

# Financial Performance of Nifty 50 Automobile Companies in India - An Empirical Comparative Analysis

V. L. Govindarajan\*, U. Parthiban\*\*, V. Balu\*\*\*

## Abstract

The present study is mainly based on the secondary data and the data is collected from the annual report of selected company and websites of moneycontrol.com, BSE.com etc for the period of Ten years, which ended on 31st March. The period of the study is 2009-10 to 2018-19. Edward Altman's Z score, IGR and SGR under Du Pont analysis were used as dependent variables and profitability ratios, liquidity ratios, per share ratios, were applied as independent variables. Earlier studies applied EPS, DPS, ROCE and operating profit etc. (Suwaidan 2004, Shailesh 2013, Butalal Ajmera 2019). All the parameters have been analyzed with descriptive statistics, Karl Pearson's correlation, Friedman test and coefficient of determination applied for its validity. EPS, DPS and Net Profit Margin have a positive impact on IGR at 84.9% (R Square). EPS, DPS, Net profit Margin, Current ratio, Quick ratio, Enterprise value/ Operating revenue and Price/Book value per share have a positive impact on SGR at 82.1%. EPS, ROCE, BVPS, NP Margin, Asset turnover and Current ratio have a significant impact at 0.01 levels and Quick ratio and Price/Book value per share have significant impact on Altman Z score at 0.05 levels of selected Nifty 50 automobile companies in India for the study period.

**Keywords:** Altman Z Score, DuPont Analysis of IGR and SGR and Automobile Industry

## Introduction

### Financial Performance

Company analysis is an issue of Economy-Industry-Company analysis sequence. Financial analysis starts with a historical analysis of incomes and dividend and its growth rates. Growth of economy depends on growth and development of industry sector. The literature review of Griffin and Mahon (1997) stated that the most popular financial measures are size, ROA, ROE, asset age and 5 years ROS. Bert Scholtens (2006), Brammer et al. (2006) measured financial performance based on Profit after Tax and Market capitalization as stock market performances. Fiori et al. (2009) financial performance be measured based on profitability, solvency, liquidity and repayment capacity. Theofanis Karagiorgos (2010) measured financial performances based on total sales, total assets, number of employees and risk and also measured stock return based on market capitalization. Zhi Tang et al. (2011) measured financial performances based on ROA. Babalola et al. (2012) in Nigeria, Swati Goyal in India measured financial performances based on Profit After Tax. Evelyn Setiawan et al. (2012) measured financial performances based on ROI and size measured by Total Sales and leverage measured by Total debt to Total Equity. Butala Ajmera (2019) measured based on EPS, DPS, ROCE etc.

\* Assistant Professor, Department of Commerce, DRBCCC Hindu College, Pattabiram, Chennai, Tamil Nadu, India.  
Email: [rgd1472@gmail.com](mailto:rgd1472@gmail.com)

\*\* Head, Department of Commerce, DRBCCC Hindu College, Pattabiram, Chennai, Tamil Nadu, India.

\*\*\* Assistant Professor, Department of Corporate Secretaryship, DRBCCC Hindu College, Pattabiram, Chennai, Tamil Nadu, India.

## Financial Performance under Du-Pont Analysis

Return on Investment (ROA) is Profit margin \* Assets turnover. ie  $PAT/Sales * Sales/Total Assets$ . When the investment turnover is multiplied by the Net profit ratio, the product is known as ROI. This pattern is also known as DU PONT Analysis.

Return on Equity is ROA \* Equity multiplier. I e  $PAT/Sales * Sales/Total Asset * Total Asset/ Shareholder Fund$ . (PAT/SHF)

## Measuring the Growth of the Firm

Internal Growth rate (IGR) is  $ROA * b/1 - ROA * b$ , where b is retention rate. Retention rate is 1- Dividend payout ratio, where Sustainable growth rate(SGR) is  $ROE * b/1 - ROE * b$

## Altman Z Score

Edward Altman published formulae to access the probability that a firm will measure financial health. Z score includes five easily derived business ratios, weighted by coefficients. Edward Altman's Z score was calculated and used as financial performance parameter. ( $Z \text{ score} = 1.20 X_1 + 1.40X_2 + 3.30X_3 + 0.60X_4 + 0.99X_5$ , where  $X_1$  is working capital/Total Assets,  $X_2$  is Retained earnings/Total Assets,  $X_3$  is EBIT/Total Assets,  $X_4$  is Market Capitalization/Total Value of Liability and  $X_5$  is Sales/Total Assets).

**Table 1: Standard Z Score Parameters**

Situation	Z Score	Zones	
I	Below 1.80	Bankruptcy Zone	Failure is certain
II	Between 1.80 -2.99	Healthy Zone	Uncertain to Predict
III	Above 2.99	Too Healthy Zone	Not to Fall

Source: Dr Shiv Prasad and Dr Veena Kumari, Indian Journal of Accounting (June 2013)

## Review of Literature

Akinmulegun Sunday Ojo (2012) empirically examined the effect of financial leverage (measured by Debt-Equity

ratio) on Earnings per Share (EPS) and Net Assets per Share (NAPS). Author used panel data on effect of leverage on performance indicators of some corporate firms in Nigeria during 1993 and 2005 and employed econometric technique of Vector Auto Regression (VAR) on the variables and found that leverage shock on EPS indirectly affect the NAPS. Leverage therefore significantly affects Corporate Performance.

Singh (2012) examined working Capital Ratio, Sales to Total Asset ratio, Cash conversion cycle and applied Karl Pearson's coefficient correlation and Regression analysis based on pooled observations and concluded that working capital turnover ratio, Sales to Total Assets ratio and ROCE has positive significant relationship with profitability of both IT and Telecom Industry in India and also observed that Telecom industry is operating below average so far as working capital management concerned.

Shailesh et al. (2013) examined capital structure practices with its effect on profitability of top 5 pharmaceutical companies in India, listed on BSE for the period of 5 years and used operating profit margin ratio, ROCE, RONW and Debt Equity ratio and applied Regression analysis and found that profitability of selected firms in India, is insignificant in bringing any changes in their Capital structure.

Aparna et al. (2018) studied availability of number of economies for producing on a large scale and small size firms by availing the internal economies particularly, carried out to identify whether these internal economies derived from different functional areas are truly enjoyed or not and selected 9335 public limited companies under seven categories for their period of three years from 2014-2016 and applied Analysis of Variance, concluded that greater difference among the different categories of public limited companies with respect to their profitability, expenditure and turnover positions.

Chandrakumar Mangalam (2010) studied the impact of financial leverage, Operating leverage and combined leverage on EPS of the Indian companies. Author concluded that there is a significant relationship between degree of operating leverage, degree of financial leverage and combined leverage and positive significance between degree of financial leverage and EPS.

Shiv Prasad et al. (2013) examined financial health of ITDC, public sector undertaking in India and concluded that the financial health was in the too healthy zone during 2007, 2008 and 2009, which have come to gray area due to recession in tourism sector, global crisis and terrorist attack at Mumbai.

Jothi Jayakrishnan et al. (2015) studied the relationship between fourteen capital structure determinants and its effects on capital structure of fifty chemical companies in India for the period of six years from 2000-2013 and concluded that profitability, uniqueness and manufacturing sources are the positive determinants, but tax and retained earnings are negative determinants of the capital structure of the selected chemical companies in India.

Butalal Ajmera (2019) used secondary data to analyze the relationship between financial leverage and earnings and dividend policy of selected steel companies in India, and applied correlation matrix and found that DPS has significant and positive relationship with ROCE, DPR and Ke and concluded that DPS has insignificant impact on independent variables, but DPS has been negatively affected by degree of financial leverage.

## Statement of the Problem

This study was descriptive in nature and expands the comparative knowledge in the area of Du Pont Analysis and Altman Z score of selected nifty 50 automobile companies have significant impact on financial performance is the considerable attention. In this study Profitability ratios, Liquidity ratios and Per share ratios were treated as other financial independent variables and IGR, SGR and Altman Z score were used as dependent financial variables. A comparative empirical study has been applied with these financial variables to what extent these independent variables impact on dependent variables of selected companies in India for the period ended from 31<sup>st</sup> March 2010 to 31<sup>st</sup> March 2019.

## Objectives of the Study

- To Calculate the Internal Growth Rate (IGR) and Sustainable Growth Rate (SGR) under Du Pont analysis of selected companies.
- To determine the Altman Z score of selected companies.
- To find any relationship between Altman Z score and Du Pont growth rates.
- To determine whether independent variables have any cause and effect impact on IGR, SGR and Altman Z score of selected Nifty 50 Automobile companies in India.

## Research Methodology

The study is based on secondary data consists of the annual reports of selected companies collected through moneycontrol.com for the 10 years period from 31<sup>st</sup> March 2010 to 31<sup>st</sup> March 2019. Various reports like magazines, published books and web sites were also referred for the present study.

IGR and SGR under Du Pont analysis and profitability ratios, Liquidity ratios and per share ratios were used as modern financial variable instead of other financial variables like operating profit ratio, ROCE etc. (Suwaidan 2004), Adam Lindgreen et al. (2008), Jain Neeta et al., Zhi Tang et al. (2010) Md Abdur Rouf (2011), Yaghoub Alavi Matin et al. 2011 and Altman B model Dr Krishn Awatar (2019). For the analysis Mean, Standard Deviation, one sample t test, Correlation coefficients and regression analysis have been applied for its validity.

## Analysis and Interpretations

**Table 2: Descriptive Statistics**

Nifty 50-Automobiles	N	Mean	Std. Deviation	Skewness	
Internal Growth Rate	53	11.5092	6.47598	0.957	0.327
Sustainable Growth Rate	53	21.3051	15.45703	1.823	0.327
Earnings Per Share	60	128.4628	150.90340	2.492	0.309
Dividend Per Share	60	38.9783	35.51824	0.721	0.309
Book Value Per Share	60	468.6048	486.73185	2.392	0.309
Return on Cap Employed	60	24.7505	16.82412	0.207	0.309

Nifty 50-Automobiles	N	Mean	Std. Deviation	Skewness	
NP Margin	60	10.2975	6.80007	-0.760	0.309
Asset Turnover	60	135.8392	50.68032	0.444	0.309
Altman Z Score	60	5.4007	2.59711	1.608	0.309
Current Ratio	60	1.1963	0.61787	0.706	0.309
Quick Ratio	60	.9872	0.60135	0.795	0.309
Inventory Turn-over Ratio	60	21.7375	10.29169	0.191	0.309
Enterprise Value/ Operating Revenue	60	3.0683	2.52740	2.133	0.309
Price/Book Value	60	6.5658	5.47473	2.620	0.309
Valid N (listwise)	53				

The above Table 2 shows that the Mean value of IGR is 11.5092 and SGR is 21.30. Hero motors, Eicher motors and Bajaj auto Ltd has higher mean value than the Nifty 50 auto. The Mean value EPS is 128.46, where Eicher motors, Hero Motors and Maruti Suzuki Ltd has higher than the average level. Mean value of DPS is 38.97, where Bajaj auto, Eicher and Hero motors has the higher value. Mean value of BVPS is 468.60, where Eicher and Maruti Ltd has the higher value. Mean value of ROCE is 24.75, where Bajaj auto, Eicher and Hero motors has the higher value. Mean value of NPM is 10.29, where Bajaj auto, Eicher and Hero motors has the higher value. Mean value of ATR is 135.84, where Bajaj auto, Hero motors and Maruti Suzuki Ltd has the higher value. Mean value

of Altman Z Score is 5.40, where Bajaj auto, Eicher and Hero motors has the higher value. i.e these companies were financially sound.

*Null Hypothesis-1:* That there is no any significant relationship between IGR, SGR with Altman Z score of selected companies in India.

**Table 3: Correlation Co-efficient of Selected Dependent Variables**

		Internal Growth Rate	Sustainable Growth Rate
Sustainable Growth Rate	Pearson Correlation	0.874**	
	Sig. (2-tailed)	0.000	
Altman Z Score	Pearson Correlation	0.777	0.594
	Sig. (2-tailed)	0.000	0.000

Table 3 shows that IGR has positive significant relationship with SGR and Altman Z Score at 0.01 levels and at the same time SGR also has significant positive relationship with Altman Z score at 0.01 levels. Hence, rejected the null hypothesis and stated that there is significant relationship between IGR, SGR with Altman Z score of Nifty 50 automobile companies in India.

*Null Hypothesis-2:* That there is no any significant relationship between the dependent and independent variables of Nifty 50 companies in India.

**Table 4: Correlation Co-efficient of Selected Independent Variables**

Variables		IGR	SGR	Altman Z Score	Results		
					1	2	3
Earnings Per Share	Correlation	0.873	0.375	0.681	Yes	Yes	Yes
	Significance	<b>0.000</b>	<b>0.006</b>	<b>0.000</b>			
Dividend Per Share	Correlation	0.531	0.280	0.509	Yes	Yes	Yes
	Significance	<b>0.000</b>	<b>0.042</b>	<b>0.000</b>			
Book Value Per Share	Correlation	0.367	0.091	0.298	Yes	No	No
	Significance	<b>0.000</b>	<b>0.516</b>	<b>0.021</b>			
Return on Capital Employed	Correlation	0.749	0.676	0.578	Yes	Yes	Yes
	Significance	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>			
Net Profit Margin	Correlation	0.767	0.609	0.703	Yes	Yes	Yes
	Significance	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>			
Asset Turnover	Correlation	0.310	0.300	0.183	Yes	Yes	No
	Significance	<b>0.024</b>	<b>0.029</b>	<b>0.162</b>			

Variables		IGR	SGR	Altman Z Score	Results		
					1	2	3
Current Ratio	Correlation	0.239	0.021	0.122	No	No	No
	<b>Significance</b>	<b>0.085</b>	<b>0.882</b>	<b>0.351</b>			
Quick Ratio	Correlation	0.279	0.037	0.172	Yes	No	No
	<b>Significance</b>	<b>0.043</b>	<b>0.794</b>	<b>0.189</b>			
Inventory Turnover Ratio	Correlation	0.328	0.227	0.230	Yes	No	No
	<b>Significance</b>	<b>0.016</b>	<b>0.102</b>	<b>0.076</b>			
Enterprise Vale/Operating Revenue	Correlation	0.466	0.362	0.467	Yes	Yes	Yes
	<b>Significance</b>	<b>0.000</b>	<b>0.008</b>	<b>0.000</b>			
Price/Book Value Per Share	Correlation	0.620	0.599	0.576	Yes	Yes	Yes
	<b>Significance</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>			

Table 4 shows that all the selected independent variables have positive and significant relationship with IGR (except Current ratio), SGR (except BVPS, Current ratio, Quick ratio and Inventory turnover ratio) and Altman Z score (except Asset Turnover and Liquidity ratios) at 0.05 levels.

*Null Hypothesis-3:* That there are no any significant differences between the selected independent variables of Nifty 50 companies in India.

**Table 5: Ranks**

	Mean Rank
Earnings Per Share	8.43
Dividend Per Share	6.82
Book Value Per Share	10.70
Return On Capital Employed	6.75
NP Margin	5.02
Asset Turnover	9.90
Current Ratio	2.37
Quick Ratio	1.42

	Mean Rank
Inventory Turnover Ratio	6.77
Enterprise Value/Operating Revenue	3.37
Price/Book Value	4.47

**Table 6: Test Statistics<sup>a</sup>**

	N	60
Chi-Square		492.654
df		10
Asymp. Sig.		0.000

a. Friedman Test

Friedman test statistics proved that the independent variables has significant at 0.01 levels and rejected null hypothesis and concluded that there are significant differences between the selected independent variables.

*Null Hypothesis-4:* The independent variables have no any impact on IGR, SGR and Altman Z score of selected Nifty 50 automobile companies In India.

**Table 7: Co-efficient Results of Nifty 50 (Automobile)**

Variables	Model Summary		ANOVA		Standardized Coefficient		
	R	R Square	F	Sig	IGR	SGR	Altman Z Score
(Constant) IGR	0.922	0.849	21.024	<b>0.000</b>	<b>0.049</b>		
(Constant) SGR	0.906	0.821	17.047	<b>0.000</b>		<b>0.041</b>	
(Constant) Altman Z score	0.948	0.898	38.505	<b>0.000</b>			<b>0.013</b>
Earnings Per Share					<b>0.014</b>	<b>0.020</b>	<b>0.000</b>
Dividend Per Share					<b>0.000</b>	<b>0.000</b>	<b>0.655</b>
Book Value Per Share					0.306	0.739	<b>0.000</b>
Return on Capital Employed					0.229	0.572	<b>0.000</b>

Variables	Model Summary		ANOVA		Standardized Coefficient		
	R	R Square	F	Sig	IGR	SGR	Altman Z Score
Net Profit Margin					<b>0.012</b>	<b>0.024</b>	<b>0.000</b>
Asset Turnover					0.243	0.567	<b>0.000</b>
Current Ratio					0.567	<b>0.014</b>	<b>0.009</b>
Quick Ratio					0.544	<b>0.019</b>	<b>0.010</b>
Inventory Turnover Ratio					0.998	0.782	0.554
Enterprise Vale/Operating Revenue					0.272	<b>0.003</b>	0.981
Price/Book Value Per Share					0.191	<b>0.002</b>	<b>0.019</b>

Table 7 showed that the f value of IGR is 21.024 and significant at 0.01 levels and proved that EPS, DPS and Net Profit Margin has positive impact on IGR at 84.9% (R Square). F value of SGR is 17.047 and has significant with predictors at 0.01 levels. EPS, DPS, Netprofit Margin, Current ratio, Quick ratio, Enterprise value/Operating revenue and Price/Book value per share have positive impact on SGR at 82.1% of selected companies in India. F value of Altman Z score is 38.505 and is significant at 0.01 levels. EPS, ROCE, BVPS, NP Margin, Asset turnover and Current ratio have significant impact at 0.01 levels and Quick ratio and Price/Book value per share have significant impact at 0.05 levels on Altman Z score and these variables has influences to the extent of 89.8% of selected Nifty 50 automobile companies in India.

## References

- Ojo, A. S. (2012). The effect of financial leverage on corporate performance of some selected companies in Nigeria. *Journal of Canadian Social Sciences*, 8(1), 84-90.
- Mahon, J., & Wartick, S. L. (2012). Corporate social performance profiling: Stakeholders perceptions to assess corporate reputation. *Journal of Public Affairs*, 12(1), 12-28.
- Singh, D. P. (2012). Working capital management and profitability in the IT and telecom industry in India. *Indian Journal of Finance*, 54-61.
- Bhanavat, S. S. (2013). In search of prediction model for determination of shareholders wealth. *Indian Journal of Accounting*, 44(2), 53-67.
- Bhayani, S. J., & Ajmera, B. (2018). An empirical study on effect of financial leverage on firms performance and valuation of selected pharmaceutical companies in India. *Indian Journal of Accounting*, 101-110.
- Aparna, K., Krishnudu, C., & Raghupathi (2018). Size of firms and its impact on financial performances of select Indian public companies. *Indian Journal of Accounting*, 38-44.
- Rustagi, R. P. (2013). *Investment analysis and portfolio management*. Sultan Chand Publications.
- Sharma, D., Sharam, J., & Arif, M. (2015). Corporate profitability and working capital management: A case study of steel authority of India limited. *Indian Journal of Accounting*, 47(1), 100-107.
- Ogbodo, C., Sharma, J., & Egbunike, F. (2016). The relationship between human resource performance ratios and financial performance of Nigerian firms. *Journal of Resources Development and Management*, 70-85.
- Vijayalakshmi, S., Sowndarya, K., & Sowndharya, K. (2017). A study on financial performance analysis of Bharti Airtel Limited. *International Journal of Business Marketing and Management*, 2(2), 27-32.
- Pavithra, J., Thooyamani, K. P., & Dkhar, K. (2017). A study on the analysis of financial performance with reference to Jeppiaar Cements Pvt. Ltd. *International Journal of Pure and Applied Mathematics*, 116(14), 189-194.
- Goyal, K. A., & Rathi, M. (2019). A study on financial performance analysis of TCS: Trend and Du Pont analysis. *Indian Journal of Accounting*, 51(2), 81-89.
- Chandrakumarmangalam, S. (2010). Leverage an analysis and its impact on the profitability with reference to selected companies in India. *European Journal of Economics and Administrative Sciences*, 27(2010), 53-65.
- Ajmera, B. (2019). Financial leverage, earnings and dividend earnings and dividend: An empirical analysis of selected steel companies in India. *Indian Journal of Accounting*, 113-221.
- Prasad, S., & Kumari, V. (2013). An empirical study on financial health of ITDC through Z score analysis. *Indian Journal of Accounting*, 44(2), 26-34.

## Annexure

Table 8: Descriptive Statistics

<i>Bajaj Auto Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
	<i>Statistic</i>	<i>Statistic</i>	<i>Statistic</i>	<i>Statistic</i>	<i>Std. Error</i>
Internal Growth Rate	10	15.5180	6.84816	1.231	0.687
Sustainable Growth Rate	10	31.3590	23.05394	1.343	0.687
Earnings Per Share	10	122.1510	20.00187	0.751	0.687
Dividend Per Share	10	50.0000	7.45356	0.000	0.687
Book Value Per Share	10	401.5440	205.85325	0.594	0.687
Return on Cap Employed	10	35.8690	11.01390	1.722	0.687
NP Margin	10	16.1020	2.00585	0.802	0.687
Asset Turnover	10	138.2240	26.74034	0.227	0.687
Altman Z Score	10	5.7910	0.64714	-0.478	0.687
Current Ratio	10	1.5430	0.74033	0.424	0.687
Quick Ratio	10	1.4010	0.66807	0.718	0.687
Inventory Turnover Ratio	10	30.0530	2.36216	-0.259	0.687
Enterprise Value/Op.Revenue	10	2.8420	0.38632	1.365	0.687
Price/Book Value	10	6.2920	2.00761	0.636	0.687
<i>Eicher Motors Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Internal Growth Rate	8	17.7838	7.89078	0.181	0.752
Sustainable Growth Rate	8	31.6888	16.36196	0.382	0.752
Earnings Per Share	10	321.8220	271.96974	0.358	0.687
Dividend Per Share	10	56.2000	47.51327	0.322	0.687
Book Value Per Share	10	824.6880	891.18927	1.171	0.687
Return on Cap Employed	10	34.2870	18.73377	-0.499	0.687
NP Margin	10	18.7590	2.52498	-0.651	0.687
Asset Turnover	10	102.4130	45.43454	-1.097	0.687
Altman Z Score	10	9.2700	3.30724	0.704	0.687
Current Ratio	10	1.3390	0.81961	0.152	0.687
Quick Ratio	10	1.1440	0.77357	0.373	0.687
Inventory Turnover Ratio	10	15.3250	6.57720	-1.294	0.687
Enterprise Value/Op.Revenue	10	7.4580	3.43969	-0.651	0.687
Price/Book Value	10	13.8890	9.31380	0.751	0.687
<i>Hero Motors Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Internal Growth Rate	9	11.6700	4.00620	-0.363	0.717
Sustainable Growth Rate	9	21.7944	13.55605	1.337	0.717
Earnings Per Share	10	134.3120	32.08289	0.528	0.687
Dividend Per Share	10	78.4000	21.37600	0.050	0.687
Book Value Per Share	10	353.2150	174.97970	0.590	0.687
Return on Cap Employed	10	41.7310	7.13517	2.331	0.687
NP Margin	10	10.4300	1.73638	0.915	0.687
Asset Turnover	10	217.3070	31.25872	0.169	0.687
Altman Z Score	10	6.4860	0.86791	-0.676	0.687
Current Ratio	10	1.3800	0.45605	-0.008	0.687
Quick Ratio	10	1.2230	0.40749	0.203	0.687
Inventory Turnover Ratio	10	37.3500	3.68351	0.263	0.687

<i>Hero Motors Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Enterprise Value/Op.e.Revenue	10	1.8820	0.33092	-0.314	0.687
Price/Book Value	10	7.7580	2.26410	0.075	0.687
<i>Mahindra &amp; Mahindra Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Internal Growth Rate	10	9.0390	1.43319	0.026	0.687
Sustainable Growth Rate	10	17.6380	5.26360	0.062	0.687
Earnings Per Share	10	46.9490	10.65503	-0.003	0.687
Dividend Per Share	10	11.3500	2.13503	-0.812	0.687
Book Value Per Share	10	274.1290	94.48947	0.466	0.687
Return on Cap Employed	10	16.4200	2.22296	-0.518	0.687
NP Margin	10	9.1700	1.20447	1.221	0.687
Asset Turnover	10	119.1400	14.14926	0.761	0.687
Altman Z Score	10	3.6630	0.15952	-0.701	0.687
Current Ratio	10	1.1660	0.11983	-0.938	0.687
Quick Ratio	10	.8900	0.12841	-0.919	0.687
Inventory Turnover Ratio	10	15.3240	1.42218	0.504	0.687
Enterprise Value/Op.e.Revenue	10	1.6240	0.20956	-0.604	0.687
Price/Book Value	10	3.3330	0.52673	-0.457	0.687
<i>Maruti Suzuki India Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Internal Growth Rate	10	10.6170	2.57540	0.246	0.687
Sustainable Growth Rate	10	15.5930	3.71460	0.368	0.687
Earnings Per Share	10	144.1230	79.45527	0.546	0.687
Dividend Per Share	10	33.6000	32.21783	0.775	0.687
Book Value Per Share	10	852.5350	393.31291	0.708	0.687
Return on Cap Employed	10	17.6800	5.66068	0.406	0.687
NP Margin	10	7.7110	2.01207	-0.075	0.687
Asset Turnover	10	153.2600	21.76444	1.154	0.687
Altman Z Score	10	4.7520	0.48751	-0.114	0.687
Current Ratio	10	1.2100	0.61516	0.764	0.687
Quick Ratio	10	.9430	0.59311	0.728	0.687
Inventory Turnover Ratio	10	22.8680	3.01006	-0.454	0.687
Enterprise Value/Op.e.Revenue	10	1.8270	0.82566	0.570	0.687
Price/Book Value	10	3.7820	1.34400	0.675	0.687
<i>Tata Motors Ltd</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Skewness</i>	
Internal Growth Rate	6	1.8250	1.31995	0.205	0.845
Sustainable Growth Rate	6	5.6017	4.62483	0.712	0.845
Earnings Per Share	10	1.4200	15.67528	1.520	0.687
Dividend Per Share	10	4.3200	7.16795	1.756	0.687
Book Value Per Share	10	105.5180	96.27807	1.840	0.687
Return on Cap Employed	10	2.5160	7.39330	-1.883	0.687
NP Margin	10	-.3870	5.61482	-1.532	0.687
Asset Turnover	10	84.6910	15.21409	0.778	0.687
Altman Z Score	10	2.4420	0.42624	-0.194	0.687
Current Ratio	10	.5400	0.09274	-1.006	0.687
Quick Ratio	10	.3220	0.08917	-1.187	0.687
Inventory Turnover Ratio	10	9.5050	3.75892	-1.093	0.687
Enterprise Value/Op.e.Revenue	10	2.7770	1.37989	0.764	0.687
Price/Book Value	10	4.3410	3.39512	1.360	0.687

**Table 9: IGR and SGR Calculations (Consolidated)**

## 1. Bajaj Auto Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	17.07	21.46	62.87	12.01	15.59
31-03- 2018	17.07	21.29	60.88	11.59	14.88
31-03- 2017	18.38	22.46	96.23	21.47	27.56
31-03- 2016	23.83	29.62	26.37	06.70	08.47
31-03- 2015	18.08	26.31	48.58	09.62	14.65
31-03- 2014	21.99	33.75	55.40	13.86	22.98
31-03- 2013	24.39	38.51	57.22	16.21	28.25
31-03- 2012	27.10	49.72	56.66	18.13	39.21
31-03- 2011	36.11	68.01	65.35	30.87	79.98
31-03- 2010	19.46	58.05	65.96	14.72	62.02

**Internal Growth Rate = Average return on Asset \* Average retention rate** = 0.15518 \* 0.5946 = 0.0922 or **09.22%** AND  
**Sustainable Growth Rate = Average Return on Equity \* Ave retention rate** = 0.31359 \* 0.5946 = 0.999 or **18.64%**

## 2. Eicher Motors Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	21.67	28.82	85.41	22.70	32.64
31-03- 2018	21.97	31.88	81.49	21.58	35.08
31-03- 2017	28.15	39.77	-	-	-
31-03- 2016	36.12	56.03	64.24	30.20	56.22
31-03- 2015	-	-	-	-	-
31-12- 2014	25.07	45.30	75.76	23.44	52.23
31-12- 2013	18.78	33.92	70.89	15.35	31.64
31-12- 2012	14.13	23.01	62.70	09.70	16.84
31-12- 2011	15.91	23.06	65.33	11.59	17.72
31-12- 2010	11.79	16.51	60.73	07.71	11.14

**Internal Growth Rate = Average return on Asset \* Average retention rate** = 0.1778 \* 0.7081 = 0.1259 or **12.59%** AND  
**Sustainable Growth Rate = Average Return on Equity \* Ave retention rate** = 0.3618 \* 0.7081 = 2.243 or **22.43%**

## 3. Hero Motors Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	19.18	26.32	43.95	09.19	13.07
31-03- 2018	22.08	31.41	54.09	13.56	20.45
31-03- 2017	22.98	33.39	48.56	12.56	19.34
31-03- 2016	25.38	39.42	54.11	15.91	27.11
31-03- 2015	22.67	36.47	49.78	12.71	22.17

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2014	20.88	37.66	38.41	08.72	16.90
31-03- 2013	21.96	42.31	43.44	10.46	22.50
31-03- 2012	24.04	55.43	62.22	17.58	52.53
31-03- 2011	17.97	65.21	-	-	-
31-03- 2010	26.18	64.41	01.59	04.34	02.08

**Internal Growth Rate = Average return on Asset \* Average retention rate** = 0.1167 \* 0.4401 = 0.0513 or **05.13%** AND  
**Sustainable Growth Rate = Average Return on Equity \* Ave retention rate** = 0.2179 \* 0.4401 = 0.959 or **09.59%**

## 4. Mahindra and Mahindra Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	09.10	14.01	80.57	07.90	12.71
31-03- 2018	09.18	14.37	78.76	07.79	12.76
31-03- 2017	09.11	13.60	76.92	07.52	11.68
31-03- 2016	09.02	14.29	73.58	07.11	11.74
31-03- 2015	10.08	17.25	77.56	08.47	15.45
31-03- 2014	12.01	22.39	77.06	10.19	20.85
31-03- 2013	12.21	22.88	76.2	10.25	21.11
31-03- 2012	12.03	24.08	73.35	09.67	21.44
31-03- 2011	13.62	26.46	73.48	11.11	24.13
31-03- 2010	12.78	26.72	73.68	10.38	24.51

**Internal Growth Rate = Average return on Asset \* Average retention rate** = 0.0937 \* 0.6842 = 0.0641 or **06.41%** AND  
**Sustainable Growth Rate = Average Return on Equity \* Ave retention rate** = 0.1764 \* 0.6842 = 0.1207 or **12.07%**

## 5. Maruti Suzuki India Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	11.91	16.25	67.79	08.84	12.37
31-03- 2018	13.00	18.49	70.66	10.11	15.02
31-03- 2017	14.34	20.17	85.62	14.00	20.87
31-03- 2016	12.79	17.95	85.93	12.34	18.23
31-03- 2015	11.06	15.65	79.66	09.66	14.24
31-03- 2014	09.11	13.26	86.98	08.60	13.03
31-03- 2013	08.94	12.87	89.90	08.74	13.08
31-03- 2012	07.33	10.76	86.75	06.79	10.29
31-03- 2011	12.42	16.50	90.54	12.66	17.55
31-03- 2010	15.18	21.10	83.07	14.43	21.25

**Internal Growth Rate = Average return on Asset \* Average retention rate** = 0.1062 \* 0.8269 = 0.0878 or **08.78%** AND  
**Sustainable Growth Rate = Average Return on Equity \* Ave retention rate** = 0.1559 \* 0.8269 = 1.289 or **12.89%**

## 6. Tata Motors Ltd

Year Ended on	ROA	ROE	Retention %	IGR	SGR
31-03- 2019	03.31	09.11	-	03.31	09.11
31-03- 2018	-01.74	-05.13	-	-	-
31-03- 2017	-04.12	-11.48	-	-	-
31-03- 2016	-00.10	-00.26	80.00	-	-
31-03- 2015	-09.48	-31.93	-	-	-
31-03- 2014	00.67	01.74	73.04	00.48	01.28
31-03- 2013	00.57	01.57	69.56	00.39	01.10
31-03- 2012	02.27	06.33	55.05	01.39	03.60
31-03- 2011	03.34	09.06	59.84	02.00	05.73
31-03- 2010	04.38	15.15	74.87	03.38	12.79

**Table 10: Edward Altman's Z Score of Automobile Industry in India (Nifty-50)**

Company Name	Year	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	Z Score
Bajaj Auto Ltd	2009-10	-0.087	0.445	0.894	2.040	1.361	<b>04.653</b>
	2010-11	-0.107	0.700	1.551	2.742	1.816	<b>06.702</b>
	2011-12	0.060	0.727	1.204	2.628	1.798	<b>06.417</b>
	2012-13	0.198	0.854	1.125	2.502	1.649	<b>06.328</b>
	2013-14	0.072	0.885	1.036	2.442	1.399	<b>05.834</b>
	2014-15	0.388	0.935	0.865	2.238	1.411	<b>05.937</b>
	2015-16	0.141	1.102	1.108	2.532	1.131	<b>06.014</b>
	2016-17	0.355	1.125	0.845	2.334	1.092	<b>05.751</b>
	2017-18	0.258	1.104	0.805	2.004	1.101	<b>05.272</b>
2018-19	0.096	1.097	0.825	1.842	1.153	<b>05.013</b>	
Eicher Motors Ltd	2009-10	-0.175	0.639	0.525	3.354	0.910	<b>05.253</b>
	2010-11	-0.144	0.939	0.726	3.120	1.158	<b>05.799</b>
	2011-12	0.602	0.918	0.733	3.054	1.386	<b>06.693</b>
	2012-13	0.435	0.823	1.168	4.595	1.723	<b>08.744</b>
	2013-14	0.335	0.749	1.778	5.438	2.100	<b>10.404</b>
	2014-15	0.158	0.757	1.917	10.761	2.090	<b>15.683</b>
	2015-16	-0.05	0.892	1.686	8.594	1.767	<b>12.934</b>
	2016-17	-0.262	0.984	1.359	7.527	1.297	<b>10.902</b>
	2017-18	0.050	0.959	1.122	5.942	1.179	<b>09.252</b>
2018-19	0.306	1.048	1.089	3.545	1.076	<b>07.064</b>	
Hero Motors Ltd	2009-10	-0.274	0.561	1.096	2.736	1.871	<b>05.991</b>
	2010-11	-0.026	0.381	0.763	1.764	1.812	<b>04.695</b>
	2011-12	0.058	0.600	0.964	2.490	2.396	<b>06.514</b>
	2012-13	0.113	0.721	0.868	1.926	2.484	<b>06.113</b>
	2013-14	0.134	0.770	0.875	2.706	2.524	<b>07.013</b>
	2014-15	0.159	0.865	1.046	3.000	2.643	<b>07.712</b>
	2015-16	0.184	0.896	1.175	2.862	2.326	<b>07.441</b>
	2016-17	0.274	0.960	1.046	2.634	1.950	<b>06.863</b>
	2017-18	0.323	0.980	1.033	2.544	1.764	<b>06.642</b>
2018-19	0.270	1.020	0.938	1.740	1.930	<b>05.892</b>	

Company Name	Year	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	Z Score
Mahindra and Mahindra Ltd	2009-10	0.062	0.647	0.591	1.134	1.139	<b>03.573</b>
	2010-11	-0.031	0.717	0.607	1.261	1.210	<b>03.764</b>
	2011-12	0.030	0.696	0.521	1.031	1.338	<b>03.616</b>
	2012-13	0.033	0.732	0.558	1.116	1.478	<b>03.917</b>
	2013-14	0.096	0.737	0.489	1.109	1.304	<b>03.735</b>
	2014-15	0.042	0.805	0.434	1.274	1.196	<b>03.751</b>
	2015-16	0.060	0.872	0.416	1.211	1.163	<b>03.722</b>
	2016-17	0.088	0.928	0.403	1.141	1.124	<b>03.684</b>
	2017-18	0.079	0.876	0.432	1.114	1.038	<b>03.539</b>
	2018-19	0.085	0.893	0.403	0.906	1.038	<b>03.325</b>
Maruti Suzuki Ltd	2009-10	-0.013	0.995	0.716	1.518	1.809	<b>05.025</b>
	2010-11	0.365	1.043	0.561	1.196	1.994	<b>05.159</b>
	2011-12	0.244	0.944	0.323	1.050	1.616	<b>04.177</b>
	2012-13	0.189	0.965	0.393	0.871	1.644	<b>04.062</b>
	2013-14	0.239	0.955	0.416	1.164	1.443	<b>04.217</b>
	2014-15	-0.021	0.983	0.498	2.000	1.499	<b>04.959</b>
	2015-16	-0.091	0.993	0.591	1.607	1.392	<b>04.492</b>
	2016-17	-0.103	0.991	0.647	2.135	1.358	<b>05.028</b>
	2017-18	-0.151	0.980	0.630	2.706	1.364	<b>05.529</b>
	2018-19	-0.034	1.022	0.554	1.920	1.393	<b>04.855</b>
Tata Motors Ltd	2009-10	-0.249	0.389	0.152	0.680	0.689	<b>01.661</b>
	2010-11	-0.177	0.501	0.092	0.880	0.877	<b>02.173</b>
	2011-12	-0.186	0.487	0.049	0.962	0.986	<b>02.298</b>
	2012-13	-0.252	0.496	0.049	0.987	0.849	<b>02.129</b>
	2013-14	-0.290	0.521	0.277	1.545	0.682	<b>02.735</b>
	2014-15	-0.283	0.399	0.155	2.129	0.719	<b>03.119</b>
	2015-16	-0.144	0.557	0.099	1.386	0.748	<b>02.646</b>
	2016-17	-0.178	0.487	0.221	1.609	0.745	<b>02.884</b>
	2017-18	-0.187	0.461	0.148	1.128	0.983	<b>02.533</b>
	2018-19	-0.191	0.494	0.228	0.586	1.124	<b>02.241</b>

(Source of variables from the annual reports of selected companies)