Advertising and Firms' Performance: An Empirical Analysis

BY

NIKHIL GUPTA

ROLL NO. 0624

e-mail: nikhil_economics@yahoo.co.in

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ADVISORY COMMITTEE

DR. RUPAYAN PAL

DR. J. KAJALE

DR. R. NAGARAJAN

ABSTRACT

This paper empirically examines the effect of advertisement expenditure on the firms' performance in three industries of different nature – Automobile industry, Textiles industry and Food industry. Taking data of all the three industries together, it is shown that the impact of advertisement intensity on sales is positive and significant while it has significant adverse effect on profitability. In case of automobile industry, advertisement intensity has positive and significant effect on both the performance variables, sales and profitability. However, in case of textiles industry and food industry, it seems that advertisement intensity has negative and significant effect on profitability, as in case of all three industries considered together in the analysis.

Keywords: Advertisement, Performance, Sales and Profit.

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"Advertising has been defined as the dissemination of information concerning an idea, services or products to compel action in accordance with the interest of advertisers".

M. Banerjee.

"Advertising consists of all the activities involved in presenting to a group, a non-personal, oral or visual, openly sponsored message regarding a product or services, or idea".

Stanton.

"*I am a part of that school, which believes, that a good advertisement is the one that sells the products without attracting the attention to oneself. It should attract the attention of the reader to the product. Instead of saying "what a smart advertisement", the reader should say "I didn't know this before. I must try this product".*

David Ogilvy

1. INTRODUCTION:

The roots of the Indian advertising go back to the 18th century when hawkers called out to the public to have a look at their wares. However, economists started to look at it as a matter of their concern in 20th century, since earlier it was used by merchants and its transition to the "big business" is more recent. In fact the development of transport and communication and the liberalization of the economy have contributed to the development of interest to this area and to the growth of this industry to attract more and more spectators.

India, today, is regarded as the second fastest growing economy in the world, enjoying an average growth rate of about 9.6% for the fiscal year 2006-07. With this high growth it has become such an attractive market for the world that all producers are innovating methods everyday to inform more and more people about their products. Consequently, the increased competition among industrial players, the changing behavior of the Indian consumers and an increase in the number of advertising mediums has, not surprisingly, led to a huge amount of expenditure on advertising.

Advertising is an art used to familiarize public with the product by informing of its description uses, its superiority over other brands, sources of its availability and price etc. It implies the promotion of goods, services, companies and ideas with the primary objective of creating /enhancing the demand for the product being advertised. Advertising is not only merely propaganda but it is a paid form of communication. The advertisers

have to pay for the space and time used to communicate the message to their (prospective) customers.

According to the conventional wisdom, advertising increases the demand of the products and thus it helps the firms. The aim of this dissertation is to examine impact of advertising on firms' performance. For this purpose, we have used firm level data of Automobile industry, Textiles industry and Food industry in India from 1997 to 2006.

The motivation behind doing this dissertation is because of two main reasons. First, the expenditure on advertisement in India and globally, is so huge that a researcher can't remain unaffected and would be forced to go in detail. According to Jonathan Barnard, head of publications, Zenith Optimedia, advertisement expenditure in India is expected to increase from 0.50% of the Gross Domestic Produce (GDP) to 0.53% over the next three years. In fact, they expect India's total advertising expenditure to be Rs. 26,532 crore (Rs. 265.32 billion) this year in comparison with Rs 22,721 crore in 2007, recording a 17 per cent growth.

Making a global forecast, Zenith Optimedia predicts that the global ad expenditure will grow to 6.7 per cent in 2008, up from 5.3 per cent in 2007, thanks to the Olympic Games, elections in the US and European football. The total world advertising expenditure, according to Zenith Optimedia, will touch be $485 billion in 2008 up from $455 billion this year.

Secondly, existing literature on advertising and firms performance primarily focuses on US, UK, Australia & other developed countries. Literature on developing countries like

India is very rare. We note that there is a study that analyses cross-cultural content of advertising from the US and India (Niaz Ahmed, 2000). However, it examines the characteristics, similarities and differences in the advertising strategies in the US and India. It does not analyse the effects of advertisement on the performance of a firm.

According to Braithwaite (1928), advertising is a part of the total cost which is different from the production cost as well as selling cost. It is actually that part of cost which is not incurred in order to produce the goods or to put the goods in the market, in fact it's that part of the cost without which the demand curve would be too low. It is an expenditure which is not indispensable to the marketing of the commodities, however, it is made deliberately in order to create more demand, i.e. to shift the demand curve up or to induce the consumers to buy more of the commodity at the given price or pay high price for the given units of commodity purchased or may be to buy more at a higher price. However, in modern business it is taken as a part of the selling & distribution expenses which, in turn, increases the cost of production.

Now if advertising increases the cost for the firm, it implies that it affects many other accounting variables of the firm, for example, the increased cost of production affects the prices charged by the firm for its product leading to a change in the total sales of the firm which will change the profits of the firm and thus the overall performance of the firm will be affected. This is exactly what we will be looking ahead in this paper.

However, since it costs the firms to advertise they have an incentive to create fancy pictures in the minds of the consumers to persuade them to purchase more commodities so that they can cover the expenses of the advertisement from the consumer's pocket and

can earn some extra profit over and above the total cost incurred including the advertising cost. If true information is being given in the advertisement then consumer's decision / judgement would be based on the facts and thus would overall lead to a higher satisfaction of the society, however, most of the times this is not the case. Thus, it is not always necessary that the consumers respond to the advertisement by demanding more. Though the detailed discussion of this issue is not the motivation of this paper, it is very important to look at the ways in which consumers respond to the advertisement because that will give us an idea of why do firms advertise?

As economists have struggled with this question, three views have emerged with each view being associated with distinct positive and normative implications:

1.) **The persuasive view** - This is the most highly accepted view among the economists. By various appeals advertisement induces the consumers to change their subjective valuation of the commodity. It changes the consumers' tastes and behavior in favor of the advertised products thus, creating a spurious kind of product differentiation leading to a less elastic demand of the advertised goods. Thus it helps the producers to charge a higher price for their advertised commodities because the price tend to be equal to the "true" cost of production of the commodity plus what the producer thinks it worth to add in the way of the advertisement costs. In addition, advertisement by the incumbent or established firms might lead to barriers to entry by making it more difficult for the new entrants to create the reputation that the established firms have already made and thus it becomes hard for the new entrants to find a market for their products. These kinds of barriers can easily be found in the markets which are highly

concentrated or where there are economies of scale in production and/or advertising. If this view is right then the sums spent on advertising are not on par with other costs, and can't be considered as part of the ordinary cost of production of the commodity. Thus, in short, according to persuasive view, advertising leads to the anti-competitive effects, as it has no real value but creates an artificial product differentiation to stimulate the sales and thus, results in concentration.

2.) **The informative view** – This view emerged in 1960s, under the leadership of the Chicago School. There are many markets that are characterized by imperfect consumer information because there is considerable amount of expenditure in form of huge search costs. Thus, consumers don't have much information about the quality, price, or even existence of several products. This imperfect information leads to the market inefficiencies for which advertising acts as a solution by providing information to the consumers. So, advertising is not a cause of the problem in fact it's the endogenous solution to the imperfect market. It is due to advertising that consumers come to know about the products at a low cost. In return it makes the demand of the existing products more elastic and thus gives new entrants an incentive to enter the market. Therefore, it is considered to have pro-competitive effects and hence, it is sometimes claimed that advertisement raises the standard of living and educates the public by increasing their wants and pointing out to them the use and desirability of the advertised commodities.

3.) **The complementary view** – Sometimes, advertising doesn't change the preferences of the consumers according to the persuasive view nor does it provides any new or useful information to the consumers as said in the informative view. In fact consumers who are induced to increase their purchase of advertised goods do so because the marginal utility that they derive from that commodity has been raised. That is, by advertising, advertisers try to increase the social value of the consumers and the consumption of the products may generate higher satisfaction to the customers in the form of the prestige that they get when they use that advertised products.

As said, these three views are the most widely accepted views as far as the consumer's response to the advertising is concerned, though economists were never able to get to a uniform result on which view is dominant or more preferable. Braithwaite (1928) contributes significantly toward a conceptual foundation for the persuasive view. The persuasive view of advertising is further advanced by Kaldor (1950). The formal foundation for the information view is laid by Ozga (1960) and Stigler (1961). In Telser's (1964) influential effort, the theoretical and empirical foundations for the informative view are significantly advanced. The complementary view is also associated with the Chicago School. Important elements of this view are found in Telser's (1964) work, but Stigler and Becker (1977) offer a more complete statement of the central principles. Due to shortage of time we have not done anything towards this area, however the mention of these views was indispensable in this paper.

2. EXISTING LITERATURE:

A huge literature has already been devoted to the advertisement theory and much work has been done in relation to the inter industry comparisons; however it is not recent when the effects of advertisement was seen on an intra-industry level or firm level. Since this paper is also on the same line, a look at the existing literature from this perspective is essential. There are several questions that surround our mind when we start talking about the effects of advertising like does it always lead to an increase in the sales of a firm? Is it always profitable for the firm to advertise? If yes, then what all variables measuring the performance of the company are getting affected due to advertising? Does advertisement increases the demand of the whole industry as more people are aware of the product or it just redistributes the sales among the various firms in the industry to cancel the aggregate effect? Does it work as an informative tool for the uninformed customers or it merely creates brand loyalty in form of less elastic demand for the advertised product due to the conventional wisdom that only high quality goods are advertised? Some of these questions have been investigated in details and some are still unanswered. How we will contribute to the existing literature is by trying to look at the effects of advertisement on the various performance measures and since much work has not been done to unfold its effects n Indian industries, its' not a bad idea to take this issue.

The positive relationship between the advertisement and sales are reported for the US Auto industry by John E. Kwoka, Jr. (1993), where he showed that advertising in the auto industry increases a car's model sales but it is short-lived. Seldon & Doroodian (1989)

showed that advertising increases demand of the cigarette in the US and that health warnings reduce the consumption of cigarettes. In fact, the interesting point he made is that the industry reacts to the health warnings by increasing its advertising. Nerlove and Waugh (1961) investigated the same relationship in the US orange industry by stating that industry output must always increase with the increase in the advertisement expenditure. While we have these papers, there are studies that reported the negative relationship between advertisement expenditure and sales like Baltagi and Levin (1986) used a dynamic demand for cigarettes and indicated insignificant income elasticity and significant low price elasticity. Similar negative relationship was worked out in the US cigarette industry by Hamilton (1962).

In addition to these findings, it was concluded that (i) rival's advertising reduces the effect of our own positive advertising efforts and thus the overall effect of the advertisement on primary demand is difficult to determine and appears to vary across industries. (ii) The industry, to some extent, believes that advertising mitigates the effects of health warnings and thus responds to them by increasing their total advertisement expenditures. (iii) Stronger anti smoking health warnings are considered second best to the advertising ban.

Telser (1964) gave empirical evidence to show that there exists an inverse relationship between the intensity of competition and the intensity of advertising. Henry Simons, one of the major critics of advertising summed it up neatly when he wrote that " a major barrier to really competitive enterprises and efficient service to consumer is to be found in advertising – in national advertising especially- and in sales organisation which cover

great regional or national areas." Boulding, Lee and Staelin (1994) used longitudinal and cross-section PIMS (Profit Impact of Market Strategies) data, in order to assess at the business-unit level the effect of advertising on demand elasticity. They report evidence that current advertising reduces future demand elasticity for firms that price above the industry average.

Coming to the other aspect like whether high quality firm or low quality firm engages in high advertising there is huge signaling literature on advertising spending. Hao Zhao (2000) found that the high quality firm will reduce advertising spending and increase price from their respective complete information levels. The intuition behind this is that when information is incomplete, the high quality firm cannot exploit its advantages. Whenever its advantages in quality or MC are lessened, a firm will want to spend less on advertising. Nelson (1974b) explained the way in which advertising as information operates. Manufacturers of experienced goods can increase the demand by advertising heavily, lowering the prices and increasing the quality; however, consumers have greater marginal revenue for search goods as compared to the experienced goods.

3. MEASURES OF FIRM'S PERFORMANCE:

The primary aim of this dissertation is to see the impact of advertisement expenditure on the performance of a firm. We have seen some of the existing literature on the advertisement effects thus; it becomes important to talk about the other side of the discussion, namely, the performance of a company.

Measuring performance of a company is not an easy task. As industries and firms approach the twenty-first century, they are being confronted by business environments markedly different from those of the past.

As customers have become increasingly educated and understand their requirements better, their expectations have increased. Competitors are becoming stronger and global in their perspective. Technological, social, regulatory, and other types of change are, in many cases, accelerating. To be successful in this new environment of the three C's customers, competitors, and change firms must adapt to the changing needs of customers better than their competitors along such dimensions as quality, speed, flexibility, variety, and value. They must employ their resources, including investments in new product development, capital expenditures, and people, productively. This new environment has given the firms an incentive to advertise heavily because in this world of infinite products, it becomes a challenge in itself to make consumers aware of your products. Ultimately, to increase shareholder value a firm must yield a return to its shareholders in excess of its cost of capital.

Different things are advocated to measure performance in a better way. It is said that What many firms need is a performance indicator system that focuses externally on the business environment and its changing demands, on market/customers and competitors, and internally on key non-financial indicators (such as market penetration, customer satisfaction, quality, delivery, flexibility, and value) as well as more typical financial measures (such as sales growth, profits, return on investment, and cash flows). But the way to achieve it is still missing.

Moreover, Key Performance Indicators, also known as KPI or Key Success Indicators (KSI), are defined to measure progress of a company towards organizational goals. But a KPI must be measurable. For example, "Make customers happier" is not an effective KPI without some way to measure the success of your customers. "Be the most convenient drugstore" won't work either if there is no way to measure convenience. These are the basic problems in following the new methods described to measure performance.

Therefore, whatever Key Performance Indicators are selected, they must reflect the organization's goals, they must be key to its success and they must be quantifiable (measurable). Key Performance Indicators usually are long-term considerations. The definition of what they are and how they are measured do not change often.

Should they look at the preferences of their customers or their shareholders, as most of the times they differ? Are they operating efficiently in terms of managing costs, productivity etc.? Is the company strategy's, be it market share, customer acquisition, product/service profitability, working? All these questions, in one or the other way, give some idea of the performance of a company. However, many of these variables are

subjective in nature, and thus data on them is not available. Therefore, even though one can't understand tennis by looking at the scoreboard, we don't have any other option to stick to the budget that includes various financial terms, prepared at regular intervals, to measure actual performance of a company.

The variables that we would be using to measure the performance of a company are:

(i) The ratio of sales to capital employed (Sales_capemp);

(ii) The ratio of profit after tax (PAT) to capital employed (PAT_capemp).

4. DEFINITION OF THE VARIBLES USED:

1) **Sales per unit of capital employed (Sales_capemp):** This is one of the endogenous or dependent variables used in this paper. It is the ratio of the net sales to the capital employed. We have standardized sales by capital employed to take care of the price level. But we would be using "**sales**" equivalent to this ratio, to keep things simple and easy.

2) **Profit after tax (PAT) per unit of capital employed (PAT_capemp):** Profit after tax (PAT) is the residual profit that is left to the shareholders of the company, therefore, it is also known as the net profit. To make it comparable, it is taken as per unit of capital employed. We would be using "**profitability**" for this variable throughout the paper.

3) **Advertisement expenditure per unit of capital employed (Adv_capemp):** In order to make comparison possible among different industries at different time periods, we have standardized advertisement expenditure with capital employed. It also takes care of the change in the price level. To reflect this variable, we would use "**advertisement intensity**" in the paper.

4) **Age:** The age of the company is also taken as one of the independent variable, by deducting year of inception form the current year, to see if profit or sales variable get affected by the age of a firm.

Apart from these dependent and independent variables, we have transformed the variables as and when necessary to take the log of some variables, lag of some variables and the square of some variables.

5. DATA AND DESCRIPTIVE STATISTICS:

This analysis is based on data drawn from the CAPITALINE database published by Centre for Monitoring Indian Economy (CMIE). The database includes detailed accounting information compiled from the annual reports of companies. We have analyzed data of three industries – Automobile industry, Textile industry and Food industry. There are 12 sub-industries that we have analyzed and overall 103 companies. In this section first we will look at the descriptive statistics of these 3 industries and will compare them. Going further, we will compare the descriptive statistics of 12 sub-industries and will look at the firm level comparisons as well to some extent. In between, we will also calculate the correlation (or relationship) between the performance variables and the advertisement variables in different industries.

It is well documented that consumer goods industry is the most heavily advertised industry thus all the three industries we have considered are consumer goods industry. Automobile industry is purely luxury goods industry, Food industry is purely necessary goods industry but textiles industry is a necessary as well as luxury goods industry. In fact, Automobile and textiles industry can be taken as a representative of durable or non-perishable industry, while Food industry can be taken as a representative of non-durable or perishable industry. Thus overall we are comparing the effects of advertisement on two kinds of industries- necessary and luxury goods industry. In our data, we have 5 sub-industries under Automobile industry, namely, LCV/HCV (5), Passenger Cars (5), Motor/Moped (4), Scooters/3 wheelers (6) and Tractors (6), 4 sub-industries in Textiles

industry, namely, Denim Fabrics (5), Embroidery Fabrics (4), Hosiery/Knitwear (18) and Readymade (6) and 3 sub-industries, namely, Large (13), Medium & Small (26) and MNC's (5). With the sub-industries we have given the total number of companies in parenthesis making a total of 26 companies in Automobile industry, 33 firms in Textiles industry and 44 firms in Food industry. We have data for 10 years for most of these companies starting from 1997-98 to 2006-07 but for some companies it is less than 10 years, so we would be using Unbalanced Panel Data.

Looking generally at all the industries in one glimpse (Table 1), we find that around Rs. 15.5 crore a year on an average is spent on advertisement by these 3 industries we have chosen, which is significant. Among them, automobile industry spends the most around Rs. 39 crore a year while food and textiles industry spend approximately Rs. 11 crore and Rs. 0.9 crore a year, respectively on an average. This is an interesting thing because automobile and textiles industry, both are consumer durable goods industry, still the difference in their advertisement expenditure is significantly large. Similarly, textiles and food industry can be taken as necessary goods industry, still their difference is significant. Looking at the trend in the investment & capital expenditure, where automobile industry is the most heavily invested industry and textiles industry indulges in least investment though food industry is also not far ahead of textiles. It is not surprising to find that automobile industry is highly intensive in capital, spending on an average Rs. 1287 crore a year; its cost of production is also far ahead of that in either of food industry or textiles industry since the technology that is required for automobile industry is much innovative & expensive than in any other of the two industry. This all look pretty natural, however not to forget that we are talking about the expenditures in absolute terms, they

have not been adjusted for the price level nor have we looked at the degree of variation among the firms and sub-industries. Hence, an insight of the industries with some adjustments is required to see if all these findings remain intact.

Table 1. Descriptive Statistics of some variables

Industry group	Capital employed			Investment			Advertisement expenditure		
	n	mean	s.d.	n	Mean	s.d.	n	mean	s.d.
Automobile Industry	240	1287.034	1825.965	241	381.0606	889.5233	241	39.27054	64.60275
Textiles Industry	291	230.0665	541.4791	294	27.75146	65.25209	282	0.885177	3.785563
Food Industry	365	140.1803	415.8764	367	35.92591	152.6385	365	11.1277	31.3949
All Industries	896	476.5661	1139.182	902	125.476	495.4498	888	15.51287	42.04239

Source: CAPITALINE, CMIE database

To look at the degree of variation, we have used the most commonly used and universally accepted measure of dispersion, namely, standard deviation. And to adjust for price level we have taken the ratio of two financial variables, for example, sales per unit of capital employed, advertisement per unit of capital employed etc. Thus, now on in this paper, whenever we talk of any variable, we mean the ratio of that variable with respect to capital employed. It will help us in two ways- (i) we don't need to worry for different level of inflation and different price levels at different time periods; and (ii) since we are talking about 3 industries that are very different in their magnitude of money spent, ratios will help us to make comparisons possible.

5.1 INDUSTRY LEVEL COMPARISONS:

We find that average advertisement expenditure per unit of capital employed (Adv_capemp) is 5.00 in the automobile industry, .0.80 in the textiles industry and 6.44 in the food industry. But are they really statistically and significantly different from each other? This is what we will find out in this section. We will compare the descriptive statistics of some important variables at the industry level.

To answer the above question we need to find out the student's t ratio. We calculate the t statistic pair-wise since it's not possible to take all the 3 industries at one time. The null hypothesis, denoted by Ho, would be that the difference between the mean of automobile industry and textiles industry or automobile industry and food industry or textiles industry and food industry is zero. The alternate hypothesis, denoted by Ha, would be whether the difference is greater than or less than zero, i.e.

Ho: mean (automobile) – mean (textiles) = 0;

and, Ha: mean (automobile) – mean (textiles) > 0;

or, mean (automobile) –mean (textiles) < 0;

We would be using one-tailed test since the alternative hypothesis is that either the difference is greater than or less than zero. Therefore, if we reject the null hypothesis based on the t-statistic, we can conclude that the difference between the variable of two industries is significantly different from zero, i.e. they are not same but if we don't reject

the null hypothesis, then we can say that the difference is not statistically different from each other. As far as level of significance is concerned, by looking at the p-limit value, we can find out the lowest level of significance at which null hypothesis can be rejected. Though there is no hard & fast rule of what level of significance should be chosen, we would take a difference to be significant if null hypothesis can be rejected at 10% level of significance. We will repeat this exercise for all the variables we are taking into consideration, first industry wise and then at the sub-industry level.

Before going into the summary statistics of the important variables, we will look at the correlation coefficient between these variables. Table 2 summarizes these correlations where star implies the significance at 10% level.

Table 2. Correlation Coefficient of performance variables with respect to the advertisement intensity

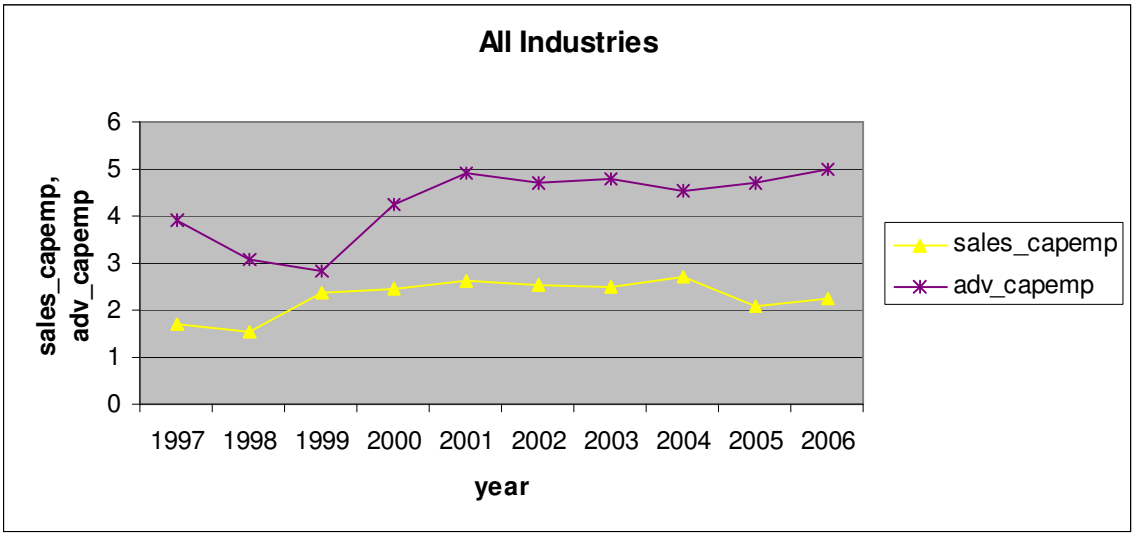
	Sales_capemp	PAT_capemp
All Industries	0.2450*	-0.0599*
Automobile Industry	0.3868*	-0.3053*
Textiles Industry	0.3756*	-0.0359
Food Industry	0.1806*	-0.0479

Table 2 shows that when we take the pooled data of all the 3 industries, the correlation coefficient between sales and advertisement intensity is positive and highly significant, while the correlation between profitability and advertisement intensity is negative and highly significant at 10% level. Thus, it is evident that advertisement intensity significantly affects both the performance variables.

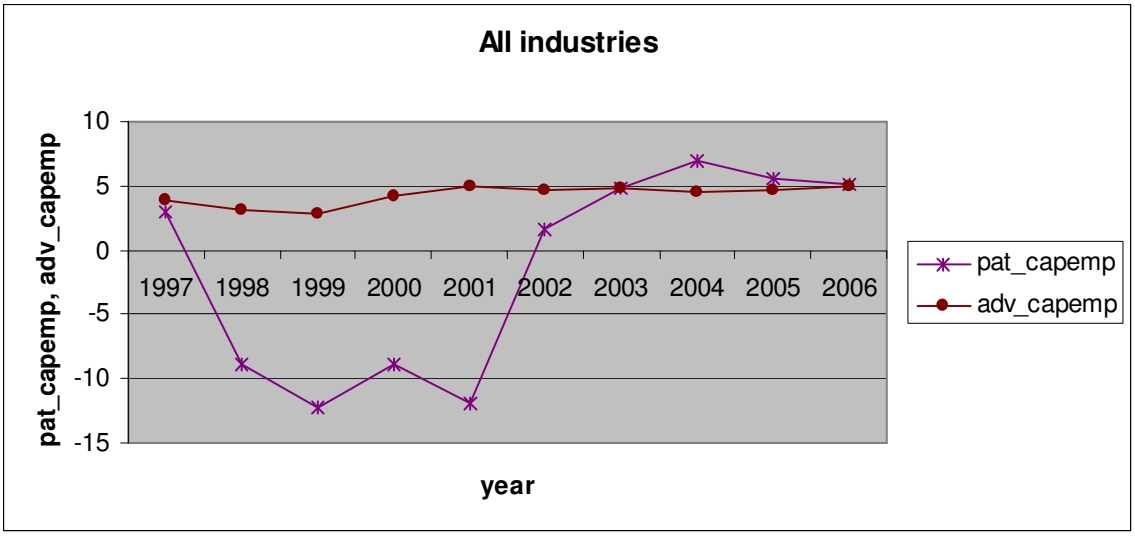
However, when we look at the correlation between sales and advertisement intensity industry wise, it comes out to be positive and significant for all of them while the correlation between profitability and advertisement is negative for all the 3 industries though it is significant only for the automobile industry.

Showing these correlation coefficients graphically in graphs 1 to 4, we can see that for the entire data of all the 3 industries, advertisement intensity affects sales positively while profitability is negatively affected by it. And though the effect of advertisement intensity on sales is significant and positive for the three industries, it affects profitability negatively though significant only in one industry, namely automobile industry.

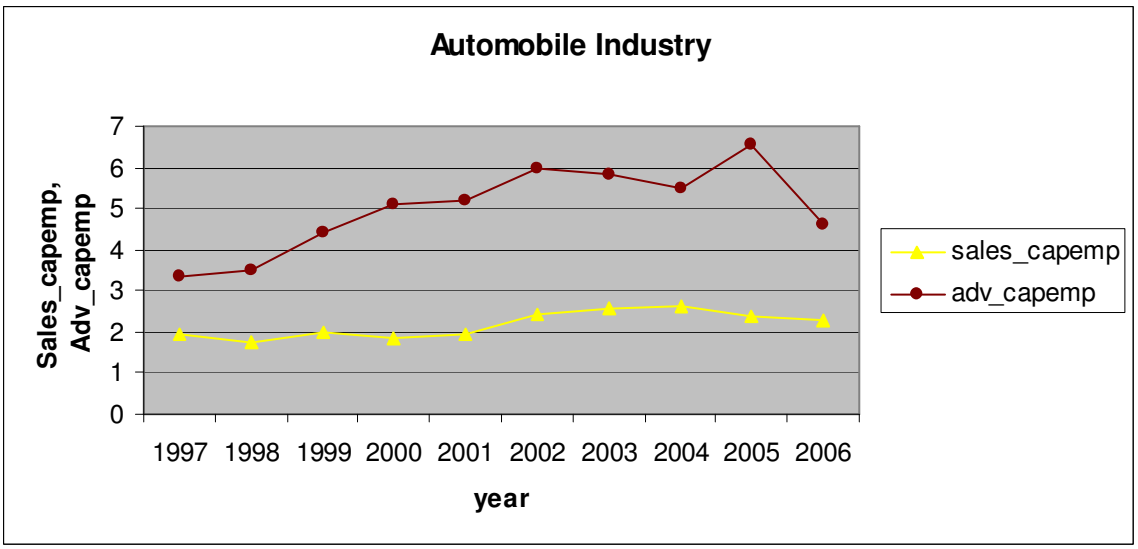
Graph 1. Sales_capemp and Adv_capemp for all 3 industries



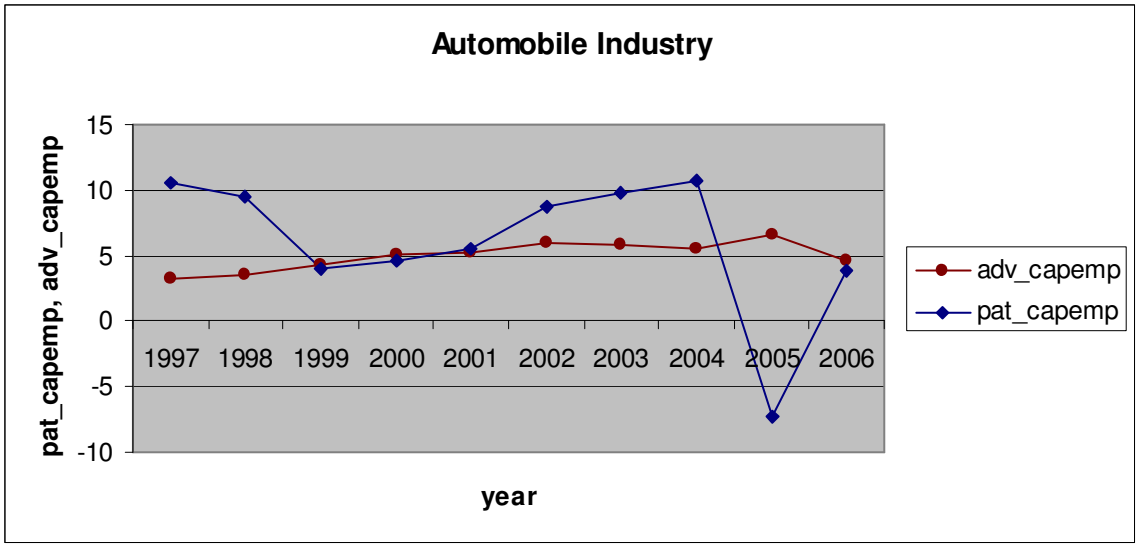
Graph 2. PAT_capemp and Adv_capemp for all 3 industries



Graph 3. Sales_capemp and Adv_capemp for the Automobile Industry



Graph 4. PAT_capemp and Adv_capemp for the Automobile Industry



After examining of the correlation coefficients between the performance variables and the advertisement variable, now we move our attention to the summary statistics of these variables. Table 3 summarizes the descriptive statistics of sales, profitability and advertisement expenditure of the entire data and the industry wise.

Sales: Comparing sales between Automobile industry and textiles industry, with null hypothesis, Ho: diff = 0 and alternate hypothesis, Ha: diff > 0, we can reject the null hypothesis because the p-value is 0.00 and we can conclude that the average sales is higher in the automobile industry than the textiles industry. Similarly, Food industry shows significantly higher sales than the other two industries. Thus, we can say that sales are highest in the food industry as compared to the other two industries.

Table 3. Descriptive Statistics of the important variables (Industry-wise)

Industry group	Sales_capemp			PAT_capemp			Adv_capemp		
	n	mean	s.d.	n	Mean	s.d.	n	mean	s.d.
Automobile Industry	240	2.155083	1.445626	240	0.060208	0.302618	239	5.008216	7.403163
Textiles Industry	291	0.934055	0.750828	291	-0.05333	0.738942	273	0.804797	3.692756
Food Industry	365	3.474685	5.927504	365	-0.04301	0.676555	351	6.444615	13.54939
All Industries	896	2.296083	4.025594	896	-0.01872	0.624374	863	4.262726	9.992828

Profitability: As shown in table 2, the profitability is positive only in the Automobile industry while it is negative in the other two industries. Based on the t-test as shown in table 4, we can conclude that automobile industry has statistically and significantly higher profitability as compared to the other two industries, while they are not significantly different between the textiles and food industry even at 10% level.

Table 4. t-test between the profitability of automobile and textiles industry

	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
x	240	0.06	0.019494	0.302	0.021598	0.098402
y	291	-0.053	0.043262	0.738	-0.138148	0.032148
combined	531	-0.00193	0.02539	0.585072	-0.051804	0.047951
diff		0.113	0.050827		0.0131523	0.212848
diff = mean(x) - mean(y)			t = 2.2232			
Ho: diff = 0			degrees of freedom = 529			
Ha: diff < 0		Ha: diff != 0			Ha: diff > 0	
Pr(T < t) = 0.9867		r(|T| > |t|) = 0.0266			Pr(T > t) = 0.0133	

Advertisement intensity: As we mentioned earlier that food industry has the highest sales as compared to other industries, it is shown by the t-statistic that food industry spends most on the advertisement as well. Thus, the positive and significant correlation coefficient between sales and advertisement intensity is also understandable. Though between automobile and textiles industry, automobile industry is the much more advertisement intensive.

5.2 INTRA-INDUSTRY COMPARISONS:

Some of the things that we investigated and discussed so far and agreed upon now is that food industry has statistically highest sales and spends most on the advertisement but automobile industry have statistically and significantly highest profitability. However, in this section we will see the differences in the sub-industries of the 3 industries in terms of sales, profitability and advertisement intensity.

As shown in table 5, we can conclude that within the automobile industry, LCV/HCV has the statistically highest sales using the t-statistic. Readymade sub-industry of textiles industry has the significantly highest sales as compared to the other sub-industries of textiles industry. Coming to the food industry, sub-industry MNC's lead in sales. Comparing between the sub-industries of 3 industries, MNC's has the statistically and significantly highest sales among all the 12 sub-industries.

Table 5. Descriptive Statistics of Dependent variables (sub-industry wise)

SUB INDUSTRIES	Sales_capemp			PAT_capemp			Adv_capemp		
	n	mean	s.d.	n	Mean	s.d.	n	mean	s.d.
LCV/HCV	50	3.0832	2.072897	50	0.104	0.122041	50	6.406199	10.0408
Passenger cars	42	1.816429	1.029056	42	0.054762	0.129129	42	2.984533	3.264675
Motor/Moped	38	2.557368	1.52684	38	0.136842	0.244276	37	8.832704	4.70284
Scooters/3 wheelers	51	1.981961	0.94769	51	-0.05588	0.553509	51	6.838196	9.933516
Tractors	59	1.500169	0.759679	59	0.077966	0.181989	59	1.283817	1.53656
Denim Fabrics	49	0.889388	0.500639	49	-0.01286	0.240849	49	0.310836	0.709107
Embroidery Fabrics	38	0.421579	0.254766	38	0.00579	0.049573	36	0.039471	0.071141
Hoseiry/Knitwear	162	1.00216	0.779819	162	-0.02136	0.457488	156	0.160533	0.407416
Readymade	42	1.187143	0.957981	42	-0.27738	1.705739	32	5.562954	9.566062
Large MNC's	112	4.401964	6.618377	112	-0.11071	1.04448	112	4.327845	8.656232
Medium/Small MNC's	205	1.993024	2.440871	205	-0.07385	0.435364	191	4.210242	14.31929
MNC's	48	7.638958	10.65215	48	0.246667	0.212166	48	20.27469	11.61753

Talking about the profitability, within the automobile industry, two sub-industries, LCV/HCV and Motor/Moped, have statistically same profitability but significantly higher than the other sub-industries in the automobile industry. In the textiles industry, all sub-industries show profitability which is not statistically different from each other at the conventional 10% level of significance. MNC's shows the statistically and significantly higher profitability compared to the other sub-industries of the food industry. And surprisingly though automobile industry showed the statistically highest profitability, MNC's, a sub-industry of Food industry shows the highest profitability among the 12 sub-industries.

Coming to the independent variable, advertisement intensity within the automobile industry, Motor/Moped and Scooters/3 wheelers spend statistically indifferent amount on advertisement intensity, while significantly higher than the other sub-industries. Within the textiles industry, readymade sub-industry has the significantly highest advertisement intensity and MNC's spends the most among the sub-industries of the food industry. Among all the 12 sub-industries, MNC's has the highest advertisement intensity, which is not surprising since this sub-industry has the highest sales and profitability as well.

One more interesting thing to notice is that 9 out of 12 sub-industries (75%) show positive and significant correlation between sales and advertisement intensity, while one sub-industry shows negative and significant relationship. Correlation between profitability and advertisement intensity shows really diverse picture. Overall, 5 sub-industries show significant correlation of which 3 sub-industries show positive and 2 sub-industries show negative correlation. Interestingly, none of the textiles sub-industry shows significant correlation coefficient.

5.3 FIRM LEVEL COMPARISON:

To understand the high tides in the sea we need to see what's there in the bottom. To understand the life of a plant we need to see what's there in the routes. Similarly, to understand the variations in any data, we need to disaggregate it as much as possible. Therefore, to see the reason of differences in the averages of two variables at the industry level, we looked the differences in the averages at the sub-industry level and to see the reason for differences in the averages at the sub-industry level, we must look at the averages at the firm level.

We will cover only some companies that show interesting results and that are important in explaining the results that we have talked about in the industry and intra-industry comparison. First thing to note is that out of 103 companies, almost 38% of the companies (for which data is available on these variables) show the positive and significant correlation between Sales and advertisement intensity. While almost 25% companies (for which data is available on these variables) show significant relationship between profitability and advertisement intensity, of which 70% companies show positive and merely 30% of the companies show negative relationship.

Table 6. Descriptive statistics of some firms in the Automobile industry

Variable	sales_capemp			PAT_capemp			adv_capemp		
	n	mean	s.d.	n	mean	s.d.	n	mean	s.d.
Swaraj Majda Ltd.	10	5.701	2.958624	10	0.189	0.15488	10	14.56539	16.69444
Force Motors Ltd.	10	2.7	0.642927	10	0.008	0.104966	10	11.70786	9.237866
TVS Motor Co. Ltd.	9	3.085556	1.371205	9	0.203333	0.184391	8	13.54152	5.800577
LML Ltd.	7	2.424286	1.163713	7	-0.60286	1.33732	7	15.65995	11.84362
Kinetic Motor Co. Ltd	9	2.892222	0.759996	9	-0.15111	0.416066	9	20.57719	10.26112

As shown in table 6, within the automobile industry, Swaraj Majda Ltd., LML Ltd. and Kinetic Motor Co. Ltd. spend the most on an average on the advertisement and the difference between them is insignificant. However, the same trend is not followed by the performance variables. Swaraj Majda Ltd. has the highest sales and profitability, though profitability of TVS Motor Co. Ltd. is indifferent from Swaraj Majda Ltd. Thus, though TVS Motor Co. Ltd. has significantly lower advertisement intensity than Swaraj Majda

Ltd., LML Ltd. and Kinetic Motor Co. Ltd., its profitability is statistically higher than LML Ltd. and Kinetic Motor Co. Ltd.

Table 7. Descriptive statistics of some firms in the Textiles industry

Variable	sales_capemp			PAT_capemp			adv_capemp		
	n	mean	s.d.	n	Mean	s.d.	n	mean	s.d.
K G Denim Ltd	10	1.373	0.425495	10	0.032	0.09016	10	1.057445	1.340812
T T Ltd.	10	1.988	0.69081	10	0.024	0.013499	10	1.06912	0.745266
Rupa & Co. Ltd.	6	2.405	0.252646	6	0.041667	0.004083	6	24.40983	2.919086
Koutons Retail India	6	2.288333	0.926119	6	0.093333	0.081404	6	3.191667	4.971963
Apeego Ltd.	5	0.676	0.609163	5	-2.784	4.553397	3	1.555556	2.143034

In the textiles industry, Rupa & Co. Ltd. spends a significantly higher amount on advertisement than other companies, but the difference between sales of Rupa & Co. Ltd. and Koutons Retail India Ltd. is statistically insignificant. In fact, profitability is significantly higher in Koutons Retail India Ltd.

Thus, two points are noteworthy here:

- Though there is a significant difference between the advertisement intensity in Rupa & Co. Ltd. and Koutons Retail India Ltd., the difference in their sales is insignificant. It shows that there are many other variables that affect the Sales of a firm.
- Similarly there are many other factors that affect the profitability since the company with significantly highest advertisement expenditure doesn't have highest profitability**.**

Table 8. Descriptive statistics of some firms in Food industry

Variable	sales_capemp			PAT_capemp			adv_capemp		
	n	mean	s.d.	n	Mean	s.d.	n	mean	s.d.
Vadilal Enterprises ltd	10	5.132	1.185456	10	0.008	0.02201	10	20.68477	6.101942
Modern Food Ind Ltd.	4	27.255	14.87966	4	-4.545	3.556501	4	25.47045	17.97252
Priya Food Pdts Ltd.	8	5.25625	3.832381	8	0.0575	0.102783	8	28.92745	28.41866
Dabur Foods Ltd.	8	5.86875	2.489007	8	-0.69	1.669003	8	51.20153	31.34958
Nestle India Ltd.	10	5.031	1.682574	10	0.505	0.276255	10	33.21127	9.339408
Cadbury India Ltd.	10	2.139	0.312604	10	0.155	0.055827	10	23.68108	4.548235
Brittania Industries ltd	10	3.237	0.512208	10	0.218	0.081076	10	21.65046	2.735999

In the food industry also, there is a positive relationship between advertisement intensity and sales, but as said since this is not the only variable affecting sales, there are firms that have higher sales even though they don't spend heavily on advertisement. Dabur Foods Ltd. has significantly highest advertisement intensity but Modern Food India Ltd. has the highest sales, while Nestle India Ltd. has the highest profitability.

After doing this rigorous comparison of the descriptive statistics at industry level, sub-industry level and firm level, now we would move to the empirical part of the paper where we would do required econometrics modeling. But before that, since we are using panel data, I would like to devote next section to panel data since it is worth spending some part of the paper to discuss this widely accepted form of data.

6. PANEL DATA

This section is heavily due to Hsiao (1988) and Gujarati (2006). A longitudinal or panel data is one that follows a given sample of individuals over time, and thus provides multiple observations on each individual in the sample. If each cross sectional unit has the same number of time series observations, then such a panel (data) is called a balanced panel. If the number of observations differs among panel members, we call such a panel as unbalanced panel.

Panel data sets for economic research possess several major advantages over conventional cross-sectional or time-series analysis. First, they usually give the researcher a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables – hence improving the efficiency of the econometric estimates. Second, and more importantly, longitudinal data allows a researcher to analyze a number of important economic questions that can't be addressed using cross sectional or time series data. For instance, those economists who tend to interpret the differences in the union or non-union workers as real believe that being a union member enhances the chances of more wages because of their bargaining power. On the other hand, those economists who regard union effects as illusionary tend to believe that the changes in the wages are mainly due to the prior differences (like skill, quality, motivation to learn etc.) in the union and non-union workers. Now, if one believes in the former view, the coefficient of the dummy variable for union status in a wage or earning equation is a measure of the effect of unionism. If one believes the latter

view, then the coefficient of the dummy variable could be simply used as a proxy for worker's quality. A single cross-sectional data set can't provide a direct choice between these two hypotheses, because the estimates are likely to reflect inter-individual differences inherent in comparisons of different people or firms. However, if panel data are used, one can distinguish these two hypotheses by studying the wage differential for a worker moving from a non-union firm to a union firm or vice-versa.

Besides the advantages that panel data allow us to construct and test more complicated behavioral models than purely cross sectional or time series data, by utilizing information on both, the intertemporal dynamics and the individuality of the entities being invested, one is better able to control in a more natural way for the effects of missing or unobserved variables.

With all these benefits, there are some issues involved with panel data. The typical assumption that economic variable *y* is generated by a parametric probability distribution function identical for all individuals at all times, may not be a realistic one. Ignoring such heterogeneity among cross sectional or time series units could lead to inconsistent or meaningless estimates of interesting parameters.

One way to take into account the "individuality" of each cross-sectional unit is to let the intercept vary for each unit but still assume that the slope coefficients are same across firms. Making a model like this, in the literature, is known as the **fixed effects model (FEM)**. The term "fixed effects" is due to the fact that although the intercept may differ across individuals, each individual's intercept doesn't vary over time; it is *time invariant*. Thus we use dummy variables to estimate the fixed effects, due to which this model is

also known as **least-squares dummy variable (LSDV) model**. But if we introduce too many dummy variables, we will lose the degrees of freedom. In fact, with so many variables in the model, there is always the possibility of multicollinearity, which might make the precise estimation of one or more parameters difficult. Thus, although straightforward to apply, fixed effects modeling can be expensive in terms of degrees of freedom.

To overcome this problem, **error components model (ECM)** or **random effects model (REM)** was introduced. The main idea of this model is that if dummy variables are essentially expressing the failure of including relevant explanatory variables that don't change overtime, then why not express this ignorance through the disturbance term. In this, we have a common mean value for the intercept and the individual differences in the intercept values of each cross sectional unit are reflected in the error term. Hence, in FEM each cross-sectional unit has its own (fixed) intercept value, in REM, on the other hand, the intercept represents the mean value of all the cross-sectional intercepts and the error term represents the deviation of individual intercept from this mean value.

"Is there a formal test that will help us to choose between FEM and REM"? Yes, a test was developed by Hausman in 1978. The null hypothesis underlying the Hausman test is that the FEM and REM estimates don't differ substantially. The test statistic developed by Hausman has an asymptotic chi-square χ^2 distribution. If the null hypothesis is rejected, the conclusion is that REM is not appropriate and that we may be better off using FEM, in which case statistical inferences will be conditional on the error term in the sample.

Another frequently observed source of bias in both cross-sectional and panel data is that the sample may not be randomly drawn from the population. For example, the New Jersey negative Income tax experiment excluded all families in the geographic areas of the experiment who had income above 1.5 times the officially defined poverty level. This sample selection procedure introduces correlation between the right hand side variables and the error term, which leads to the downward biased regression line. Though this problem is not much relevant in our analysis.

7. ECONOMETRIC MODELING

After having some knowledge on panel data and how to estimate the panel data, now it's time to do some modeling to get results. In this section, we will be doing several regressions and the performance or the dependent variables in all the regressions would be either the logarithm of Sales (log_Sales_capemp) or profitability (PAT_capemp). Since sales can't be negative so, we have taken the log of it to make it normally distributed but since profit after tax can vary from $-\infty$ to $+\infty$, there is no need to transform that variable.

Our main focus in the regressions would be to find the effect of advertisement intensity on the performance variables (log_Sales_capemp and PAT_capemp). Thus, to do that, we have transformed the explanatory variable Adv_capemp into Adv_caepmp_{-1}, i.e. we have taken one period lag of the advertisement effect to see if advertisement has any kind of unutilized effects that are utilized in the future periods, known as the goodwill effects. Apart from these two variables, we have taken the square of these two variables to see the curvature of the advertisement expenditure.

Hence, we have five explanatory variables in all, of which four are the advertisement variables:

1. Advertisement per unit of capital employed, Adv_capemp;
2. Log of Advertisement per unit of capital employed, Adv_capemp_{-1};
3. Square of Advertisement per unit of capital employed, $(Adv\_capemp)^2$;

4. Square of the Lag of Advertisement per unit of capital employed, $(\text{Adv\_capemp}_{-1})^2$;
5. Age.

We will run two regressions each taking one of the performance variables as the dependent variable. First, we will run the regressions for the entire data and then we will do it industry wise. Thus, we will estimate two regressions for the entire data, i.e. pooled data of all the three industries together:

Regression 1:

$$\text{log\_Sales\_capemp} = \alpha_0 + \alpha_1(\text{Adv\_capemp}) + \alpha_2(\text{Adv\_capemp})^2 + \alpha_3(\text{Adv\_capemp}_{-1}) + \alpha_4(\text{Adv\_capemp}_{-1})^2 + \alpha_5(\text{Age}) + \mu_1$$

Regression 2:

$$\text{PAT\_capemp} = \beta_0 + \beta_1(\text{Adv\_capemp}) + \beta_2(\text{Adv\_capemp})^2 + \beta_3(\text{Adv\_capemp}_{-1}) + \beta_4(\text{Adv\_capemp}_{-1})^2 + \beta_5(\text{Age}) + \mu_2$$

Now since we have taken the logarithm of the sales, such models, in the literature, are known as semi-log models or log-lin model because only one variable (regressand in this case) appears in the logarithmic form. Thus, in this model, the slope coefficient measures the proportional or relative change in the regressand for a given absolute change in the value of the regressors. However, since profit after tax (PAT) is taken in its absolute form, it is a linear model with the usual interpretation.

Before interpreting the result, one important thing is that based on the Hausman specification test, we have chosen the method of estimating the results – whether it is Fixed effects method or Random effects GLS method.

Table 9. Dependent variable is log_Sales_capemp

	Regression 1	
	No. of obs	735
	Prob>chi2	0.000
Variables	**Coefficient**	**p-value**
Adv_capemp	0.02366	0.006
$(Adv\_capemp)^2$	-0.00008	0.399
Adv_capemp_{-1}	0.01374	0.093
$(Adv\_capemp_{-1})^2$	-0.00010	0.226
age	0.00589	0.248
_cons	-0.17199	0.355
Method	Random effect GLS	
R-sq: within	0.0340	
between	0.1620	
overall	0.1243	
Hausman specification test :		
chi2	4.600	
(Prob>chi2)	0.4671	

Tables 9 and 10 present the estimated regressions of sales and profitability, respectively when we take the pooled data. The coefficients estimate in Table 9 that current expenditure on advertisement and the lagged advertisement expenditure have positive and significant effect on sales with p-value equal to 0.006 and 0.093, respectively, while their squares are negative. Thus there are evidences of significant positive effects of advertisement intensity on sales. However, we have to be cautious in interpreting this result because it doesn't necessarily imply that all the three industries, separately also, has positive and significant relationship between these two variables. We will look in those details shortly when we run the regressions for each industry.

The effect of age on sales is positive but insignificant and the comparatively high coefficient of the constant term is evident of many other variables affecting the dependent variable.

Table 10. Dependent variable is PAT_capemp

	Regression 2	
	No. of obs	744
	Prob>chi2	0.000
Variables	**Coefficient**	**p-value**
Adv_capemp	-0.03487	0.000
$(Adv\_capemp)^2$	0.00011	0.148
Adv_capemp_{-1}	0.02870	0.000
$(Adv\_capemp_{-1})^2$	-0.00017	0.012
age	0.00344	0.255
_cons	-0.12160	0.244
Method	Random effect GLS	
R-sq: within	0.0882	
between	0.0371	
overall	0.0436	
Hausman specification test :		
chi2	1.740	
(Prob>chi2)	0.8842	

This picture however is different when profitability is taken as the endogenous variable. Table 10 shows that the effect of advertisement intensity on profitability, surprisingly, is negative and significant while the lagged advertisement expenditure affects the profitability positively and significantly. Thus, though current advertisement expenditure has positive and significant effect on sales, it affects profitability negatively. Though not very convincing, a possible explanation for this may be is that the advertisement is a kind of addition to the total cost of production, whose return can be reaped only if with the

unchanged price sales are higher or if with the same sales figure, the price charged for one unit of output is higher, however it is not necessary that advertisement leads to these changes. Thus, profit after tax may fall if advertisement is done excessively and returns are not according to the amount of advertisement.

Here also, the effect of age on the profitability is positive but insignificant implying that age does not have any crucial effect on profitability or sales.

However, again one thing needs to be kept in mind is that tables 9 and 10 are results for the pooled data of all the three industries which doesn't imply that all the three industries separately have the similar effects as shown in the above tables. Their effect will be examined next but before that we should look at some interesting propositions established:

1.) Advertisement intensity has positive and highly significant effects on Sales but it has negative and significant effect on profitability.
2.) The effect of the one period lag of advertisement, Adv_capemp_{-1}, is positive and significant on both of the performance variables.
3.) The effect of age on both the performance variables is positive but insignificant.

7.1 INDUSTRY LEVEL MODELING:

All the above mentioned propositions are true when we pooled the entire data but now we will split the data into three industries- Automobile industry, Textiles industry and Food industry. It is expected to see the differences between these industries as their intensity to advertise is entirely different. Moreover, the nature of the industries is also very different, automobile industry is luxury goods industry, food industry is necessary goods industry and textiles industry is a mix. Thus, it is important to look at the effect of advertisement intensity separately on these 3 industries.

The modeling will remain same, the dependent and independent variables will remain same, and as earlier, we will run two regressions for each industry. But the difference would be in the data. Earlier, we combined the three industries data and run the regressions. Now we will run the regressions for each industry separately as implied by the subscript i in all the models: where i = 1 for automobile industry, 2 for textiles industry and 3 for the food industry. Thus, overall we will have 2 tables for each industry one with sales as the regressand and the other with profitability as the regressand. Therefore, in total we will have 6 tables, 2 for each industry. Table 11 to 16 shows the results of the industry-wise regressions.

Again we will be using the log-lin or semi-log models whenever we use sales as the dependent variable to find the relative change and linear models when the dependent variable is the PAT per unit of capital employed.

Regression 1:

$$(\text{log\_Sales\_capemp})_i = \gamma_0 + \gamma_1 (\text{Adv\_capemp})_i + \gamma_2 (\text{Adv\_capemp})_i^2 + \gamma_3 (\text{Adv\_capemp}_{-1})_i + \gamma_4 (\text{Adv\_capemp}_{-1})_i^2 + \gamma_5 (\text{Age})_i + \mu_1$$

Regression 2:

$$(\text{PAT\_capemp})_i = \delta_0 + \delta_1 (\text{Adv\_capemp})_i + \delta_2 (\text{Adv\_capemp})_i^2 + \delta_3 (\text{Adv\_capemp}_{-1})_i + \delta_4 (\text{Adv\_capemp}_{-1})_i^2 + \delta_5 (\text{Age})_i + \mu_4$$

Table 11 and 12 present the estimated regressions of sales and profitability in the automobile industry. Advertisement intensity shows positive and significant impact on sales with p-value equal to 0.022, while the effect of the lagged advertisement expenditure is insignificant. The square of the current advertisement is negative and significant with p-value equal to 0.033.

Table 11. Dependent variable is log_Sales_capemp (Automobile Industry)

	Regression 1	
	No. of obs	203
	Prob>chi2	0.0026
Variables	**Coefficient**	**p-value**
Adv_capemp	0.04935	0.022
$(\text{Adv\_capemp})^2$	-0.00121	0.033
Adv_capemp_{-1}	0.02028	0.321
$(\text{Adv\_capemp}_{-1})^2$	-0.00025	0.649
age	0.00774	0.281
_cons	0.05399	0.847
Method	Random effect GLS	
R-sq: within	0.0811	
between	0.1258	
overall	0.0841	
Hausman specification test :		
chi2	6.20	
(Prob>chi2)	0.2875	

The coefficient of age is positive but insignificant implying that the sales are not affected significantly by the age of the firms.

Table 12. Dependent variable is PAT_capemp (Automobile Industry)

	Regression 2	
	No. of obs	203
	Prob>chi2	0.000
Variables	**Coefficient**	**p-value**
Adv_capemp	0.03510	0.002
$(Adv\_capemp)^2$	-0.00175	0.000
Adv_capemp_{-1}	-0.00701	0.548
$(Adv\_capemp_{-1})^2$	0.00040	0.201
age	-0.00108	0.506
_cons	0.05109	0.464
Method	Random effect GLS	
R-sq: within	0.3104	
between	0.2161	
overall	0.2549	
Hausman specification test :		
chi2	6.86	
(Prob>chi2)	0.2313	

Table 12 shows that the advertisement intensity has positive and significant relationship with profitability as well however; the profitability is not affected significantly by the lagged advertisement variable just like in case of sales.

Hence, it is evident from tables 11, 12 that, in the automobile industry, current advertisement expenditure does affect sales and profitability positively and significantly; same is not true for the advertisement done in the previous year. In the automobile industry, there are no goodwill effects in the sense that neither sales nor profitability is affected significantly by advertisement done in the last period.

Thus, some propositions that can be established for the automobile industry, as far as advertisement per unit of capital employed is concerned, from the above results are:

1. In the automobile industry, the higher the advertisement intensity is, the higher the is the sales and profitability of a firm;
2. The effect of the lagged value of advertisement is insignificant in the automobile industry;
3. The effect of age is positive on and negative on profitability, but insignificant in both the cases;

Table 13. Dependent variable is log_Sales_capemp (textiles industry)

	Regression 1	
	No. of obs	231
	Prob>chi2	0.186
Variables	**Coefficient**	**p-value**
Adv_capemp	0.00131	0.981
$(Adv\_capemp)^2$	0.00060	0.818
Adv_capemp_{-1}	0.12407	0.026
$(Adv\_capemp_{-1})^2$	-0.00348	0.149
age	-0.00229	0.767
_cons	-0.46465	0.038
Method	Random effect GLS	
R-sq: within	0.0203	
between	0.1083	
overall	0.0925	
Hausman specification test :		
chi2	0.64	
(Prob>chi2)	0.9862	

Having explained the results for the automobile industry (i=1), we can repeat the same exercise for the rest of the two industries, namely Textiles and Food industry, i.e. we will

run the same two regressions with the subscript i=2 for the textiles industry now and i=3 for the Food industry after that.

Table 13 and 14 present the results for the textiles industry. Table 13 shows that in the textiles industry, advertisement intensity does not have any significant effect on sales while the effect of the lagged variable is positive and significant on sales with p-value equal to 0.026.

As shown in table 14, advertisement expenditure incurred in this period negatively affect the profitability of firms in the textiles industry with p-value equal to 0.000 while the lagged advertisement expenditure affects the profitability positively in significant manner with p-value equal to 0.001. The squares of these variables are also significant.

Table 14. Dependent variable is PAT_capemp (textiles industry)

	Regression 2	
	No. of obs	236
	Prob>F	0.0002
Variables	**Coefficient**	**p-value**
Adv_capemp	-0.23404	0.000
$(Adv\_capemp)^2$	0.00716	0.029
Adv_capemp_{-1}	0.19074	0.001
$(Adv\_capemp_{-1})^2$	-0.00472	0.074
age	-0.00168	0.909
_cons	-0.01563	0.961
Method	Fixed effects	
R-sq: within	0.1134	
between	0.0014	
overall	0.0434	
Hausman specification test :		
chi2	48.9	
(Prob>chi2)	0.000	

Thus, textiles industry shows that though advertisement does not have any significant effect on sales, it does have a negative and significant effect on profitability of firms in the textiles industry. Hence, it is worth to compare the effect of advertisement intensity on the performance of the two industries (automobile and textiles industry):

1.) The effect of advertisement intensity was significantly positive on sales of the firms in the automobile industry and it is insignificant in the textiles industry.
2.) While the effect of advertisement intensity was positive and significant on profitability in the automobile industry, it is negative and significant on the profitability in the textiles industry.
3.) Unlike automobile industry, where the lagged advertisement expenditure didn't have any significant effect on both the performance variable, in the textiles industry, both of the performance variables are positively affected by the lagged advertisement expenditure.
4.) Like automobile industry, age doesn't have any significant effect on the performance of the firm.

Now, we move our attention to the third and last industry. So, again we will estimate two regressions, one with each performance variable. Table 15 and 16 show the results of the regressions estimated for sales and profitability in the food industry.

Food industry, like automobile industry, shows the positive and significant effect of advertisement intensity on sales. The coefficient of the square of advertisement expenditure is negative but insignificant.

Table 15. Dependent variable is log_Sales_capemp (Food industry)

	Regression 1	
	No. of obs	301
	Prob>chi2	0.0005
Variables	**Coefficient**	**p-value**
Adv_capemp	0.03738	0.003
$(Adv\_capemp)^2$	-0.00018	0.156
Adv_capemp_{-1}	0.01033	0.369
$(Adv\_capemp_{-1})^2$	-0.00008	0.464
age	-0.00185	0.842
_cons	0.11047	0.767
Method	Random effect GLS	
R-sq: within	0.0648	
between	0.1148	
overall	0.0978	
Hausman specification test :		
chi2	1.85	
(Prob>chi2)	0.8689	

The effect of the lagged variables of advertisement intensity is positive but insignificant, like that in the automobile industry. Similarly, the effect of age on sales is also insignificant.

Overall, the effect of advertisement intensity in the food industry on sales is almost similar to that in the automobile industry; though there is difference in the magnitude of the effects (0.049 in the automobile industry and 0.037 in the food industry) they affect the performance in the same direction.

Table 16. Dependent variable is PAT_capemp (Food industry)

	Regression 2	
	No. of obs	305
	Prob>chi2	0.000
Variables	**Coefficient**	**p-value**
Adv_capemp	-0.03904	0.000
$(Adv\_capemp)^2$	0.00017	0.027
Adv_capemp_{-1}	0.03826	0.000
$(Adv\_capemp_{-1})^2$	-0.00024	0.000
age	0.00249	0.348
_cons	-0.08492	0.371
Method	Random effect GLS	
R-sq: within	0.2199	
between	0.1528	
overall	0.1313	
Hausman specification test :		
chi2	0.11	
(Prob>chi2)	0.9998	

Table 16 shows the results of the regression that we run by taking profitability as the dependent variable in the food industry. Here we find that like the textiles industry, one unit increase in the advertisement intensity in this period decreases the profitability in the food industry. In fact, similar to that in the textiles industry, the advertisement done in the last period affects the profitability positively and significantly with p-value equal to 0.000. Thus, it is evident that though current advertisement intensity has negative and highly significant impact on the profitability of the firms in the food industry, the advertisement expenditure incurred in the last period affects profitability positively and significantly with p-value equal to 0.000.

However, like other industries, age doesn't have any significant effect on the performance in the food industry also. The overall model is significant as shown by the p-value of chi-square equal to 0.000.

Thus, food industry shows some mixed results of automobile and textiles industry, which are worth noting:

1.) Like the automobile industry, the advertisement intensity positively affects the sales, which is significant also.
2.) But the effect of advertisement intensity is negative and significant on the profitability just like the textiles industry.
3.) Though like automobile industry, the lagged term of advertisement has insignificant effect on the sales, the effect of lagged advertisement on profitability is positive and significant like the textiles industry.
4.) Like the other two industries, the effect of age is insignificant on both the performance variables in the textiles industry also.

8. DISCUSSION AND CONCLUDING REMARKS:

The primary aim of this dissertation was to find out the impact of advertisement on the firms' performance in three different industries- Automobile industry, Textiles industry and Food industry. This paper was different in the sense that we have used three industries of different nature and compared the effect of advertisement on them pooling the entire data and separately as well. It is evident from the results that advertisement certainly affects the firms depending on their nature.

When the entire data was taken, it is evident that advertisement has positive and significant effect on sales of firms while it has significant adverse effect on profitability. Doing the modeling industry-wise, we are convinced that there are huge differences in the way; the advertisement affects the sales and profitability in these 3 industries. Automobile industry shows positive impact of advertisement on sales as well as profitability. However, the effect of advertising on profitability in food and textiles industry seems to be negative and significant.

Due to shortage of time, I was not able to derive the demand functions for these different industries and see if micro modeling fits in the empirical findings. This can be taken as a task for future research for the interested candidates.

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