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REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

ANALYSIS OF SIZE, GROWTH AND PROFITABILITY IN INDIAN TWO AND THREE WHEELER SECTOR COMPANIES

DR. A. VIJAYAKUMAR
ASSOCIATE PROFESSOR
ERODE ARTS & SCIENCE COLLEGE
ERODE

S.SRI DEVI
RESEARCH SCHOLAR
DEPARTMENT OF COMMERCE
ERODE ARTS & SCIENCE COLLEGE
ERODE

ABSTRACT

The growth of industrial sector income, improve the standard of living, build infrastructure and create balanced economy which ultimately increases GDP and tax revenue of the government. Hence, it is necessary to analyses the size, growth and profitability relationship in the industry. In this paper an attempt has been made to analyse the relationship between size and profitability and growth and profitability of the selected companies of two and three wheeler sector of Indian Automobile Industry. The study results showed that firm size affecting profitability. Among the selected companies, some companies showed positive relationships between size and profitability. While others did not. Similarly, the study also found that the positive effects of growth on profitability are greater than the negative effects. These findings should be useful to the management to decide on the extent to which firm size and growth needs to be monitored and controlled.

KEYWORDS

Profitability, Growth, Size, Indian Automobile Industry, Two and Three wheeler sector, Profit Margin, Profit Rate and Return on capital employed.

INTRODUCTION

Corporate must have a multiplicity of objectives instead of a single objective, profit, which has been traditionally over emphasized. India's development strategy places a heavy emphasis on the creation of a well-diversified industrial base to realize the dream of industry-led development. Liberalization has been a key ingredient of recent economic policies in India and elsewhere, based upon the notion that removing restrictions on domestic economic activity as well as on the trade relations with other countries has a beneficial impact on the economy. These changes have provided great opportunities for the Indian corporate sector. The reforms are helpful by increasing access to foreign technology and making imports of capital and intermediate goods cheaper. Improvements in infrastructure and more flexible labour laws will facilitate the future growth of India's manufacturing sector. The ever increasing importance and role of the corporate sector in the economic growth of a country, particularly, in a developing country like India, have attracted several academicians, professional institutions, researchers and administrators to conduct diversified studies in this area. It has also been the primary concern of business practitioners (managers and entrepreneurs) in all types of organizations since corporate performance has implications for organization's health and ultimately its survival. High performance reflects the management's effectiveness and efficiency in making use of the company's resources and this in turn contributes to the country's economy at large. The growth of the industrial sector promises to spur employment opportunities, increase per capita income, improve the standard of living, build infrastructure, and create a balanced economy which ultimately increases Gross Domestic Product and tax revenue of the government. Hence, there is a need to study the size, growth and profitability relationship of companies so as to determine the overall success of an industry.

OBJECTIVES OF THE STUDY

The primary purpose of the present study is to obtain a true insight into the relationship between size and profitability and growth and profitability of the selected companies of two and three wheelers sector of Indian automobile industry.

RESEARCH METHODOLOGY

SELECTION OF SAMPLE

Keeping in view the scope of the study, it is decided to include all companies under two and three wheelers sector of Indian 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 is compelled to restrict the number of sample companies to nine. There are thirteen companies operating in the two and three wheelers sector of Indian automobile industry. Out of thirteen companies of the selected sector, thirteen years data is available for nine companies only. Therefore, all the nine companies are included in the sample. The list of companies selected in the present study along with their year of incorporation, ownership and its market share is presented in Table 1. It is evident from Table 1 that the sample companies represent 99.81 percentage of market share in two and three wheelers sector. Thus, the findings based on the occurrence of such representative sample may be presumed to be true representative of two and three wheelers sector of automobile industry in the country. The period of study is 1996-97 to 2008-09.

SOURCES OF DATA

The study is mainly based on secondary data. The major source of data analyzed and interpreted in this study related to all those companies selected is collected from "PROWESS" database, which is the most reliable on the empowered corporate database of Centre for Monitoring Indian Economy (CMIE). The database provides financial statements, ratio analysis, funds flow, cash flow, product profiles, returns and risks on the stock market etc. Besides prowess database, relevant secondary data have also been 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, through Internet etc.

A. FIRM SIZE AND PROFITABILITY

Economic theory prescribes that increasing firm size allows for incremental advantages because the size of the firm enables it to raise the barriers of entry to potential entrants as well as gain leverage on the economies of scale to attain higher profitability. Key features of a large firm are its diverse capabilities, the abilities to exploit economies of scale and scope and the formalization of procedures. These characteristics, by making the implementation of operations more effective, allow larger firms to generate superior performance relative to smaller firms **Penrose (1959). Baumol (1959)** suggested that the larger firm may be in a position to earn a higher rate of return in its investment than the smaller firm because it has all the options of a smaller firm open to it and in addition can undertake projects which are of large scale and denied to smaller firms. A similar argument had earlier been put forward by **Steindl (1945).** Besides large firms have an advantage over smaller firms as they can enter variety of product lines which gives them the benefits both the scale and the size. Also, bigger firms

being more efficient in Research & Development (R&D) which together with their ability to spend larger sums on advertising, substantially raise the cost of entry to a new comer. This creates powerful monopoly position, giving large firms a degree of independence in pricing and output decisions. It is, therefore, important to test this hypothesis and to analyze the relationship between the size of the firm and profitability.

THEORETICAL BACKGROUND AND THE DEVELOPMENT OF HYPOTHESES

A good number of researchers had investigated the relationship between firm size and profitability. The pioneering studies conducted in this field is attributed to **Hall and Weiss (1967)[13].** Their empirical analysis of fortune 500 Industrial Corporations for the years 1956-1962 aimed at testing the relationship between profit rates and other appropriate variables such as firm size, concentration, leverage and growth. Results of the study showed that firm size exhibit a positive relationship with profitability. The Hall and Weiss study, however, considered only firms of optimal size. A comparable study was made by **Marcus (1969)** who re-evaluated earlier findings against new data within an improved analytical framework. Marcus study included the entire distribution of firms. Results showed that firm size influences profitability in some, but not all industries. **Amato & Wilder (1985)** conveyed that the relationship between firm size and profitability may be positive for some firm size ranges and negative for others. Again, if the size reached a threshold, additional expansion of firm size may further separate ownership from control. This suggests that the relationship between firm size and profitability can become negative beyond the threshold firm size. Large firms can lead to increased coordination requirements, which in turn, make the managerial task more difficult leading to organizational inefficiencies and lower profit rates **Downs (1976).** Further, it has been suggested that increased size tends to be associated with higher bureaucratization **Ahuja & Majumdar (1998).** Another plausible argument to justify the possibility of a negative firm size-profitability relationship can be found in the concept of x-inefficiency **Leibenstein (1976).** X-inefficiency is a measure of the degree to which costs are higher than they need to be. Whilst diseconomies of scale refers to the inadequacy in matching resource requirements to produce more, x-inefficiency reasons that general managerial or technological inefficiency in larger firms cause higher production costs which end up in reductions in the bottom line i.e. profit rates decline.

Various studies attempted in the context of size and profitability relate to the developed countries. Most of the results come out with varying opinions. Some studies postulate negative results while some studies have evidence supporting the positive notion. The studies by **Marcus Matityahu (1969), Sumit K. Majumdar (1997), Michaelas et al., (1999), Cassar & Holmes (2003) and Darko Tipuric (2002),** showed the positive relationship between firm size and profitability. On the other hand, studies **Radice (1971), Whittington (1980), Capon et al., (1990), Schneider et al., (1993), Rajan and Zingales (2000), Dhawan (2001), Goddard Tavakoli and Wilson (2005), Bala Ramasamy et al., (2005) and Abdussalam Mahmound Abu-Tapanjeh (2006)** postulated negative relationship between firm size and profitability. However, there are some studies that concern developing countries in general and India in particular. Efforts to study size and profitability have been made in some of the studies related to Indian industries. The studies by **Siddharthan and Das Gupta (1983), Nagarajan and Barthwal (1990), Shanta (1994), Vishnu Kanta Purohit (1998), Vijayakumar and Kadirvel (2003) and Renu Luthra and Mishra (2006)** observed positive relationship between large size firms and profitability. Further, the studies by **Agarwal (1978) and Kuldip Kaur (1998)** found a negative association between firm size and profitability of Indian industries.

Based on previous literature, it is difficult to make a clear, let alone a final prediction of the overall effects of the firm size-profitability relationship from the studies carried out, the association appears to differ depending on the industry under analysis. Given this ambiguity, it seems prudent to empirically resolve, independently, the association between firm size and profitability on a case-by-case basis and avoid the tendency to generalize. Thus, from this theoretical background, the advances advances the following hypothesis:

H_0: Firm size positively affects profitability.

The models

The study considered the following regression models.

Model 1: PM as the dependent variable

$$PM = \infty 0_{f,y} + \beta_1 (Ln\ NS_{f,y}) + l_{fy}$$

Model 2: PR as the dependent variable

$$PR = \infty 0_{f,y} + \beta_1 (Ln\ NS_{f,y}) + l_{fy}$$

Model 3: ROCE as the dependent variable

$$ROCE = \infty 0_{f,y} + \beta_1 (Ln\ NS_{f,y}) + l_{fy}$$

Where,

PM	measures the firm's profitability with gross profit as a percentage of sales turnover for firm (f) in year (y).
PR	measures the firm's profitability with gross profit as a percentage of total assets for firm (f) in year (y).
ROCE	measures the firm's profitability with net profit before tax as a percentage of capital employed for firm (f) in year (y).
$\infty 0_{f,y}$	constant term for firm (f) in year (y)
β	regression co-efficient
$LnNS_{f,y}$	natural logarithm of Net Sales (size) for firm (f) in year (y)
l_{fy}	disturbance term for firm (f) in year (y).

RESULTS AND DISCUSSION

With a view to estimate the relationship between the size and profitability, this study used semi-logarithmic specification. This helps in analyzing changes in the results due to different measures of profitability and size. The first two measures of profitability [Profit Margin (PM) and Rate of Profit on assets (PR)] are representative of short-term profitability and the remaining one measures [Return on Capital Employed (ROCE)] long-term profitability. Table 2 to 4 show the results of various regression equations estimated to test the relationship between size and profitability. The overall results presented in the tables are encouraging. Co-efficient is statistically significant and goodness of fit of the model is also satisfactory.

The analysis shows that size has statistically significant effect on profitability in Indian two and three wheelers sector. However, in the overall pooled sample, firm size showed significant negative relation with profitability in the selected sector. This is consistent with many other studies, such as that by **Singh and Whittington (1968)** and **Goddard, Tavakoli and Wilson (2005).** The result is contradictory to the findings of **Samuels and Smith (1968)** who postulated positive relationship between size and profitability. This could be due to the changes in output either because of increased demand or reduction of costs. The reduction in costs could come directly from more productive capital equipment while increased demand could stimulate expansion on the part of the firm, hence affect profitability. It is evident from the results that one unit increase in sales had resulted in 0.27 units decrease in profitability. Thus, the study does not support the hypothesis, as the effect of size on profitability measured by profit margin (PM), is negative at1 per cent level. The sector wise analysis showed significant negative relationship between size and profitability i.e., one unit increase in sales will lead to 0.53 units decrease in profitability in two and three wheelers sector which is significant at 1 per cent level. The results of the equation for two and three wheelers sector indicated that Bajaj Auto Ltd, LML Ltd,Hero Honda Motors Ltd and Kinetic Engineering Ltd have shown positive relationship. Among them, only three companies (Bajaj Auto Ltd,LML Ltd and Kinetic Engineering Ltd) have shown statistically significant relationship. In these firms, more than 38 per cent of variations in profitability are explained by sales size. On the contrary, Maharashtra Scooters Ltd,TVS Motor Company Ltd,Kinetic Motor Company Ltd,Majestic Auto Ltd and Scooters India Ltd showed negative relationship. However, it was significant in the case of Majestic Auto Ltd.

Table 3 shows the results of regression of Profitability Rate (PR) fitted on size in all the selected companies and the whole automobile industry. The regression co-efficient 'b' relating profitability to sales (size) in the linear regression equation varies between companies. Similarly the table also shows that the degree of explanation of profitability (R^2) achieved in different companies also varied to a considerable degree. Equations fitted for profitability (Profit Rate) is hardly significantly different from the equation fitted for profit margin (shown in Table 2) as far as better explanation (R^2) is concerned. Only in the case of Maharashtra

Scooters Ltd, positive relationship between profitability and size can be seen, while these were negative in the case of regression of profit margin with size (shown in Table 2).

Table 4 shows the results of regression of long-term profitability (ROCE) fitted on size. The simple linear regression model describing the relationship between long-term profitability and size showed both positive and negative relationship (shown in Table 2 and 3). Here, the maximum explanation of profitability (i.e., highest R^2) through sales is in the case of TVS Motor Company Ltd as in Table 4. Here, 65 per cent of the variations in long-term profitability are explained by sales. The co-efficient is also statistically significant and goodness of fit of the model is also satisfactory.

B. GROWTH AND PROFITABILITY

It is well established that both growth and profitability are important dimensions of a firm's performance. When the study of growth is undertaken in terms of systematic influences which may affect growth, rather than regarding the growth as a wholly chance phenomenon, then the most important systematic influence on growth, is that of profitability. 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 argue 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 remains 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 minimum. In that range, increased size would, ceteris paribus, be associated with improved profitability. Assuming rational behavior, 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. In this scenario, cost concerns do not hinder additional growth, but in the size range beyond minimum efficient scale profitability would be either be unrelated to (increase in) size or the relationship would be determined by factors other than production cost. In short, basic econometric theory suggests that atleast 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 in the 1970s is intended as an actionable theory for business organizations in the world. According to this theory not only static economies of scale in production, but 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 the recipe for profitable growth begins 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 chances more readily than their bigger rivals. It may also be that smaller firms can profitability 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 Mongomer** suggest that new entrants can create a lasting advantage by rapidly building a dominant position for themselves in the market. **Mac Millan and Day** suggested that new firms become more profitable when they enter markets quickly and on a large scale. Therefore, 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. In addition, larger firms have higher rates of survivals 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 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** the relationship between company growth and profitability can be positive or negative. On the other hand, increased growth can contribute to a breakdown of informal relationships established over time 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, it has been found that growth had a positive impact on profitability, providing support for explanations that indicate a positive relationship. On the other hand, studies postulated negative relationship between growth and profitability.

In summary, 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 while the two dimensions of performance sometimes move together as suggested by theories reviewed, there are frequent other instances when growth-profit relationship is negative or neutral. But in an expanding economy, one should expect a positive association between growth and profitability of firms. 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, the researcher concludes that most of the studies support the general notion and so the postulates the following hypothesis:

Ho: Firm's growth positively affects profitability.

The models:

The study considered the following regression models.

Model 1: PM as the dependent variable

$PM_{ij} = \beta_0 + \beta_1 GROW_{ij} + e_{ij}$ .....1(a)

Model 2: PR as the dependent variable

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

Model 3: ROCE as the dependent variable

$ROCE_{ij} = \beta_0 + \beta_1 GROW_{ij} + e_{ij}$ .....1(c)

Where,

PM	measures the firm's profitability with gross profit as a percentage of sales turnover for firm (i) in the year (j)
PR	measures the firm's profitability with gross profit as a percentage of sales turnover for firm (i) in the year (j)
ROCE	measures the firm's profitability with return on capital employed as a percentage of sales turnover for firm (i) in the year (j)
β_0	constant term for firm (i) in the year (j)
β_1	regression co-efficient
$GROW_{ij}$	compound growth rate of net sales (growth) for firm (i) in the year (j)
e_{ij}	disturbance term for firm (i) in the year (j).

RESULTS AND DISCUSSION

The relationship between growth and profitability has been explored by means of regression analysis. The results are presented in Table 5. The table shows the extent to which changes in profitability margin are explained by the changes in growth of sales. The maximum value of co-efficient of determination (R^2) is in the case of whole industry i.e., 67, this means that 67 per cent changes in profitability margin are explained by growth of sales. The value of regression co-efficient 'b' showed positive impact of growth on profitability of two and three wheelers sector. The value of regression co-efficient 'b' is also the highest for the whole industry (0.38), followed by two and three wheelers sector (0.32). These co-efficients are statistically significant at 1 per cent level.

Table 5 also shows the results of regression of profit margin on growth of sales of companies selected for the study. Inter-companies differences regarding the relation between profitability and growth are evident from the table. These differences were expected because the firm's ability to grow and willingness to grow depend on many factors and these factors differ from company to company. Among the two and three wheeler companies, the highest value of R^2 (0.67) is in the case of Kinetic Engineering Ltd suggesting that 67 per cent changes in profit are explained by growth of sales. All the companies showed positive impact of growth of sales on profitability during the study period. The values of regression co-efficient 'b' ranged between 0.01 in Bajaj Auto Ltd and 1.01 in Kinetic Engineering Ltd indicating thereby that one per cent change in growth leads to 1 per cent to 1.01 per cent statistically significant change in profitability in the case of companies under two and three wheelers sector. Correlation co-efficient recorded the highest value of 0.82 for Kinetic Engineering Ltd followed by TVS Motor Company Ltd (0.67), whole industry (0.60) and two and three wheelers sector (0.48). These results are consistent with the results of **Capon et al. and Serrasqueiro** who found a positive relationship between growth and profitability in their study. However, these regression co-efficients are significant only in five out of nine companies. But all companies showed positive relationship between the two variables except Kinetic Motor Company Ltd.

High value of correlation co-efficient (0.82) for Kinetic Engineering Ltd also indicates that there is a significant positive correlation between profitability and growth of sales, as far as this company is concerned. Highest value of R^2 (0.67) in this company also indicates that 67 per cent variations in profitability are explained by variations in growth of sales. Profitability is almost unaffected by growth of sales in the case of Bajaj Auto Ltd, Hero Honda Motors Ltd and Majestic Auto Ltd (value of R^2 being either 0.01 or 0.02). After Kinetic Engineering Ltd, the next best fit of the regression equation is in the case of Maharashtra Scooters Ltd (0.58), followed by TVS Motor Company Ltd (0.45), Kinetic Motor Company Ltd (0.37) and Scooters India Ltd (0.33) and this again is statistically significant. Further, the regression co-efficient 'b' is negative (-0.28) in the case of Kinetic Motor Company Ltd. This explains that one per cent change in growth of sales leads to 0.28 per cent decrease in profitability. This proves that beyond a certain growth rate, the relationship between growth and profitability may be negative.

Table 6 shows the results of regression of profitability rate (PR) fitted on growth of sales in all the selected companies of two and three wheelers sector and the whole industry. The regression co-efficient 'b' relating profitability to growth in the linear regression equation varies between companies. Similarly, the table also shows that the degree of explanation of profitability (R^2) achieved in different companies also varied to a considerable degree. Here, the maximum explanation of profitability (i.e., highest R^2) through growth of sales is in the whole industry (38 per cent) and two and three wheelers sector (27 per cent). The positive values of correlation co-efficient show positive relationship between profitability and growth. Among the two and three wheelers sector companies, 7 per cent to 64 per cent variations in profitability are explained by growth of sales. Regression co-efficient in five out of nine companies are statistically significant either at 1 per cent or 5 per cent or 10 per cent level of significance. All the correlation co-efficient are also having positive values except in the case of Kinetic Motor Company Ltd, Hero Honda Motors Ltd and Majestic Auto Ltd. This suggests that different companies have different extents of relationship between profitability and growth of sales (both positive and negative). Similarly, in Hero Honda Motors Ltd and Majestic Auto Ltd, profitability is unexplained by growth of sales as suggested by zero value of R^2. Equation fitted for profitability rate (PR) is hardly significantly different from the equation fitted for profitability margin (PM) (shown in Table 5).

Table 7 shows the results of regression of Return on Capital Employed (ROCE) fitted on growth of sales in two and three wheelers sector and the whole industry. The regression co-efficient 'b' relating profitability to growth in the linear regression equation varies between companies. Similarly, the table also shows that the degree of explanation of profitability (R^2) achieved in different companies also varied to a considerable degree. Here, the maximum explanation of profitability (i.e., highest R^2) through growth of sales is in the case of whole industry (58 per cent) and two and three wheelers sector (54 per cent). The positive values of correlation co-efficient confirm positive relationship between profitability and growth. Among two and three wheelers sector companies, 2 per cent to 66 per cent variations in profitability are explained by growth of sales. Regression co-efficient in 6 out of 9 companies are statistically significant either at 1 per cent or 5 per cent or 10 per cent level of significance. All the correlation co-efficient are having positive values except in the case of Kinetic Motor Company Ltd which shows that there is a significant positive correlation between profitability and growth of sales. The highest value of R^2 (i.e., 0.66) in Maharashtra Scooters Ltd indicates that 66 per cent variations in profitability are explained by variations in growth of sales. All the companies showed positive impact of growth of sales on profitability during the study period. The values of regression co-efficient 'b' ranged between 0.01 in Bajaj Auto Ltd and 0.85 in TVS Motor Company Ltd. Majority of the companies are significant either at 1 per cent, 5 per cent or 10 per cent level except in the case of LML Ltd, Hero Honda Motors Ltd and Majestic Auto Ltd. Equation fitted for return on capital employed (ROCE) is significantly different from the equation fitted for profitability rate (PR) and profitability margin (PM) (shown in Table 5 and 6) as far as better explanation is concerned.

CONCLUSION

The analysis of the relationship between firm size and firm profitability in two and three wheelers sector companies finds firm size affecting profitability. The results show negatively significant evidence in two and three wheelers sector companies. Among the various companies selected for the study, some companies showed positive relationships while others did not. Therefore, while bigger firms perform better, the opposite holds true in two and three wheelers sector companies. These findings should be useful to the managerial authorities to decide on the extent to which firm size needs to be monitored and controlled. The study also investigated the behavior of growth rates and profitability for Indian two and three wheeler sector. In line with previous studies, it was found that growth rates are highly volatile over time and the relationship with profitability is not clear. Most of the previous studies support the general notion that there is a positive relationship between growth and profitability. However, in the case of two and three wheelers sector companies the positive effects of growth on profitability are greater than the negative effects. Also the extent of this positive relationship is 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.

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TABLES

TABLE 1: LIST OF SAMPLE COMPANIES INCLUDED IN THE PRESENT STUDY

S. No.	Companies	Year of Incor-poration	Ownership	Market Share (%)	Total Market Share
1.	Bajaj Auto Ltd	1945	Bajaj Group	18.80	
2.	LML Ltd	1972	LML Group	11.58	
3.	Maharashtra Scooters Ltd	1975	Bajaj Group	7.80	
4.	TVS Motor Company Ltd	1982	TVS Group	12.93	
5.	Kinetic Motor Company Ltd	1984	Firodia Group	11.75	
6.	Hero Honda Motors Ltd	1984	Hero (Munsals) Group	10.54	
7.	Kinetic Engineering Ltd	1970	Firodia Group	9.72	
8.	Majestic Auto Ltd	1986	Hero Group	9.04	
9.	Scooters India Ltd	1972	Central Govt. Commercial Enterprise	7.65	99.81

TABLE 2: REGRESSION ANALYSIS FOR FIRM SIZE AND PROFITABILITY (Model I – PM as the dependent variable)

Particulars	Constant	Size Co-efficient	R^2	Adj R^2	F Value	DW
Bajaj Auto Ltd	-7.69	2.98 (2.59)**	0.38	0.32	6.69	0.47
LML Ltd	-148.07	22.21 (4.04)*	0.60	0.56	16.18	0.51
Maharashtra Scooters Ltd	338.26	-69.38 (4.75)*	0.67	0.64	22.52	0.93
TVS Motor Company Ltd	48.28	-5.41 (5.78)*	0.75	0.73	33.37	1.36
Kinetic Motor Company Ltd	-479.55	-84.80 (6.78)*	0.81	0.79	46.01	1.16
Hero Honda Motors Ltd	10.08	0.39 (0.61)	0.03	-0.06	0.38	0.64
Kinetic Engineering Ltd	-231.14	42.18 (3.98)*	0.59	0.55	15.87	0.72
Majestic Auto Ltd	15.57	-2.56 (0.63)	0.03	-0.05	0.39	1.60
Scooters India Ltd	106.33	-21.60 (-1.88)***	0.24	0.17	3.52	0.71
Two & Three Wheelers	**12.78**	**-0.53 (3.05)***	**0.36**	**0.32**	**8.96**	**1.72**
Whole Industry	**10.35**	**-0.27 (2.58)****	**0.32**	**0.28**	**7.16**	**0.50**

*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

TABLE 3: REGRESSION ANALYSIS FOR FIRM SIZE AND PROFITABILITY (Model II – PR as the dependent variable)

Particulars	Constant	Size Co-efficient	R^2	Adj R^2	F Value	DW
Bajaj Auto Ltd	1.90	2.52 (2.39)**	0.34	0.28	5.73	0.54
LML Ltd	-94.17	13.34 (0.66)	0.04	-0.05	0.44	1.65
Maharashtra Scooters Ltd	0.27	2.27 (2.10)***	0.29	0.22	4.41	0.86
TVS Motor Company Ltd	89.40	-8.12 (3.15)*	0.36	0.31	9.16	0.82
Kinetic Motor Company Ltd	558.73	-99.30 (2.39)**	0.34	0.28	5.69	2.28
Hero Honda Motors Ltd	-1.02	7.70 (1.33)	0.14	0.06	1.77	0.45
Kinetic Engineering Ltd	-61.83	11.79 (3.25)*	0.38	0.29	8.42	0.37
Majestic Auto Ltd	43.97	-8.16 (1.05)	0.09	0.01	1.10	2.12
Scooters India Ltd	341.12	-70.01 (2.43)**	0.35	0.29	5.90	0.78
Two & Three Wheelers	**57.58**	**-3.93 (3.58)***	**0.38**	**0.31**	**6.18**	**1.68**
Whole Industry	**8.79**	**-0.29 (3.52)***	**0.36**	**0.32**	**5.98**	**0.86**

*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

TABLE 4: REGRESSION ANALYSIS FOR FIRM SIZE AND PROFITABILITY (Model III – ROCE as the dependent variable)

Particulars	Constant	Size Co-efficient	R^2	Adj R^2	F Value	DW
Bajaj Auto Ltd	15.99	1.17 (0.75)	0.05	-0.04	0.57	0.88
LML Ltd	-413.16	60.38 (2.12)***	0.29	0.23	4.49	1.49
Maharashtra Scooters Ltd	-0.62	2.05 (2.75)*	0.28	0.23	4.27	0.61
TVS Motor Company Ltd	232.46	-26.46 (4.51)*	0.65	0.62	20.34	1.07
Kinetic Motor Company Ltd	-396.21	-69.65 (1.79)***	0.23	0.26	3.19	1.97
Hero Honda Motors Ltd	52.07	1.96 (0.37)	0.01	-0.08	0.14	0.41
Kinetic Engineering Ltd	-111.43	20.11 (3.35)*	0.36	0.30	8.12	0.75
Majestic Auto Ltd	15.51	-2.11 (0.24)	0.01	-0.09	0.06	1.52
Scooters India Ltd	708.03	-147.57 (1.23)	0.12	0.04	1.52	1.37
Two & Three Wheelers	**54.85**	**-2.65 (3.79)***	**0.41**	**0.38**	**0.63**	**0.97**
Whole Industry	**5.54**	**-1.27 (2.79)***	**0.29**	**0.27**	**5.62**	**0.52**

*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

TABLE 5: REGRESSION RESULTS OF PROFITABILITY (P_1) ON GROWTH OF SALES ($PM_{ij} = \beta_0 + \beta_1 GROWTH_{ij}, + e_{ij}$)

Particulars	Constant	Growth Co-efficient	R^2	Adj R^2	F Value	DW	r
Bajaj Auto Ltd	15.03	0.01 (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	0.03 (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	0.02 (0.01)	0.00	-0.09	0.00	1.57	0.02
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****

PM – profit as percentage of sales

*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

TABLE 6: REGRESSION RESULTS OF PROFITABILITY (P_2) ON GROWTH OF SALES ($PR_{ij} = \beta_0 + \beta_1 GROWTH_{ij} + e_{ij}$)

Particulars	Constant	Growth Co-efficient	R^2	Adj R^2	F Value	DW	r
Bajaj Auto Ltd	20.41	0.01 (0.91)	0.07	-0.02	0.82	0.64	0.26
LML Ltd	-19.57	0.35 (1.40)	0.15	0.07	1.96	2.14	0.39
Maharashtra Scooters Ltd	13.60	0.20 (4.43)*	0.64	0.61	19.63	1.84	0.80*
TVS Motor Company Ltd	20.55	0.42 (1.85)***	0.24	0.17	3.41	0.98	0.49
Kinetic Motor Company Ltd	112.94	-15.91 (2.57)**	0.38	0.32	6.59	1.55	-0.61**
Hero Honda Motors Ltd	64.06	-0.02 (0.05)	0.00	-0.09	0.00	0.42	-0.02
Kinetic Engineering Ltd	3.74	0.46 (2.55)**	0.37	0.31	6.48	1.05	0.61**
Majestic Auto Ltd	3.62	-0.01 (0.07)	0.00	-0.09	0.01	1.99	-0.02
Scooters India Ltd	-2.32	0.77 (2.11)***	0.29	0.22	4.45	0.65	0.54
Two & Three Wheelers	**17.10**	**0.21 (2.01)*** **	**0.27**	**0.20**	**4.04**	**1.80**	**0.52**
Whole Industry	**10.00**	**0.09 (2.58)****	**0.38**	**0.32**	**6.67**	**0.74**	**0.61****

PR – profit as percentage of total assets
*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

TABLE 7: REGRESSION RESULTS OF PROFITABILITY (P_3) ON GROWTH OF SALES ($ROCE_{ij} = \beta_0 + \beta_1 GROWTH_{ij} + e_{ij}$)

Particulars	Constant	Growth Co-efficient	R^2	Adj R^2	F Value	DW	r
Bajaj Auto Ltd	23.59	0.01 (2.07)**	0.28	0.22	4.29	0.76	0.53
LML Ltd	-49.94	0.24 (0.55)	0.03	-0.06	0.30	0.94	0.16
Maharashtra Scooters Ltd	12.07	0.21 (4.57)*	0.66	0.62	20.91	1.44	0.81*
TVS Motor Company Ltd	15.71	0.85 (3.27)*	0.49	0.45	10.66	1.35	0.70*
Kinetic Motor Company Ltd	-106.30	-11.01 (2.51)**	0.36	0.32	6.12	1.02	-0.58**
Hero Honda Motors Ltd	63.14	-0.21 (0.64)	0.04	-0.05	0.40	0.42	0.19
Kinetic Engineering Ltd	0.92	0.84 (3.31)*	0.50	0.45	10.96	1.89	0.71*
Majestic Auto Ltd	4.70	-0.03 (0.41)	0.02	-0.07	0.17	1.48	0.12
Scooters India Ltd	-16.50	0.72 (2.21)***	0.30	0.26	4.98	1.61	0.51
Two & Three Wheelers	**28.26**	**0.18 (3.70)***	**0.54**	**0.49**	**12.18**	**1.04**	**0.63****
Whole Industry	**15.92**	**0.24 (3.56)****	**0.58**	**0.55**	**13.17**	**1.43**	**0.66****

ROCE – return on capital employed
*** - P < 0.01, ** - P < 0.05, *** - P < 0.10**

Source: Computed

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