run Granger causality, while the traditional channel reflects short run Granger causality. Hence the following form of error correction regression equation is to be estimated: -

$$X_t = a_0 + P_1 E_{t-1} + \text{Lagged } (DX_t, D_t) + U_{1t} \dots\dots\dots(4)$$

$$X_t = b_0 + P_2 E_{t-1} + \text{Lagged } (DX_t, DY_t) + U_{2t} \dots\dots\dots(5)$$

Where E_{t-1} = the lagged error obtained from cointegration regression equation, U_{1t} U_{2t} = finite order moving averages, P_1 $P_2=0$. The error correction model explains two possible sources of causation of X_t by Y_t in equation (4) either through lagged Y_t or through E_{t-1} term. It is also found that the temporal causality can be traced through error correction term (Miller and Ruzzek 1990).

We can hypothetically create the casual relationship with advertising and consumption. The casual relation from consumption to advertising is based on the observation that businesses tend to allocate certain percentage their consumption to advertising. It can generate revenues, which accompany increased consumption. Hansen claimed that advertising does affect income of the consumer. It can increase the Marginal Propensity to Consume (MPC) and would cause to decrease in Marginal Propensity to Save (MPS).

Empirical Results

The results of unit root tests given in Table 1 show the results of Dickey-Fuller and Augmented Dickey Fuller statistics for each variable. The Dickey Fuller and related test unit roots we can formulate the null hypothesis that advertising and consumption are not integrated against alternative hypothesis that they are cointegrated. Akaike’s information Criterion and final prediction error are used to determine the lag order for the augmented terms in equation. The unit root test is conducted for both levels and for the first difference for each series. The Table I show that the null hypothesis of a unit root accepted and rejected for the first differenced at the 5 percent level of significance. The results suggested that advertng and consumption are negative and statistically significant. Hence it can be concluded that each variables are integrated of order (1) and we accepted the alternative hypothesis that advertising and consumption are integrated after fist differencing. . Therefore we can conduct the cointegration test for consumption and advertising.

Table I. Dickey-Fuller Unit Root Test

Variables	Dickey Fuller Test	Augmented Dickey Fuller Test	Philips Perron Test	Lag Order
Advertising	-2.1851	-2.1423	-2.01265	
Consumption	-1.6721	-1.2114	-1.8923	
First Differenced				
Advertising	-4.6125	-4.7389	-5.2987	1
Consumption	-5.1321	-5.6184	-5.2401	1

Test rejects the null hypothesis of unit root at both the 1% and 5% level of significance.

After confirming the advertising and consumption expenditure are integrated on the order of one, it is necessary to run the co integration equation to identify the influence of advertising on consumption and vice versa. The results of cointegration regression equation are given below: -

$$ADV_{t+1} = 0.5231 + 0.8562CON_t$$

(11.52*) (22.57*)

$$R^2 = 0.9276 \qquad F = 2314^* \qquad D.W = 0.5239^*$$

A high level of D.W statistics would reveal that cointegration between two series. In present analysis as the D.W statistics is statistically significant and high r^2 and D.W statistics reflected that spurious regression does not valid in the test. Therefore we can accept the alternative hypothesis that advertising and consumption spending in India are cointegrated.

After identifying the cointegration between two variables, we can estimate the error correction model, which help us to identify the long run effect of advertising on consumption and vice versa.

The error correction model results describe as follow: -

$$ADV_t = 0.0532 - 0.0621 DADV_{t-1} + 0.1724 DCON_{t-1} + 0.0621 E_{t-1}$$

(0.74) (2.31)** (4.15)* (0.67)

$$R^2 = 0.5632 \qquad F = 5.846^*$$

The error correction models reveals that the advertising and consumption in Indian during the period of 1980 to 2006. During the period casual relation between advertising and consumption is bi-directional. Thus study reveals that there is a strong evidence of validity advertising influences the consumption pattern of India and vice versa. It shows that advertising have less lag and has better influence on the consumption pattern.

Concluding Remarks

Unit root test, cointegration technique and error correction models were employed to examine association between advertising and consumption during the period of 1980-2006. The study evidences that the fluctuations in advertising expenditure has a positive impact on consumption expenditure. The empirical results are thus consistent with a model in which causation runs bi directionally from advertising and consumption expenditure and vice versa. This shows that a sudden change in advertising effect the consumption pattern of the people. The study reveals that increase in advertising expenditure can have a positive impact of consumption irrespective of its lag.

Reference

- Alessandra Buratto, Luca Grosset and Bruno Viscolani. ‘Advertising a new product in a segmented market’. European Journal of Operational Research, Volume 175, Issue 2, 1 December 2006, 1262-1267
- Ashely, Richard, Clive W. J. Granger and Richard Schmalensee. ‘Advertising and Aggregate Consumption: An Analysis of Causality’. July 1980, 1149-67.
- Barry J. Seldom and Chulho Jung. ‘The length of the effect of aggregate advertising on aggregate consumption’ Economics Letters, Volume 48, Issue 2, May 1995, 207-211
- Chowdhury, Abdur R., ‘ Advertising Expenditures and the Macro Economy: Some New Evidence.’ International Journal of Advertising, No.1 1994, 1-14.
- DeJong, David N, et al., ‘Integration versus Trend Stationarity in Time Series’, Econometrica, Econometric Society, vol. 60(2), 423-33, 1992. March.
- Dickey, David A. and Wayne A. Fuller, ‘ Distribution of the estimators for Autoregressive Time Series with a Unit Root.’ Journal of American Statistical Association, June 1979, 423-31.
- Ekelund, Robert B., and William P. Gramm, ‘A Reconsideration of Advertising Expenditures, Aggregate Demand and Stabilization.’ Quarterly Review of Economics and Business, summer 1969. 71-77.
- Engle, Robert F. and W.J. Granger, ‘Co-integration and Error Correction Representation, Estimation and Testing’, Econometrica, March 1987, 251-76.
- Granger, C.W.J., and J. Lin.. ‘Causality in the Long Run.’ Econometric Theory 11, no. 3: 1995, 530–536.

- Jean J. Gabszewicz, Didier Laussel and Nathalie Sonnac, 'Does advertising lower the price of newspapers to consumers? A theoretical appraisal'. *Economics Letters*, Volume 87, Issue 1, April 2005, 127-134.
- Jones, J.D., and D. Joulfaian. 'Federal Government Expenditures and Revenues in the Early Years of the American Republic: Evidence from 1792 to 1860.' *Journal of Macroeconomics* 13, no. 1: 1991. 133–155.
- KPMG Research May, 2005.
- Makoto Mizuno Hiroyuki Odagiri, 'Does advertising mislead consumers to buy low-quality products?' *International Journal of Industrial Organization*, Volume 8, Issue 4, December 1990, 545-558.
- Martin Eisend, 'Two-sided Advertising: A Meta-analysis,' *International Journal of Research in Marketing*, Volume 23, Issue 2, June 2006, Pages 187-198.
- Phillips, P.C.B, and P. Perron, 'Testing for a Unit Root in Time Series Regression'. *Biometrika*, 1988 75, 335-346.
- Taylor, Lester D and Daniel Weiserbs, 'Advertising and the aggregate Consumption Function.' *The American Economic Review*, September 1972, 642-55.
- Verdon, Walter A., Campell R McConeell and Theodore W Roester, 'Advertising Expenditures as an Economic Stabilizer: 1945-64'. *Quarterly Review of Economics and Business*, spring 1968, 7-18.