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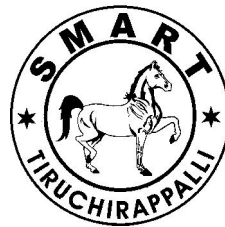
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GROWTH AND CORPORATE PROFITABILITY : A STUDY IN INDIAN AUTOMOBILE INDUSTRY

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Abstract

This study investigated the Relationship between the Growth of Indian Automobile Industry and their Profitability. The empirical evidence indicates that growth rates were highly volatile over the study period and the relationship with profitability was not clear. However, the positive effects of growth on profitability were greater than the negative effects. Also the extent of this positive relationship was different in different companies, depending upon ability and willingness to grow, which may further depend upon factors like extent of monopoly power, growth of demand, market share, better labour relations and other managerial conditions etc.,. Concerning the other empirical evidence obtained in this study, it is concluded that (1) there was considerable persistence of profitability in Indian Automobile Companies; (2) greater size of Indian Automobile Companies means increased profitability (3) greater recourse to debt by Indian Automobile Companies means diminished profitability; and (4) Liquidity also appears to be relevant in explaining the profitability of Indian Automobile Companies.

Introduction

It is well established that both growth and profitability are important dimensions of firm performance. When the study of growth is undertaken in terms of systematic influences which may affect growth, rather than regarding growth as a wholly chance phenomenon, then the most important systematic influence on growth, is that of profitability (**Singh and Whittington 1975**). Thus the relationship between growth and profitability is of considerable interest both from theoretical and practical point of view. A primary difficulty in studying this phenomenon is the complex inter-relationship between growth and profitability. There are sound theoretical arguments that growth affects future profitability and that profitability allows future growth. Of course, industry conditions and economic cycles affect the competitiveness of the market environment, and in turn, both growth and profitability of firms.

Micro economic perspectives reveal that a trade-off often exists between short-term growth and profitability. Many econometric studies have empirically established relationships between growth and profitability but the exact nature of these relationships and causality remain unresolved.

Growth and Profitability-Theoretical Perspectives and Empirical Evidence.

Basic economic theory, assuming inverted U-shape cost curves, implies that firms grow until they have reached the size where average variable cost is at a minimum (**Besanko et al., 2004**). In that range, increased size would, ceteris paribus, be associated with improved profitability. Assuming rational behaviour, the firm would refrain from expanding beyond that point. Applying the more realistic assumptions of L-shaped cost curves, the same rationally behaving firm would grow atleast to the size where the cost curve flattens out, which

corresponds to the idea of minimum efficient scale in industrial economics. Up to a point, growth would improve profitability. In this scenario, cost concerns do not hinder additional growth but in the size range beyond minimum efficient scale, profitability would be either unrelated to (increases in) size or the relationship would be determined by factors other than production cost. In short, basic economic theory suggests that at least up to a point, economies of scale ensures that growth is rewarded with increased profitability.

By contrast, the Strategy School, emanating from the Boston Consulting Group (BCG) in the 1970s, is intended as an actionable theory for business organizations in the world as we know it. According to this theory, not only static economies of scale in production but also experience curve effects pertaining to all aspects of the firm's operations can be the basis of cost advantages. This leads to a cost advantage for the firm with the highest cumulative volume in any industry and hence to a positive relationship between market share and profitability. Based on evidence of a positive relationship also between industry market growth and profitability (Capon et al, 1990), the recipe for profitable growth is to launch and secure large market shares for new products in high growth markets.

Further, it is also argued that growth displays a favorable impact on its profitability except for the samples of bigger firms. It might be argued that smaller firms, being more flexible, tend to take chance more readily than their bigger rivals. It may also be that smaller firms can profitably exploit chances by expanding sales at unreduced prices. In a similar vein, and more closely related to the reality of young and small firms, the literature on first mover advantages (Lieberman and Montgomery, 1988) suggests that new entrants can create a lasting advantage by rapidly building a dominant position for themselves in the market. Mac Millan and

Day (1987) suggested that new firms become more profitable when they enter markets quickly and on a large scale.

There are a number of rather strong and straight forward theoretical reasons to believe that growth leads to profitability. However, even in the supportive literature, it is observed that growth does not always enhance profits. Growth beyond minimum efficient scale is associated with unknown or reversed effect on profitability, and pursuing growth in low growth markets or by increasing sales for products with low initial market share is no guaranteed recipe for financial success.

The use of growth as a measure of firm performance is generally based on the belief that growth is a precursor to the attainment of sustainable competitive advantages and profitability (Markman and Gartner, 2002). In addition, larger firms have higher rates of survivals (Aldrich and Auster, 1986) and may have the benefits of associated economies of scale. The alternate view is that fast growing firms may encounter difficulties associated with growth that leads to reduced profitability and perhaps financial difficulty. Overall, it is difficult to imagine sustained growth without profitability. Without funding growth through retained earnings, the firm must rely on additional debt or equity finance. The relationship between growth and profitability is therefore an important consideration and to date, there has been little agreement on the relationship between these two measures.

Marris (1964) was the first to develop a rigorous model to analyze the growth and profits of firms. In the Marris Model, there is no optimum firm size. He deals with optimum growth path given by the demand and supply of growth functions, rather than the static demand and supply functions. According to this Model, a firm's ability to shift the demand and supply functions (growth - profit frontier) depends on the environment in which it operates. According

to **Greiner (1972)**, the relationship between company growth and profitability can be positive or negative. On the one hand, increased growth can contribute to a breakdown of informal relationships established overtime in companies, greater growth requiring greater formality in relationship at work, which in the short-term can be difficult to achieve efficiency, thus leading to diminished company profitability. On the other hand, greater growth can result in greater profitability, as a result of increased motivation among employees who expect greater gains in the future, gains resulting from greater company size.

With several theoretical perspectives suggesting that growth and profitability are positively related, one would expect the empirical evidence to clearly demonstrate a positive association between the two, whether or not the research can determine the direction of casualty. Accordingly, **Fenny and Rogers (1999)**, **Mendelson (2000)**, **Debashish Rai and Debashish Sur (2001)**, **Tze-Wei Fu et al., (2002)**, **Cox et al., (2002)**, **Kaen and Baumann (2003)**, **Maninder S. Sarkaria and Shergil (2004)**, **Cowling (2004)**, **Peng (2004)**, **Kim et al., (2004)**, **Cho and Pucic (2005)**, **Zeiton and Tian (2007)**, **Martin Hovey (2007)**, **Fulbag Singh and Monica Mogla (2008)**, **Grace Tola Olutunla and Tomola Marshal Obamuyi (2008)**, **Ahmed Arif Karim Almazari (2009)** and **Zelia Serrasqueiro (2009)**, found evidence that growth had a positive impact on profitability, providing support for explanations that indicate a positive relationship.

On the other hand, studies by **Bothwell et al., (1982)**, **Hoy et al., (1992)**, **Debashish Rai and Debashish Sur (2001)**, **Markman and Gartner (2002)**, **Kaen and Baumann (2003)**, **Abuzar and Eljelly (2004)**, **Orden and Garmendia (2005)**, **Long Chan and Xinlei Zhao (2005)**, **Kirchmaer (2006)**, **Fulbag Singh and Monica Mogla (2008)** and

Eldos Mathew Punnoose (2008) postulated negative relationship between growth and profitability.

In short, the empirical evidence on the relationship between growth and profitability performance is inconclusive. That is, despite theoretical support of different kinds, there is no evidence of a substantial, universal and positive relationship between growth and profitability. This demonstrates that while the two dimensions of performance sometimes move together as suggested by theories reviewed, there are other instances when growth and profit relationship is negative or neutral. But in an expanding economy, one should expect a positive association between growth and profitability of firms because profits provide the ability to grow. However, the factors affecting the willingness to grow are such that these are likely to vary between different industries. These are also likely to vary within the same industry at different points of time. This means that the magnitude and precise form of the positive association between profitability and growth, will be different in different industries at a particular time and in the same industry at different times.

From the above reviews, Researchers conclude that majority of the studies support the general notion that there is a positive relationship between growth and profitability. In order to test this general notion, Researchers postulated the following hypothesis.

“Firm’s Growth positively affects Profitability”.

Variables Specifications and Empirical Model

The main aim of this part of analysis is to study the relationship between growth and profitability in the Indian Automobile Industry. The analysis of data employs the use of correlation and a normal linear regression model that consists of both growth and profitability. For this purpose, three different models using varying

concepts of growth and profitability were considered. This helped in analyzing changes in the results due to different measures of profitability and growth.

Profitability

Many researchers use different measures of firm profitability in the analysis of the relationship between growth and profitability. Return on Assets (Zelia Serrasqueiro, 2009; Kuldip Kaur and Kushwinder Kaur, 2008) and Return on Sales (Samuels and Smyth, 1968; Amit K. Mallick and Debasish Sur, 1998; Vijayakumar, 2002; Zelia Serrasqueiro, 2009) are widely used measures of profitability. It is assumed that management may be concerned with effective utilization of all resources and these two measures could be proper in this line of arguments. The profit rates measured by sales will give a short-term perspective of profitability because sales are annual flows. On the other hand, the return on assets and return on capital employed will give us long-term perspective of profitability. In this study, Ratio of Profit Margin on Sales (PM), Ratio of Profit on Total Assets (PR) and Return on Capital Employed (ROCE) were used as dependent variables in the specified models.

Growth

Several researchers suggest growth as the most important performance measure in firms, with growth being a more accurate and easily accessible performance indicator than accounting measures, and therefore superior to indicators of financial performance. (Wiklund, 1999). Performance measures included sales growth, employment growth and assets growth. Delmar et al., (2003) discussed the various performance measures and suggested that if only one indicator had to be chosen as a measure of firm growth, then the preferred measure of growth should be sales. Sales figures are relatively easy to obtain and reflect both short-term and long-term changes in the firm. In addition, as Barkham et al., (1996) pointed out,

it is also the indicator favoured by entrepreneurs themselves. Other arguments for using sales growth are based on the growth process being driven by demand for the firm’s products and services. Increasing sales will allow growth along other dimensions such as employees and assets. Based on this line of argument, this study used the compound growth rate of net sales in current price as independent variables to measure the relationship between profitability and growth. The sales turnover could not be converted into constant price because many firms produce and market different models of cars and commercial vehicles. These models are priced differently, but data on models wise sale of the number of vehicles were not available. Therefore, to estimate the compound growth rate of net sales, the following models were used.

$$Y = A B^t e^u$$

(or)

$$\text{Log } Y = \text{log } A + t \text{ log } B + u$$

Where ,Y is the value of dependent variable; t is the time variable; A and B are constants and e^u is the error term.

$$r = (B^t - 1) * 100$$

Where, r is the compound growth rate of Y.

The models:

The study considered the following regression model.

$$PR_{ij} = \beta_0 + \beta_1 GROW_{ij} + e_{ij} \dots \dots \dots (1)$$

Where,

PR – measures the firm’s profitability with gross profit as a percentage of total assets for firm (i) in year (j).

β_0 – constant term for firm (i) in year (j).

β_1 – regression co-efficient

GROW_{ij} – compound growth rate of net sales (growth) for firm (i) in year (j).

e_{ij} – disturbance term for firm (i) in year (j).

Initially, the study only estimated the relationship between Growth and Profitability. Afterwards the study added other possible explanatory variables of profitability, with the simultaneous objective of testing robustness of the relationship obtained between Growth and Profitability and enhancing the value of the analysis made in this study (**Table-1**). The study also considered other explanatory variables of profitability, like size (**Adams and Buckle, 2003; Goddard et al,2005**), Debt (**Adams and Buckle,2003; Goddard et al, 2005**), and Liquidity (**Adams and Buckle, 2003; Goddard et al,2005**). Apart from what is stated above, using dynamic panel estimates allowed us to determine the level of persistence of profitability, that is to say, it let us estimate the relationship between Profitability in the previous period and Profitability in the current period.

The study also considered the following regression model.

$$PR_{i,j} = \beta_0 + \beta_1 P_{(t-1)i,j} + \beta_2 GS_{i,j} + \beta_3 S_{i,j} + \beta_4 LEV_{i,j} + \beta_5 CR_{i,j} + e_{i,j} \dots\dots\dots (2)$$

Motivation for selecting the Automobile Industry

The main motivation for the analysis of Growth and Profitability Relationship of Automobile Industry was provided by two major developments in the Indian Automobile Industry during the last decade which includes Liberalization in government policy measures resulting in the entry of firms with expanded capacity and capability to produce vehicles involving technological up-gradation, and massive inflow of Foreign Direct Investment into Automobile Sector. Both these developments have important implications for the performance of individual firms. Further, the importance of the Automobile Sector cannot be underestimated as it contributes more than 5 per cent of GDP at present, and its expected contributions to be around 10 per cent of GDP in 2016 offering employment to a large number of people in our

country as well as contributing significantly to the country's export. Keeping in view the importance of the Automobile Industry, it was selected to study the Relationship between Profitability and Growth of key players in the Sector. The period 1996-97 to 2008-09 was selected for this study of Indian Automobile Industry.

Selection of Sample

Keeping in view the scope of the study, it was decided to include all the companies under Automobile Industry working before or from the year 1996-97.

But owing to several constraints such as non-availability of financial statements or non-working of a company in a particular year etc., it was compelled to restrict the number of sample companies to 20. Therefore, this study was based on ex post facto survey method making a survey of twenty companies in the Indian Automobile Industry. There are 26 companies operating in the Indian Automobile Industry. The companies under Automobile Industry are classified into three categories. Commercial Vehicles, Passenger Cars and Multi-Utility Vehicles and Two and Three Wheelers. The details of the Sector, with the available companies of Indian Automobile Industry, are presented in **Table -2**.

For the purpose of the study, all the three categories were selected. The selected categories included 26 Companies. Out of the 26 companies, five were under Commercial Vehicles, eight under Passenger Cars and Multi-Utility Vehicles and thirteen under Two and Three Wheelers Sector. Out of 26 Companies of the selected categories, 13 year data were available for only 20 companies. Therefore, all the 20 companies were included in the Sample. It accounted for 76.92 per cent of the total companies available under the Indian Automobile Industry. The selected 20 companies included five under Commercial Vehicles, six under

Passenger Cars and Multi-Utility Vehicles and nine under Two and Three Wheeler categories. List of Companies included in the present study, along with the year of incorporation, ownership and its market share are presented in **Table 3**. It is evident from the Table 2 that sample companies represented 98.74 percentage of market share in Commercial Vehicles, 96.84 percentages in Passenger Cars and Multi-Utility Vehicles and 99.81 percentages in Two and Three Wheelers. Thus, the findings based on the occurrence of such representative sample may be presumed to be true and representative of the Automobile Industry in the country.

Source of Data

The study was mainly based on Secondary Data. The major source of data related to all those companies selected were collected from "PROWESS" database, which is the most reliable and empowered corporate database of Centre for Monitoring Indian Economy (CMIE). It contains a highly normalized database built on a sound understanding of disclosure in India of around 12,000 companies which include public, private, co-operative and joint sector companies. The database provides financial statements, ratio analysis, funds flow, cash flow, product profiles, returns and risk on the stock market etc.,. Besides prowess database, relevant Secondary Data were also collected from BSE Stock Exchange Official Directory, CMIE Publications, Annual Survey of Industry, Business Newspapers, Reports on Currency and Finance, Libraries of various Research Institutions, Internet etc.

Results and Discussion

The relationship between Profitability and Growth has been explored by means of Regression Analysis. The results are presented in **Table - 4**.

Table 4 shows the extent to which changes in Profitability Margin are explained by the changes in the Growth of Sales. The

maximum value of co-efficient of determination (R^2) in the case of the entire Industry was 67 and this means that 67 per cent changes in Profitability and its margin could be explained by Growth of Sales. The value of regression co-efficient 'b' showed the positive impact of growth on profitability in the Indian Automobile Industry. The value of regression co-efficient 'b' was also the highest for the whole industry (0.38), followed by Commercial Vehicles (0.32), Two and Three Wheelers (0.32) and Passenger Cars and Multi-Utility Vehicles Sector (0.28). All these co-efficients were statistically significant at 1 per cent level. Correlation co-efficients also recorded the highest value of 0.68 for Commercial Vehicles, followed by Passenger Cars and Multi-Utility vehicles (0.67), Whole Industry (0.60) and Two and Three Wheeler (0.48). These results are consistent with the results of **Fenny and Rogers (1999)**, **Cox et al., (2002)**, **Cowling (2004)**, **Fulbag Singh and Monica Mogla (2008)** and **Zelia Serrasqueiro (2009)**, who found positive relationship between Growth and Profitability in their study.

Table 4 also shows the results of regression of profitability margin on growth of sales of companies selected for the study. Inter-companies differences regarding relation between Profit and Growth are evident from the Table. These differences were expected because the firms' ability to grow and willingness to grow depended on many factors and these factors differed from company to company. Among the Commercial Vehicle Companies, the highest value of R^2 (0.46) was in the case of Tata Motors Ltd, suggesting that 46 per cent of changes in Profitability were explained by Growth of Sales. All the companies showed positive impact of Growth of Sales on the Profitability during the study period. The values of regression co-efficient 'b' ranged between 0.03 in Eicher Motors Ltd to 0.26 in Swaraj Mazda Ltd, which were significant, except in the case of Bajaj Tempo Ltd.

Among the Passenger Cars and Multi - Utility Vehicle Companies, R^2 ranged between 0.04 in the case of Ford India Ltd to 0.59 in the case of Mahindra & Mahindra Ltd, suggesting 4 per cent to 59 per cent changes in Profitability could be explained by the Growth of Sales. Zero values of R^2 in the case of Hyundai Motors Ltd reveals that in this company, Profitability was unaffected by the Growth of Sales. The regression co-efficient of 'b' ranged between 0.00 in Hyundai Motors Ltd to 0.20 in Maruti Udyog Ltd, indicating thereby that one per cent change in Growth leads to 0 per cent to 20 per cent change in Profitability in the case of companies manufacturing Passenger Cars and Multi-Utility Vehicles. However, these regression co-efficients were significant only in 3 out of 6 companies. But all the companies showed positive relationship between the two variables.

Table-4 also depicts the results of regression of Profitability Margin on Growth of Sales of all companies manufacturing Two and Three Wheelers. Regression co-efficient 'b' was statistically significant in 5 out of 9 companies. In the case of Kinetic Engineering Ltd, the value of regression co-efficient was 1.01, suggesting that one per cent increase in Growth of Sales was associated with 1.01 per cent increase (i.e., more than growth rate) in profitability and it was statistically significant too. High value of correlation co-efficient (0.82) of Kinetic Engineering Ltd also reveals that there was significant positive correlation between Profitability and Growth of Sales, as far as this company was concerned. Highest value of R^2 (i.e., 0.67) in this company also reveals that 67 per cent of variations in Profitability were explained by variations in Growth of Sales. Profitability was almost unaffected by Growth of Sales in the case of Bajaj Auto Ltd, Hero Honda Motors Ltd and Majestic Auto Ltd (value R^2 being either 0.00 or 0.01). After Kinetic Engineering Ltd, the next best fit of the regression equation was in the case of Maharashtra Scooters Ltd (0.58), followed by

TVS Motor Company Ltd (0.45), Kinetic Motor Company Ltd (0.37) and Scooter India Ltd (0.33) and this again was statistically significant. Further, the regression co-efficient 'b' was negative (i.e., -0.28) in the case of Kinetic Motor Company Ltd. This explains that one per cent change in Growth of Sales caused 0.28 per cent decrease in Profitability. This proves that beyond a certain level of Growth Rate, the relationship between Growth and Profitability may turn negative.

Table -5 presents the results referring to the relationship between Growth and Profitability, without adding the control variable. In **Table-6**, the analysis of other Control Variables used in this study, is presented. Based on the empirical results obtained and presented in Table 6, it is evident that greater the growth of Indian Automobile Companies, greater the Profitability except in Two and Three Wheelers. Therefore, in the context of Indian Automobile Companies, the positive effects of Growth on Profitability were greater than the negative effects. Concerning the other empirical evidence obtained in this study, the profitability of Indian Automobile Industry was persistent. The values obtained for Persistence of Profitability varied between 0.04 for Commercial Vehicles and 0.31 for Passenger Cars and Multi - Utility Sector Vehicles. This result indicates that disturbance arising from companies entering and leaving the market was less relevant in the context of Indian Automobile Companies.

The study also showed a positive and statistically significant relationship between Size and Profitability in the Indian Automobile Industry. Thus, the greater possibility of taking advantage of Economies of Scale and Diversification of Activities and Products, as a consequence of greater size, seems to be more relevant for increased Profitability in Indian Automobile Companies. The relationship between debt and profitability in the Indian Automobile Companies was negative and

statistically significant. It shows that debt seems to be a restrictive factor of Profitability in Indian Automobile Companies, possibly due to the need to make periodic payments of the debt charges diminishes the capacity for taking advantages of good opportunities for company growth opportunities which could mean increased profitability. Further, the relationship between Liquidity and Profitability showed negative between these two and statistically significant relationship.

Conclusion

The study investigated the behaviour of Growth Rates and Profitability for the Indian Automobile Companies. In line with the previous studies, it was found that Growth Rates were highly volatile over time and the relationship with Profitability was not clear. However, the positive effects of Growth on Profitability were greater than the negative effects. These results are consistent with the results of **Singh and Whittington (1995)**, who also found positive relationship between Growth and Profitability in their study. Also the extent of this positive relationship was different in different companies, depending upon their ability and willingness to grow, which may further depend upon factors like extent of monopoly power, growth of demand, market share, better labour relations and other managerial conditions etc.,. Concerning other empirical evidence obtained in this study, it is concluded that (1) there was considerable Persistence of Profitability in the Indian Automobile Companies; (2) Greater Size of Indian Automobile Companies means increased Profitability (3) Greater Recourse to Debt by Indian Automobile Companies means Diminished Profitability; and (4) Liquidity also appears to be relevant in explaining the Profitability of Indian Automobile Companies.

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Table-1
Measurement of Variables

Independent Variables	Measurement
Growth (GS)	Growth of Sales
Size (S)	Natural Logarithm of Sales
Leverage (LEV)	Ratio Between Total Liabilities and Total Assets
Liquidity (LIQ)	Ratio between Current assets and Current Liabilities
Persistency ($P_{(t-1)}$)	One year lagged profitability

Table- 2
Total Number of Companies Available in Indian Automobile Industry

Sl.No.	Sectors	Total companies available	13 years data available companies
1.	Commercial Vehicles	5	5
2.	Passenger Cars and Multiutility Vehicles	8	6
3.	Two and Three Wheelers	13	9
	Total	26	20

Source: Prowess Database, 2004.

Table -3
List of Sample Companies Included in The Present Study

Sl. No.	Sectors / Companies	Year of Incorporation	Ownership	Market share (%)	Total market share (%)
	Commercial Vehicles (5)				
1.	Ashok Leyland Ltd	1956	Hinduja Group	35.62	
2.	Tata Motors Ltd	1956	Tata Group	34.22	
3.	Bajaj Tempo Ltd	1958	Firodia Group	11.50	
4.	Eicher Motors Ltd	1982	Eicher Group	10.65	
5.	Swaraj Mazda Ltd	1983	State and Private Sector	6.75	98.74
	Passenger Cars and Multiutility Vehicles (6)				
6.	Hindustan Motors Ltd	1942	Birla C.K.Group	8.31	
7.	Mahindra and Mahindra Ltd	1945	Mahindra and Mahindra	17.17	
8.	Maruti Udyog Ltd	1981	Private (Foreign)	36.60	
9.	Hyundai Motors India Ltd	1996	Private (Foreign)	19.50	
10.	Honda Siel cars India Ltd	1999	Private (Foreign)	10.22	
11.	Ford India Private Ltd	1998	Ford FIGO India Owners group	05.04	96.84
	Two and Three Wheelers (9)				
12.	Bajaj Auto Ltd	1945	Bajaj Group	18.80	
13.	LML Ltd	1972	LML Group	11.58	
14.	Maharashtra Scooters Ltd	1975	Bajaj Group	7.80	
15.	TVS Motor Company Ltd	1982	T.V.S. Group	12.93	
16.	Kinetic Motor Company Ltd	1984	Firodia Group	11.75	
17.	Hero Honda Motors Ltd	1984	Hero (Munsals) Groups	10.54	
18.	Kinetic Engineering Ltd	1970	Firodia Group	9.72	
19.	Majestic Auto Ltd	1986	Hero Group	9.04	
20.	Scooters India Ltd	1972	Central Govt. Commercial Enterprise	7.65	99.81

Table- 4
Results of Regression of Profitability (P₁) on Growth of Sales
(PR_{ij} = β₀ + β₁ GROWTH_{ij} + e_{ij})

Particulars	Constant	Growth Co-efficient	R ²	Adj R ²	F Ratio	DW	r
Ashok Leyland Ltd	8.90	0.16 (2.62)**	0.37	0.34	6.36	0.59	0.60*
Tata Motors Ltd	7.33	0.05 (2.97)*	0.46	0.40	8.16	0.69	0.42
Bajaj Tempo (Force)Ltd	3.25	0.04 (0.34)	0.01	-0.08	0.12	1.47	0.16
Eicher Motors Ltd	0.06	0.03 (1.79)***	0.23	0.16	3.19	1.08	0.47
Swaraj Mazda Ltd	5.66	0.26 (3.12)*	0.36	0.32	6.12	0.76	0.40
Commercial Vehicles	6.80	0.32 (3.80)*	0.56	0.52	14.28	1.48	0.68*
Hindustan Motors Ltd	0.40	0.12 (2.73)**	0.36	0.33	6.17	1.18	0.46
Mahindra and Mahindra Ltd	9.21	0.16 (3.01)*	0.59	0.55	13.96	0.83	0.41
Maruti Udyog Ltd	6.73	0.20 (1.26)	0.13	0.05	1.59	0.78	0.36
Hyundai Motors Ltd	6.44	0.00 (0.12)	0.00	-0.10	0.01	0.89	0.04
Honda Sael Ltd	1.35	0.11 (2.17)***	0.37	0.29	4.72	1.55	0.61
Ford India Ltd	0.27	0.01 (0.55)	0.04	-0.10	0.30	1.89	0.18
Passenger cars and Multi-utility Vehicles	5.93	0.28 (3.54)*	0.52	0.48	14.36	1.29	0.67*
Bajaj Auto Ltd	15.03	0.00 (0.48)	0.02	-0.07	0.23	0.74	0.14
LML Ltd	-13.92	0.06 (0.53)	0.03	-0.06	0.28	0.33	0.16
Maharashtra Scooters Ltd	4.16	0.68 (3.16)*	0.58	0.53	14.42	0.52	0.62**
TVS Motor Company Ltd	4.26	0.16 (3.01)*	0.45	0.40	9.04	1.48	0.67**
Kinetic Motor Company Ltd	-12.39	-0.28 (2.46)**	0.37	0.33	6.12	1.17	-0.58**
Hero Honda Motors Ltd	13.23	0.00 (0.10)	0.00	-0.09	0.10	0.63	0.03
Kinetic Engineering Ltd	-1.50	1.01 (4.76)*	0.67	0.64	22.62	1.51	0.82*
Majestic Auto Ltd	2.60	0.00 (0.01)	0.00	-0.09	0.00	1.57	0.00
Scooters India Ltd	0.08	0.30 (2.31)**	0.33	0.26	5.31	0.79	0.57**
Two & Three Wheelers	7.59	0.32 (3.51)*	0.63	0.59	15.18	1.53	0.48
Whole Industry	7.01	0.38 (3.68)*	0.67	0.63	16.12	1.49	0.60**

PR-Profit as percentage of total assets * P < 0.01; ** P < 0.05; ***P < 0.10
Source : Computed.

Table- 5
Other Factors Affecting Profitability – Multiple Regression Model
 $(PR_{ij} = \beta_0 + \beta_1 P_{t-1} + \beta_2 GS + \beta_3 S + \beta_4 LEV + \beta_5 CR + e_{ij})$

Dependent variable : Operating profit on total assets				
Independent variables	Commercial vehicles	Passenger cars and multi-utility Vehicles	Two and three wheelers	Whole Industry
Past profitability (P _{t-1})	0.04 (2.96)**	0.31 (1.89)***	-0.39 (3.01)**	0.18 (2.43)**
Growth (GS)	0.05 (2.48)***	0.13 (2.75)***	-0.05 (0.43)	0.04 (0.96)
Size (S)	0.43 (3.39)*	0.52 (3.95)*	-3.69 (2.56)**	0.51 (3.81)*
Leverage (LEV)	-13.40 (3.88)*	-13.34 (2.01)***	-9.65 (2.33)**	-3.43 (2.76)**
Liquidity (CR)	-7.97 (3.10)**	-6.48 (1.12)	-30.59 (1.93)***	-10.59 (3.64)*
R²	0.92	0.70	0.79	0.88
Adj R²	0.86	0.65	0.64	0.76
F Ratio	15.43*	3.34***	5.23**	6.12*
DW	1.80	0.64	2.04	1.98

*P < 0.01; ** P <0.05, *** P < 0.10

Source: Computed