

Research article

# EFFECT OF ADVERTISING ON THE SALES REVENUE AND THE PROFITABILITY OF SELECTED FOOD AND BEVERAGES FIRMS IN NIGERIA

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## ABSTRACT

Advertising is a prominent feature of modern business operations. One could encounter advertising messages, while watching TV, reading magazines, listening to the radio, surfing the internet or even simply working down the street, as advertising has a stimulating influence on purchasing behavior of the consumers. Empirical evidence has proven that advertising increases sales revenue of firms. Advertising provides a platform for firms to create awareness about their products or services and how consumers could make the best out of such products. This study evaluated the effectiveness of advertising expenses on the sales revenue and profitability of selected food and beverages firms in Nigeria. This study was based on secondary data collected for advertising expenditures, sales revenue and profit of food and beverages companies listed in the Nigerian Stock Exchange over the period of 2000 to 2012 from the annual report and accounts of the firms under study. Among the objectives of the study is to determine the extent to which advertising costs impact on the sales revenue and profitability of the selected food and beverages companies in Nigeria. Correlational and Ordinary Least Square regression analysis study designs were adopted for the study. The first hypothesis test showed that advertising expenses has no positive significant relationship with the sales revenue of the companies. Further, the second hypothesis test showed a positive significant relationship between advertising and the profitability of the firms. This study concluded that advertising is one of the most important medium of communication influencing the companies' performance in more than one ways. It is therefore recommended that not only advertising should be given adequate attention while formulating strategies relating to sales revenue and profitability promotion policy. Other factors which are important to increasing sales revenue and profitability such as sales promotion, personal selling, publicity etc which are crucial should be considered. **Copyright © IJEBF, all rights reserved. USA**

**Key words:** Revenue; Profitability; Promotion; Stock Exchange and Advertising

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## **Introduction**

The role of sales promotion in the form of advertising in promoting product and service awareness among consumers cannot be overstressed. Advertisement provides a platform for firms to create awareness about their products or services and how consumers can make the best out of such products. Olusegun (2006) opined that all advertisement must be honest and follow ethical standards and must not be perceived by the target consumer as lie; otherwise it can batter the image of a company and hinder it from building successful brands. Thus, for advertising to be effective, it must have an appeal, attract attention, command interest, inspire conviction and must provoke interest (Frank, 2005). In the same vein, Okeji (2008) posited that a good advert message should not be boring but rather reflect the lifecycle of the product. He concluded that advertising must be exposed in the right medium as this will enable organization to reach the right people with the right message.

Against this backdrop of controversy, it became very pertinent to investigate the extent to which the advertising costs of manufacturing firms in Nigeria affect their sales revenue and profits. Consequently, this study was conducted with the intent of establishing the extent to which the advertising costs of the food and beverages firms affect their sales revenue and net profits.

## **Statement of the Problem**

It is an established fact that advertising plays a very significant role in creating product or service awareness in the market place. David and James (1982) argued that advertising is one easy way to educate existing and prospective consumers about a product or service. Although it is common for people to relate the performance of a company with the priority it gives to advertising, people tend to forget that advertising budgets are a huge source of costs for the organization. In fact, the amount of resources committed by firms to advertising has steadily grown over the years because of the increased awareness and sophistication of consumers (Kotler, 2009).

Despite the fact that the advertising budget of the food and beverages sector had grown over the years to constitute a reasonable chunk of expenditure for the companies, little research attention has been paid to the effect of such advertising costs on the sales revenue and net profit of the firms in Nigeria.

Abiodun (2011) examined the impact of advertising on sales volume of Starcomms Plc. The study used frequency tables, percentages and Chi-square to establish relationship between advertising and sales volume of the company.

Despite the attempt made by the study to establish relationship between advertising and sales volume of the company, the study suffered from a number of weaknesses. The study failed to clearly reveal the impact of advertising on the sales volume of the firm because it utilized primary data that does not adequately capture the impact of relationships. Similarly, the sampling procedure of the study and the absence of validity and reliability test for the research instruments may have affected the data collected and by implication the findings of the study. Lastly, the number of questionnaire copies filled and returned was not adequate by any systematic standard for the test of hypothesis.

This particular study is unique and significant because it attempted to overcome the deficiencies of the previous studies by intending to rise up to the current realities by utilizing the data sought from Cadbury Nigeria Plc and Nestle Nigeria Plc both in food and beverages sector in Nigeria from 2000 to 2012. The previous studies used

primary data which does not adequately capture relationships. Further, this study equally tried to establish stationarity test for the secondary data utilized for this study to avoid the results being spurious which the previous studies had failed to establish. This study therefore hopes to fill these gaps.

Consequently, the objectives of the study are to determine the extent to which advertising costs affect the sales revenue of selected food and beverages firms in Nigeria. To evaluate the effect of the advertising costs on the net profit of selected food and beverages firms in Nigeria.

The hypotheses tested for the study; stated in the null form, are as follows:

**H<sub>01</sub>:** Advertising costs have no significant effect on the sales revenue of selected food and beverages firms in Nigeria.

**H<sub>02</sub>:** Advertising costs have no significant effect on the net profit of selected food and beverages firms in Nigeria.

The study expected to yield a number of desirable benefits, the most essential of which is contribution to existing knowledge. Specifically, the findings of the study would provide direction as to the effect of advertising costs or expenditures on the sales revenue and profit of manufacturing companies, especially those in the food and beverages sector.

## **Literature Review and Theoretical Framework**

The meaning of advertising cannot be definite as it means different things to different people depending on their perceptions of what it is. According to Kotler (2000), advertising is any non-personal presentation and promotion of ideas, goods, or services by an identified sponsor. Advertiser includes not only business firms but also museums, charitable organizations and government agencies that direct messages to target public. Advertising can also be defined as any paid non-personal communication about an organization, products, services or ideas by an identified sponsor (Bennet, 2006). Advertising is any paid message presented through various media, such as television, radio, magazine, newspapers or billboards by an identified source.

All the aforementioned definitions made modest efforts to define advertising. However, one or two deficiencies could be observed from some of the definitions. The study finds the definition by Bennet (2006) that advertising is any paid non-personal communication about an organization, products, services or ideas by an identified sponsor as a better one and hence it was adopted by it. The definition appears to be adequate for the purpose of the study, and encompasses all the important dimensions to advertising such as the product, awareness and sales among others.

### **The dynamic theory of profitability**

Until recently, firms managers were solely expected to maximize the firms' wealth. If that is the case, managers are now expected to take decisions that take account of the interests of the firms in term of profits. Measuring profitability is the most important measure of the success of the business. Therefore, managers must do their best to ensure that their firms are operating at marginal level of certainty of returns to warrant profitability for the firm.

Theories have been formulated over the years to explain the variable of profitability. Few of such theories to mention are dynamic theory of profit, compensation theory of profit, monopoly theory of profit and innovative

theory of profit. The main concern to discuss is the dynamic theory of profit. Don (2009) propounded that the dynamic theory of profit is the residue; the difference between price and cost, due to the reductions in the cost effected by changes in the economy such as population increase (this reduces wages), increased capital supply (this reduces the interest rate charged and hence the cost of capital comes down), and technological improvements (reduces the costs). This theory treats profits as a residue in price after deducting costs.

Furthermore, profitability is defined as either accounting profits or economic profits. Accounting profits means net income, while economic profits, means net worth. Profitability is the primary goal of all business ventures. Without profitability the business will not survive in the long run. So measuring current and past profitability and projecting future profitability is very important. Profitability is measured with income and expenses. Income is money generated from the activities of the business. For example, if crops and livestock are produced and sold, income is generated. However, money coming into the business from activities like borrowing money does not create income. This is simply a cash transaction between the business and the lender to generate cash for operating the business or buying assets.

Profitability is measured with an “income statement”. This is essentially a listing of income and expenses during a period of time (usually a year) for the entire business. An income statement is traditionally used to measure profitability of the business for the past accounting period. However, a “pro forma income statement” measures projected profitability of the business for the upcoming accounting period. A budget may be used when you want to project profitability for a particular project or a portion of a business.

Whether you are recording profitability for the past period or projecting profitability for the coming period, measuring profitability is the most important measure of the success of the business. A business that is not profitable cannot survive. Conversely, a business that is highly profitable has the ability to reward its owners with a large return on their investment. Increasing profitability is one of the most important tasks of the business managers. Managers constantly look for ways to change the business to improve profitability.

## **Methodology**

This work has utilized correlational research design as the approach for the study. According to Mark *e tal* (2009), correlation is referred to when a change in one variable is accompanied by a change in another variable, but it is not clear which variable caused the other to change. The choice of the design is necessitated by the fact that the study sought to establish relationship among variables. The population of this study consisted of the fifteen firms listed under the food, beverages and tobacco sector of the Nigerian Stock Exchange at 31<sup>st</sup> December 2012. Using filtering to the whole companies’ data filed in the Abuja and Kaduna Stock Exchange libraries. Thus, companies whose data were available for the period of the study were picked up and those companies whose data were not complete were not considered for the study.

Data for the study was collected purely through secondary sources by extracting the relevant data from the annual report and accounts of the food and beverages firms in Nigeria from 2000 to 2012.

Analysis was started first by establishing the stationarity of the variables used for the study. Given the fact that the variables employed for the study were collected over time, there was need to establish the stationarity of such variables to avoid the results being spurious. To address this, this study employed the use of Augmented

Dickey-Fuller (ADF) test to establish the absence of unit root in the time series of advertising cost, sales revenue and net profit of the selected food and beverages firms in Nigeria. The ADF test was conducted based on the model below:

$$y_t - y_{t-1} = \Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \varepsilon_t \quad \text{--- 1}$$

Where  $y$  is a non-stationary series,  $\alpha_0$  and  $\alpha_1$  are parameters to be estimated and  $\varepsilon_t$  is a random disturbance term. The null hypothesis for the presence of a unit root in the series was rejected if the Dickey-Fuller statistic was less than the critical value at a given apriori alpha level and the alternate hypothesis of a stationarity time series was accepted. The reverse is true if the test statistic is greater than the critical value.

The study employed descriptive statistics and Ordinary Least Squares (OLS) simple regression analysis to ascertain the effect of advertising cost on the sales revenue and the net profit of the selected food and beverages firms in Nigeria. In order to ensure that none of the assumptions guiding OLS estimation was not violated, the residuals of the regression model was subjected to the Breusch-Godfrey serial correlation test in order to ensure that there was no serial dependence among the variables of the study. The Brush-Godfery test belongs to the family of Lagrange-Multiplier (LM) test for asymptotic sample and was run based on the model below (Eviews, 7).

$$e_2 = X_t \gamma + \left( \sum_{s=1}^p \alpha_s e_{t-s} \right) + v_t \quad \text{--- 2}$$

Where  $e$  is the residual. Like the other LM tests, this test was also based on a t-statistic and LM statistic. The significance of the t-statistic and the LM statistic at apriori alpha level indicated the presence of serial correlation in the residuals, and vice versa (Eviews, 2001).

Further, the White (1980), test for heteroskedasticity was conducted on the residuals of the series to ensure that there were no traces of heteroskedasticity in the data series. Given a liner regression with two variables  $x$  and  $z$ , the test statistic was based on

$$e_{i,t}^2 = \alpha_0 + \alpha_1 x_t + \alpha_2 z_t + \alpha_3 x_t^2 + \alpha_4 z_t^2 + \alpha_5 x_t z_t + v_t \quad \text{--- 3}$$

Where  $x$  and  $z$  were variables estimated, and  $e$  is the residual of the linear model. The significance of the t-statistic and the LM-statistic at apriori alpha rejection of the hypothesis of non-presence of heteroskedasticity in the series, and vice versa (Agung, 2009).

### Model Specification and Development

The model of the study was premised on the simple linear relationship that advertising should have some sort of effect on sales. This relationship could be modeled below:

$$TS_{i,t} = \alpha_0 + \beta_1 AC_{i,t} + \varepsilon_{i,t} \quad \text{--- 1}$$

Where  $TS_{i,t}$  is the total sales revenue for the company at time  $t$ ,  $\alpha_0$  and  $\beta$  are the intercept and coefficients to be estimated,  $AC_{i,t}$  is the advertising cost of the company at time  $t$ , and  $\varepsilon_{i,t}$  is the random disturbance term. To model the effect of advertising on the net profit of the company, the following simple relationship became obvious:

$$PAT_{i,t} = \alpha_0 + \beta_1 AC_{i,t} + \varepsilon_{i,t} \quad \text{--- 2}$$

Where  $PAT_{i,t}$  is the profit after tax for the company at time  $t$ , and  $\alpha_0$ ,  $\beta_1$ ,  $AC_{i,t}$  and  $\varepsilon_{i,t}$  are as defined above.

Thus, hypothesis one of the study would be tested using equation (1), while hypothesis two would be tested based on equation (2).

### Descriptive Statistic

The table below showed the descriptive statistics of advert costs, total sales and profit after tax of the firms.

**Descriptive statistic of Variables.**

Variables	Advert Cost	Profit After Tax	Total Sales
Mean	2.49	8.139	1.109
Maximum	2.39	2.55	6.20
Minimum	3.08	6.33	1.92
Std. Dev.	2.491	7.304	1.583
Skewness	0.616	1.573	0.616
Kurtosis	12.446	2.014	10.929
Observations	13	13	13

Source: SPSS 17.0 Output, 2014

The basic characteristics of the variables under study were shown in the table above in form of descriptive statistic. The average expenditure on advert was N2.49 billion. Similarly, the average expenditure on profit after tax was N8.139 billion and that of sales revenue was N1.109 billion respectively for the period of the study. On the other hand, the minimum value for the advert was N3.08 billion and its maximum value stood at N2.39 billion. For the profit after tax, the minimum value was N6.33 billion and its maximum value was N2.55 billion. Further, the minimum value for the sales revenue was N1.92 billion with a corresponding maximum value of N6.20 billion for the period. The standard deviation of 2.491; 7.304; and 1.583 for advertising costs, profit after tax and total sales respectively for the food and beverages firms in Nigeria were indicative of the variables' deviation around their respective means.

In terms of skewness, the companies have portrayed the values of 0.616 and 0.616 for advert cost and total sales respectively and were positively skewed. This implied that the variables exhibited normal distribution with a right long tail. For the profit after tax, the skewness of 1.573 distribution had shown flatness with a right long tail. Further, in terms of kurtosis, advert cost has a value of 12.446 and total sales have a value of 10.929, implying that the series exhibited flatness. The profit after tax's kurtosis value of 2.014 had shown flatness distribution for this study.

### Stationarity Test

#### Variable Measurement of ADF Test

Variables	ADF	t-statistic at 5%	P-Value	Decision
<b>PAT</b>	-3.830951	-3.144920	0.0161	Stationary
<b>ADVERT</b>	-4.228238	-3.175352	0.0100	Stationary
<b>SALES</b>	-3.462574	-3.14492	0.0297	Stationary

Source: Eviews 7.0 output, 2014

The table above has shown the summary results of the stationarity test for profit after tax, advertising cost, and sales revenue for the selected food and beverages firms in Nigeria. As indicated in the table, all the values of Augmented Dickey-Fuller test statistics are greater than their corresponding t-statistics at 5% level. This implied that the data are stationary and using them would not lead to a spurious regression results. This could also be confirmed by the probability values of the respective variables which are less than the 5% test criteria.

### Test of Hypotheses

The tests for the hypotheses for the study were summarized in tabular form and presented as shown below.

#### Test of Null Hypothesis One ( $H_{01}$ )

The results of the relationship between advert costs and the sale revenues of the selected food and beverages firms in Nigeria are presented below.

#### Test of Hypothesis One using Equation (1)

Variable	Coefficient	t-statistic	Probability
<b>Constant</b>	1.057E11	2.147	0.055
<b>Advert Cost</b>	0.214	0.290	0.777
<b>R<sup>2</sup></b>	0.008		
<b>Adj. R<sup>2</sup></b>	- 0.83		
<b>F-Statistic</b>	0.084		
<b>F-Statistic(Prob.)</b>	0.777		
<b>Durbin-Watson</b>	2.141		
<b>Observations</b>	13		

Source: SPSS Output 17.0, 2014

The table above portrayed the output of the result of Ordinary Least Square (OLS) conducted. The coefficient of the determination for the study r-squared is 0.008 i.e. 8% while its adjusted r-squared is -0.083 i.e -83%. This implied that the level of the relationship that exist between total sales and advert costs for the food and

beverages firms in Nigeria is accounted up to 8%. The remaining 92% is explained by other factors not explicitly captured by the model.

Null hypothesis one stated that there is no significant relationship between advertising costs and the sales revenue of the selected food and beverages firms in Nigeria. Thus, the coefficient of  $b_1$  stood at 0.214 indicating a positive relationship with the sales revenue of the firms in (table 4.3) above. At 0.05% level of significance, the result showed a statistically insignificant relationship between advertising costs and the sales revenue of the firms in Nigeria. Since the p-value of 0.777 is greater than 0.05% level of significance, we accepted the null hypothesis and concluded that there is no enough evidence to suggest a significant relationship between advertising costs and the sales revenue of the firms under study. We therefore concluded that the model is not fit. We are 95% confidence that the slope for advert cost is somewhere between -2.634 and 2.140. In other words, it implied that we are 95% confidence that for every single unit increase in advert cost, the sales revenues decrease between -2.634 and 2.140 (see appendix).

### Test of Null Hypothesis Two ( $H_{02}$ )

The results of the relationship between advert cost and the profitability of the food and beverages firms in Nigeria are presented below.

**Summary of Results for the Test of Hypothesis Two using Equation (2)**

Variable	Coefficient	t-statistic	Probability
Constant	-5.988E9	4.067	0.002
Advert Cost	0.086	3.923	0.002
$R^2$	0.583		
Adj. $R^2$	0.545		
F-Statistic	15.390		
F-Statistic(Prob.)	0.002		
Durbin-Watson	1.609		
Observations	13		

Source: SPSS output 17.0, 2014

In the above result, the measure of the relationship between the variables which is represented by the value of r-squared is 0.583 i.e 58% with the adjusted r-squared of 0.545 i.e 55% for the food and beverages firms in Nigeria. This result implied that only 58% of the variable accounted for the profitability of the firms while the remaining 42% are explained by other factors not captured in this study.

Null hypothesis two stated that there is no significant relationship between advertising costs and the profitability of the firms in Nigeria. Thus, the coefficient of  $b_2$  stood at 0.086 showing a positive relationship with the profitability of the firms in (table 4.4) given above. At 0.05% level of significance, the result indicated a



statistically significant relationship between advertising costs and the profitability of the firms in Nigeria. Since the p-value of 0.002 is less than 0.05% level of significance, we rejected the null hypothesis and concluded that there is enough evidence to suggest a significant relationship between advertising costs and the profitability of the firms. We therefore concluded that the model is fit. We are 95% confidence that the slope for advert cost is somewhere between 2.748 and 9.228. In other words, it implied that we are 95% confidence that for every single unit increase in advert cost, the profitability increase between 2.745 and 9.228 (see appendix).

## **Discussion of Findings**

In this study, the results of the regression for the equation 1 i.e. first hypothesis test revealed that there is no significant relationship between advertising expenditure and sales revenue of the firms under study. The coefficient of determination represented by r-squared is 8% for the firms explaining that the variation in sales revenue was signified by advertising up to 8% for the firms while the remaining 92% is determined by other factors, such other than advertising such as; competitors' price, the reputation of the company, brand name, sales promotion, product features, product quality and customers' loyalty which were not captured by the model. The p-value of 0.777 is greater than the 0.05% level of significance. Thus, the hypothesis one which stated that there is no significant relationship between advertising costs and the sales revenue of the food and beverages firms in Nigeria is upheld. We are 95% confidence that the slope for advert cost is somewhere between -2.634 and 2.140. In other words, we are 95% confidence that for every single unit increase in advert cost, the sales revenues decrease between -2.634 and 2.140 (see appendix).

The results were not consistent with prior findings of Okeji (2008), Nigeria data; Abiodun (2011), Nigeria data; Akeem (2011), Nigeria data; Akanbi & Adeyeye (2011), Nigeria data; Olufayo, Ladipo & Bakare (2012) Nigeria data who found significant relationship between advertising costs and the sales revenues of the various companies respectively. Thus, the implication of this finding is that advertising cost had not made a significant impact on the sales revenue of the firms under study for the period of the study.

In this study, utilizing equation 2 of the regression model i.e. second hypothesis test, it was found that there is a significant relationship between advertising costs and profitability of the firms. The coefficient of determination as given by 54% shown that advertising significantly made impact on the profitability of the companies under study. Thus, the p-value in the above table is 0.002 which is less than 0.05% level of significance. Thus, the second hypothesis which stated that there is no significant relationship between advertising costs and the profitability of the food and beverages firms in Nigeria is rejected. It is therefore concluded that advertising is capable of increasing reasonably the profitability of the companies.

The findings have far reaching implications for the promotional policies of the manufacturing firms. This is because the results were consistent with prior findings of the studies of Comanor and Wilson (1967), Chicago data; and Carl and David (n.d) Germany data who found significant relationship between advertising costs and the profitability of the various companies respectively. We are 95% confidence that the slope for the advert cost

is somewhere between 2.745 and 9.228. This has shown that we are 95% confidence that for every single increase in advert cost, the average profit for the firms increase between 2.745 and 9.228 (see appendix). The implication of this finding is that advertising cost has shown strong capacity to impact positively on the profitability of the firms.

## Conclusion and Recommendations

Advertising is a persuasive communication which attempted to change or reinforce one's prior attitude and it is basically done not only to inform customers about products, rather it is a process which further influences and persuades customers to purchase.

It could be concluded by stating that advertising is considered as one of the most important medium of communication influencing the company's performance in more than one ways if properly utilized. But its influential roles could be suppressed by other factors which also seek equal attention at the time of framing up any sales and profitability promotion policy.

Based on the findings and the conclusion reached in this study, the following recommendations were made:

- i. The management should emphasize on advertising as an important and strategic policy aimed at increasing sales revenues of the firms while formulating creative advertising entrepreneurial marketing strategies relating to sales revenue and profitability promotion policy. This could be achieved through the commitment of more financial resources and the enhancement of advertisement budgets from time to time in tandem with economic realities.
- ii. We recommended that there is the cogent need for the management to review their existing advertising policy on their products so that multiple approaches could be used in a cost effective manner to reach out to target consumers and by implication increase sales revenues for the firms.
- iii. Other factors which are crucial to increase sales revenue and profitability such as sales promotion, personal selling and publicityetc. which are important shouldbe considered while formulating promotion policy for thefirms.
- vi.Finally, management should use the right medium of advertising so that the message would reach the target consumers with the right products. By doing so,a large number of consumers would be reached. This could help to increase the patronage of the buyers leading toimproving the sales revenue of the companies in Nigeria.

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## APPENDIX

### STATIONARITY TESTS

Null Hypothesis: PAT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.830951	0.0161
Test critical values: 1% level	-4.121990	
5% level	-3.144920	
10% level	-2.713751	

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

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 12

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(PAT)

Method: Least Squares

Date: 23/02/2015 Time: 00:22

Sample (adjusted): 2000 2012

Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PAT(-1)	-1.212705	0.316555	-3.830951	0.0033
C	1.50E+10	5.68E+09	2.638631	0.0248
R-squared	0.594751	Mean dependent var		1.86E+09
Adjusted R-squared	0.554226	S.D. dependent var		2.35E+10
S.E. of regression	1.57E+10	Akaike info criterion		49.94317
Sum squared resid	2.47E+21	Schwarz criterion		50.02399
Log likelihood	-297.6590	Hannan-Quinn criter.		49.91325
F-statistic	14.67618	Durbin-Watson stat		1.978165
Prob(F-statistic)	0.003314			

Null Hypothesis: ADVERT has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.228238	0.0100
Test critical values:		
1% level	-4.200056	
5% level	-3.175352	
10% level	-2.728985	

\*MacKinnon (1996) one-sided p-values.  
 Warning: Probabilities and critical values calculated for 20 observations  
 and may not be accurate for a sample size of 11

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(ADVERT)  
 Method: Least Squares  
 Date: 23/02/2015 Time: 00:28  
 Sample (adjusted): 2000 2012  
 Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ADVERT(-1)	12.86315	3.042201	4.228238	0.0029
D(ADVERT(-1))	-34.31431	12.32504	-2.784115	0.0238
C	-2.07E+10	2.17E+10	-0.955723	0.3672
R-squared	0.690981	Mean dependent var		2.16E+10
Adjusted R-squared	0.613726	S.D. dependent var		6.60E+10
S.E. of regression	4.10E+10	Akaike info criterion		51.93943
Sum squared resid	1.35E+22	Schwarz criterion		52.04795
Log likelihood	-282.6669	Hannan-Quinn criter.		51.87103
F-statistic	8.944167	Durbin-Watson stat		1.961029
Prob(F-statistic)	0.009119			

Null Hypothesis: SALES has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.462574	0.0297
Test critical values:		
1% level	-4.121990	
5% level	-3.144920	
10% level	-2.713751	

\*MacKinnon (1996) one-sided p-values.  
 Warning: Probabilities and critical values calculated for 20 observations  
 and may not be accurate for a sample size of 12

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

Date: 23/02/2015 Time: 00:29  
 Sample (adjusted): 2000 2012  
 Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SALES(-1)	-1.077530	0.311194	-3.462574	0.0061
C	1.27E+11	5.95E+10	2.134420	0.0586
R-squared	0.545236	Mean dependent var		1.07E+10
Adjusted R-squared	0.499759	S.D. dependent var		2.41E+11
S.E. of regression	1.70E+11	Akaike info criterion		54.70900
Sum squared resid	2.90E+23	Schwarz criterion		54.78982
Log likelihood	-326.2540	Hannan-Quinn criter.		54.67908
F-statistic	11.98942	Durbin-Watson stat		2.036235
Prob(F-statistic)	0.006096			

### Regression for Advert Costs and Profit After Tax

#### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.764 <sup>a</sup>	.583	.545	4.92533E9

a. Predictors: (Constant), ADVERT

b. Dependent Variable: PAT

#### Model Summary<sup>b</sup>

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.583	15.390	1	11	.002	1.609

b. Dependent Variable: PAT

**Regression for Advert Costs and Total Sales**

**Model Summary<sup>b</sup>**

Model				
	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.087 <sup>a</sup>	.008	-.083	1.64653E11

a. Predictors: (Constant), ADVERT

b. Dependent Variable: SALES

**Model Summary<sup>b</sup>**

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.008	.084	1	11	.777	2.141

b. Dependent Variable: SALES