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MAXIMIZATION OF SHAREHOLDERS WEALTH: A STUDY ON INDIAN AUTOMOBILE COMPANIES

Sri Ayan Chakraborty
Faculty,Management: University Program (Techno India University), ICA Eduskills

Abstract
The main objective of a Company is to maximize its Shareholders' Wealth. Maximization of P/E has been an Accounting procedure which has been used by Financial Analysts over decades. Traditional analysis do not take into consideration a firm's cost of capital, and are therefore considered inappropriate in evaluating value creation. These measuring tools are based exclusively on financial statements & so are exposed to accounting distortions. As a result of the perceived limitations of traditional measuring tools, value based financial performance measures evolved which has been appreciated by both Analysts as well as Investors. Value based measures report high level of correlation between the Profitability & Market Return & so measures yielding positive values lead to generation of economic profits which inturn create & maximize Shareholders wealth. On the other hand, Negative values indicate the destruction of shareholder wealth.

Economic Value Added (EVA), Market Value Added (MVA), Enterprise Value (EV) are considered as important criterion for evaluation of internal performance and total return of Shareholders. On the other hand, stock return is another key factor in decisions of the stock. It provides some information which has been used by many potential and actual investors for financial analysis and prediction. Value Added Analysis is a measure of true economic performance of a company and a strategy for creating shareholder wealth. Investing in projects where the return exceeds the cost of capital results in value creation, while investing in projects with returns below the cost of capital destroys value.

EVA is the difference between Net Operating Profit after Tax and Cost of Equity multiplied by Capital Employed. MVA is the difference between Market Value of Equity and Shareholders Fund while EV is the difference between Market Cap plus Market Value of Debt and Cash & Cash Equivalents.

The study aims at evaluating the impact of EPS on EVA per Share, MVA per Share, ROE, P/E & Economic Profit per Share on Leading Indian Automobile companies

Keywords: NOPAT, EVA, Market Cap, MPS, EPS, MVA, EV, CFROI, ROCE and ROE.

I. Objectives of the Study

1. To analysis the profitability, Liquidity, Operating Efficiency & Valuation Ratios of leading Indian Automobile Companies as well as calculate the market values like EVA, EV, MVA etc.
2. To analyse the performance in terms of Economic Profit of the selected companies using Value Based Analysis.
3. To highlight the impact of Profitability & Rate of Return ratios on EVA/ Capital Employed.

Review of Literature

The researcher and economists have recognized that the measurement of profitability is necessary to analyse and improve the financial performance of the sector. A large number of studies have been conducted in the field of Value based Management. A brief review of some of these studies has been presented.

1. In 1990, Joel Stern, managing partner of M/s Stern Stewart & Co. introduced the modified concept of economic profit named Economic Value Added (EVA) as measure of business performance in order to overcome the limitations of accounting based measures. EVA-based financial management and incentive compensation scheme gives manager better quality information and helps to analyse the Shareholders' wealth. EVA is a performance measure which is most closely linked to the creation of shareholders' wealth over a period of time. EVA should

be made the focal point for financial reporting, planning, and decision-making. The executives of an organization should look out for appropriate techniques that will guard them against any future attacks by corporate marauders. The best way of maximizing shareholder return is to offer incentives to managers for making decisions that boost long-term value. The objective is to motivate the managers to look beyond short-term measures of economic performance by essentially turning managers into owners. The managers may be guided by EVA and pursue such objectives that improve operating profits investing more capital. Managers can be remunerated a proportion of both the total EVA and the positive change in EVA.

2. Stewart (1994) has expended that EVA is a powerful new management tool that has gained worldwide recognition as the standard tool of corporate performance. EVA presents an integrated framework of financial management and incentive compensation. The adoption of EVA system by more and more companies throughout the world clearly depicts that it provides an integrated decision-making framework, can reforms energies and redirect resources to create sustainable value for companies, customers, employees, shareholders and for managements.

3. Huang and Liu (2010) represented that the traditional accounting performance measures (Return on Equity, Earnings per Share) only reflected short-term performance, and were unable to express an enterprise's long-term value. The sample of their study included a list of high-technology firms in Taiwan and China from 1998 - 2008. They used the ordinary least squares method to test their hypothesis. Empirical results of their study showed that the account receivables and account payables from related-party transactions of high-technology firms in Taiwan exhibited a significant (positive) relationship with performance. They used Market value added (MVA), which was a powerful method for explaining market value.

4. Rice (1996) believes that there is a direct relationship between EVA improvement and a higher share price. EVA has been made a part of Varity's mantra company for building corporate culture and creating wealth for shareholders.
Specific ways that EVA has been applied at Varity Company include:

1. EVA caused the company to take a closer look at its capital structure.
2. EVA identifies operations and projects that return more than the cost of capital.
3. EVA is used to evaluate potential joint ventures and
4. EVA provides a means of determining whether the sale of businesses or assets is in the best interest of shareholders.

5. Rajeshwar (1997) offered in his study that EVA can also be used as a device for shareholders' communication and manager incentive system, apart from measuring the financial performance of organization. Demand for EVA among the corporate world has spurred competition among financial consultants, who help in computing EVA of business organizations.

6. Banerjee (1997) has conducted an empirical research to find the superiority of EVA over other traditional financial performance measure. Ten industries were chosen and each industry was represented by four/five companies. ROI and EVA have been calculated for sample companies and a comparison of both has been undertaken, showing the superiority of EVA over ROI. Indian companies are gradually recognizing the importance of EVA.

II. Scope of study

The financial statement is a mirror, which reflects the financial position and operational strength and weakness of concern. But a mere look at the financial statement will not reveal some crucial information. To bring out the hidden information, financial statements over a period are to be studied.

The study is concerned with the analysis of NOPAT, EVA, Market Cap, MPS, EPS, MVA, EV, CFROI of Leading Indian Automobile Companies as well as impact of Rate of Return ratios on Economic Profit (EVA/CE).

Methodology

Sources of Data: The study is based on secondary data. Information and data has been collected from Annual Reports of Ashok Leyland, Bajaj, Hero Motor, Mahindra & Mahindra, Maruti Suzuki, Tata Motors and different books, journal, magazines, and various websites.

III. Tools Applied

In this study various tools: Financial Tools – Ratio Analysis and Statistical Tools (i.e.) Mean and ANOVA, t-test has been used for data analysis.

MEAN = Sum of variable/N

Standard Deviation is used to see how measurements for a group are spread out from Mean. A low Standard Deviation means that most of the numbers are very close to the average and vice-versa.

(SD) = $\sqrt{\sum X^2/N-(\sum X/N)}$

Coefficient of Variation is a standardized measure of dispersion of a probability distribution or frequency distribution. It is the ratio of standard deviation to mean. Higher the coefficient of variation, the greater the level of dispersion around mean and vice-versa. **Coefficient of Variation (CV) = SD/MEAN* 100**

t-Test (Two-Sample Assuming Unequal Variances): t-test assesses whether the means of two groups are statistically different from each other.

Hypothesis

An ANOVA is statistical hypothesis in which the sampling distribution of test statistic when null hypotheses is true. Null hypotheses have been set and adopted for the analysis of data. The null hypotheses are represented by H_0. It is a negative statement which avoids personal bias of investigator during data collection as well as the time of drawing conclusion.

IV. Limitation of the study

1. The study is related to a period of 6 years.
2. Data is secondary i.e. they are collected from the published Annual Reports
3. Profitability, Structural and Valuation ratios have been taken for the study.

Indian automobile sector & its key players

Indian Automobile Sector holds a strong position in terms of manufacturing of tractor, bus, heavy vehicles and passenger cars. It currently manufactures 25 mn vehicles, of which 3.5 mn are exported. Increase in income, standard of living has been the key factor behind the sale of passenger cars &two wheelers. During 2019, Automobile exports increased by 14.5% and sale of passenger cars by 2.7% & two-wheeler by 4.86%.

Ashok Leyland: Founded in 1948, headquartered in Chennai, Ashok Leyland is a leading automobile company. It is the 2nd largest manufacturer of commercial vehicles in India & 4th largest manufacturer of buses in the world & 12th largest manufacturer of trucks globally.

Bajaj Auto Limited: It was established by Jamnalal Bajaj in Rajasthan during 1940's. It manufactures both two-wheeler & three-wheeler and is the largest exporter of two and three-wheelers.

Hero MotoCorp: It is the world's largest manufacturer of two-wheelers. It has 4 manufacturing facilities in Dharuhera and Gurgaon in Haryana, Haridwar in Uttarakhand & Neemrana in Rajasthan.

Mahindra & Mahindra established in 1945, is an Indian multinational car manufacturer headquartered in Mumbai. It operates in 9 segments: automotive segment comprises of sales of automobiles spare parts and related services.

Maruti Suzuki is the largest passenger car company accounting for over 50% of the Indian market. It is a 56.21% owned subsidiary of Suzuki Motor Corporation.

Tata Motors headquartered in Mumbai is an Indian multinational automotive manufacturing company. It is a leading global automobile manufacturer of cars, utility vehicles, buses, trucks and defence vehicles. It has a strong global network and operates in UK, South Korea, Thailand, South Africa & Indonesia.

Preface

The important goal of financial management is to create highest capital employees (owners & lenders) wealth and consequently enhancing the value of the firm. The question arises about the method to evaluate a firm's value. In answer to this question, it can be said, various accounting based measures like Earning Per Share (EPS), Return on Equity (ROI); Return on Capital Employed (ROCE) and growth in sales have been used to evaluated the performance of the business. But the problem with these performance measures is that they lack a proper benchmark for comparison. The shareholders require at least a minimum rate of return that the above mentioned performance measures ignore. EVA is an estimation of firm's economic profit or value generated over the generated over the required rate of return.

Profit is the prime motive of every business. It plays a pivotal role behind the success and growth of an enterprise. Profitability is the main base for liquidity as well as solvency. Analysing a company's profitability is an important part of financial statement analysis. Profitability of a company measures the ability to generate earnings.

EVA & its Constituents

EVA is a measure based on the Residual Income technique that serves as an indicator of the profitability of projects undertaken. Its underlying premise consists of the idea that real profitability occurs when additional wealth is created for shareholders and that projects should create returns above their cost of capital.

EVA = EVA = NOPAT – (WACC * Capital Employed)

To understand and calculate EVA we have to calculate NOPAT, Capital Employed, Debt Equity Ratio and Weighted Average Cost of Capital

Revenue: It is the income a business generates from its Operating Activities, after deducting Sales Returns and Indirect Taxes. It plays a pivotal role behind the success and growth of an enterprise.

Exhibit – 1: Revenue

Millions	Ashok Leyland	Bajaj	Hero Motor	Mahindra & Mahindra	Maruti	Tata Motors
2014	1,18,592	2,01,583	2,52,755	7,40,009	4,43,963	23,28,337
2015	1,57,082	2,16,143	2,75,380	7,14,480	5,08,014	26,31,590
2016	2,17,279	2,25,865	2,84,571	7,58,414	5,75,890	27,30,456
2017	2,32,654	2,17,667	2,86,104	8,37,731	6,80,850	26,96,925
2018	3,00,533	2,52,189	3,24,584	9,20,940	7,98,094	29,15,505
2019	3,36,207	3,02,500	3,39,708	10,47,207	8,60,685	30,19,384
Mean	2,27,058	2,35,991	2,93,850	8,36,463	6,44,583	27,20,366
SD	82,584	36,611	32,322	1,27,926	1,64,438	2,40,712
CV	0.364	0.155	0.110	0.153	0.255	0.088
CAGR (%)	23.2	8.5	6.1	7.2	14.2	5.3

Tata Motors reported the highest mean value in terms of Revenue followed by Mahindra & Mahindra & Maruti. Ashok Leyland reported the maximum CAGR of 23.2% followed by Maruti, indicating the maximum growth in Revenue.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (Revenue of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (Revenue of Automobile Companies differ over years)

Exhibit – 2: Revenue: Automobile Companies: Anova

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	1362345	227057.5333	6820078328
BAJAJ	6	1415947	235991.0833	1340391857
HERO MOTOR	6	1763102	293850.4	1044716064
MAHINDRA & MAHINDRA	6	5018780	836463.3833	16365123712
MARUTI	6	3867496	644582.6667	27039840245
TATA MOTORS	6	16322197	2720366.1	57942076712

ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.767E+13	5	5.534E+12	300.3469	1.15E-24	2.53355
Within Groups	5.52761E+11	30	18425371153			
Total	2.82228E+13	35				

Above analysis shows that the F value (300.3469) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that Revenue of Automobile Companies differs over the years.

Net Operating Profit after Tax (NOPAT) is a measure of profit that excludes the costs and tax benefits of debt financing. It is used by analysts and investors as a precise and accurate measurement of profitability to compare a company's financial results across it's over years as well as peer group.

Exhibit – 3: Net Operating Profit After Tax

Millions	**Ashok Leyland**	**Bajaj**	**Hero Motor**	**Mahindra & Mahindra**	**Maruti**	**Tata Motors**
2014	4,368	32,352	32,251	91,290	52,603	3,12,979
2015	10,032	28,184	30,454	75,983	63,728	3,55,786
2016	26,304	40,623	35,358	84,860	83,262	3,57,139
2017	30,740	40,809	37,588	91,652	1,03,108	2,72,056
2018	45,434	42,203	42,783	1,14,894	1,07,587	3,21,118
2019	50,510	49,321	40,672	1,34,381	1,06,310	2,54,044
Mean	27,898	38,915	36,518	98,843	86,100	3,12,187
SD	18,451	7,534	4,774	21,668	23,622	42,410
CV	0.661	0.194	0.131	0.219	0.274	0.136
CAGR (%)	63.2	8.8	4.7	8.0	15.1	-4.1

Tata Motors reported the highest mean value in terms of NOPAT followed by Mahindra & Mahindra & Maruti. Ashok Leyland reported the maximum CAGR of 63.2% followed by Maruti, indicating the maximum growth in NOPAT over the years.

Hypothesis

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (NOPAT of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (NOPAT of Automobile Companies differ over years)

Exhibit – 4: NOPAT: Automobile Companies: Anova

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	167387	27898	340457629
BAJAJ	6	233491	38915	56763716
HERO MOTOR	6	219107	36518	22794975
MAHINDRA & MAHINDRA	6	593060	98843	469494840
MARUTI	6	516598	86100	558003394
TATA MOTORS	6	1873122	312187	1798614807

ANOVA: VARIATION

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3.49067E+11	5	69813490555	129.0401	2.39953E-19	2.53355
Within Groups	16230646806	30	541021560			
Total	3.65298E+11	35				

Above analysis shows that the F value (129.0401) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that NOPAT of Automobile Companies differs over the years.

Capital Employed is the total amount of long term fund employed both from Equity & Debt which is utilized in order to procure long term Assets as well as manage the Operating Activities in order to generate profit.

Exhibit – 5: Capital Employed

Millions	**Ashok Leyland**	**Bajaj**	**Hero Motor**	**Mahindra & Mahindra**	**Maruti**	**Tata Motors**
2014	94,804	1,04,351	59,814	5,45,317	2,39,610	14,14,535
2015	1,07,307	1,13,477	67,376	5,40,756	2,53,997	15,45,818
2016	1,27,908	1,42,565	91,341	5,60,116	3,16,836	17,44,665
2017	1,52,694	1,81,111	1,06,517	6,62,194	3,87,015	17,49,256
2018	1,76,487	2,07,062	1,23,185	7,88,348	4,43,087	20,97,562
2019	2,17,552	2,34,180	1,35,529	9,18,702	4,93,459	19,54,477
Mean	1,46,125	1,63,791	97,294	6,69,239	3,55,667	17,51,052
SD	45,912	52,234	30,175	1,55,074	1,02,884	2,51,738
CV	0.314	0.319	0.310	0.232	0.289	0.144
CAGR (%)	18.1	17.5	17.8	11.0	15.5	6.7

Tata Motors reported the highest mean value in terms of Capital Employed followed by Mahindra & Mahindra & Maruti. Ashok Leyland reported the maximum CAGR of 18.1% indicating the maximum growth in Capital Employed over the years.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (Capital Employed of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (Capital Employed of Automobile Companies differ over years)

Exhibit – 6: capital employed: automobile companies: anova

Anova: single factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	876752	146125.3	2107870240
BAJAJ	6	982745.3	163790.9	2728409749
HERO MOTOR	6	583761.9	97293.7	910522984

MAHINDRA & MAHINDRA	6	4015434	669239.0	24048079911
MARUTI	6	2134004	355667.3	10585090295
TATA MOTORS	6	10506315	1751052.4	63371887740

ANOVA: VARIATION

Source of Variation	***SS***	***df***	***MS***	***F***	***P-value***	***F crit***
Between Groups	1.20567E+13	5	2.41134E+12	139.4485	7.92E-20	2.53355
Within Groups	5.18759E+11	30	17291976820			
Total	1.25755E+13	35				

Above analysis shows that the F value (139.4485) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that Capital Employed of Automobile Companies differs over the years.

Debt Equity Ratio measures the Long Term Debt of a company as a percentage of Equity share holders fund. A high Debt Equity ratio indicates high amount of Interest expenses which has to be paid irrespective of the profit volume.

Exhibit – 7: debt equity ratio (D/E)

Year	**Ashok Leyland**	**Bajaj**	**Hero Motor**	**Mahindra & Mahindra**	**Maruti**	**Tata Motors**
2014	1.377	0.026	0.064	0.878	0.115	1.156
2015	1.379	0.023	0.030	0.703	0.044	1.748
2016	1.430	0.017	0.034	0.728	0.035	1.210
2017	1.388	0.014	0.033	0.835	0.044	2.013
2018	1.378	0.014	0.029	0.751	0.041	1.198
2019	1.488	0.008	0.033	0.900	0.048	2.248
Mean	1.407	0.017	0.037	0.799	0.054	1.595
SD	0.045	0.007	0.013	0.083	0.030	0.474
CV	0.032	0.391	0.356	0.104	0.547	0.297
CAGR (%)	1.56	-21.35	-12.37	0.51	-16.03	14.22

Bajaj reported the minimum mean value in terms of D/E ratio followed by Hero Motor, Maruti, which indicates minimum risk in terms of Bankruptcy cost.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (D/E ratio of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (D/E ratio of Automobile Companies differ over years)

Exhibit – 8: Debt Equity Ratio: Automobile Companies: Anova

ANOVA: Single Factor

Groups	***Count***	***Sum***	***Average***	***Variance***
ASHOK LEYLAND	6	8.43951	1.40658	0.00198
BAJAJ	6	0.10187	0.01698	0.00004
HERO MOTOR	6	0.22252	0.03709	0.00017
MAHINDRA & MAHINDRA	6	4.79495	0.79916	0.00685
MARUTI	6	0.32682	0.05447	0.00089
TATA MOTORS	6	9.57204	1.59534	0.22447

ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	15.7162	5	3.1432304	80.4519	1.86E-16	2.53355
Within Groups	1.17209	30	0.0390697			
Total	16.8882	35				

Above analysis shows that the F value (80.4519) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that D/E ratio of Automobile Companies differs over the years.

Weighted Average Cost of Capital (WACC): It is the average of the costs of various long term sources of financing. It is also known as composite or average cost of capital. After computing the cost of individual sources of finance, the weighted average cost of capital is calculated by putting weights in the proportion of the various sources of funds to the total funds.

WACC =Proportion of Equity * K_E + Proportion of Debt * K_D * (1-t), K_E =Cost of Equity, K_D * (1-t) =Post Tax Cost of Debt

Exhibit – 9: Weighted Average Cost of Capital (WACC %)

Year	Ashok Leyland	Bajaj	Hero Motor	Mahindra & Mahindra	Maruti	Tata Motors
2014	10.40	12.26	11.51	10.62	13.19	9.42
2015	13.56	10.02	12.26	10.14	9.88	8.60
2016	10.03	11.05	12.84	11.17	9.59	7.98
2017	9.38	11.57	13.17	10.80	11.84	7.67
2018	10.77	14.72	13.04	10.37	15.53	9.62
2019	10.95	13.26	13.43	11.63	15.70	8.13
Mean	10.85	12.15	12.71	10.79	12.62	8.57
SD	1.44	1.67	0.71	0.54	2.67	0.80
CV	0.133	0.137	0.056	0.050	0.211	0.093
CAGR (%)	1.05	1.58	3.14	1.85	3.54	-2.91

Tata Motors reported the minimum mean value in terms of WACC followed by Ashok Leyland & Mahindra & Mahindra.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (WACC of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (WACC of Automobile Companies differ over years)

Exhibit – 10: Wacc: Automobile Companies: Anova

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	65.0817	10.8470	2.0803
BAJAJ	6	72.8965	12.1494	2.7879
HERO MOTOR	6	76.2471	12.7078	0.5024
MAHINDRA & MAHINDRA	6	64.7255	10.7876	0.2964
MARUTI	6	75.7205	12.6201	7.1226
TATA MOTORS	6	51.4124	8.5687	0.6396

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ANOVA: VARIATION

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	74.2285	5	14.8457	6.632882	0.000288	2.53355
Within Groups	67.1459	30	2.2382			
Total	141.3745	35				

Above analysis shows that the F value (6.632882) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that WACC of Automobile Companies differs over the years.

Economic Value Added: The EVA concept developed by Stern Stewart during 1990's replacing the traditional concept of Accounting Profit with Economic Profit is considered as the best tool to analyse the shareholders wealth along with financial performance & Economic Profit of an entity. $\mathbf{K_E}$ is the return expected by Shareholders for their investments & risks undertaken. $\mathbf{K_D}$ is the cost of procuring fund from long term sources. These costs were not considered by financial managers while computing the profit of a company earlier, so a proper justification could not be found between Accounting & Economic Profit. EVA does not take into account whether a company is Profitable or not. It considers the earnings that remain after all costs from all resources are taken into account including opportunity cost of capital. Opportunity cost for equity capital means the cost that is incurred to compensate the equity shareholders at a market determined rate of return. **EVA = NOPAT - (WACC x Capital Employed)**

Exhibit – 11: Economic Value Added (EVA)

Millions	Ashok Leyland	Bajaj	Hero Motor	Mahindra & Mahindra	Maruti	Tata Motors
2014	1,182	19,556	25,369	33,400	20,993	1,79,715
2015	-2,166	16,810	22,196	21,136	38,645	2,22,857
2016	9,569	24,865	23,629	22,313	52,889	2,17,993
2017	18,370	19,852	23,555	20,136	57,289	1,37,937
2018	17,967	11,714	26,721	33,166	38,766	1,19,277
2019	19,781	18,263	22,471	27,504	28,860	95,207
Mean	10,784	18,510	23,990	26,276	39,574	1,62,165
SD	9,502	4,299	1,744	5,992	13,803	52,949
CV	0.881	0.232	0.073	0.228	0.349	0.327
CAGR (%)	75.7	-1.4	-2.4	-3.8	6.6	-11.9

Tata Motors reported the maximum mean value in terms of EVA followed by Maruti, Hero Motor. Ashok Leyland had the maximum CAGR of 75.7% indicating the maximum growth in EVA over the years.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (EVA of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (EVA of Automobile Companies differ over years)

Exhibit – 12: Eva: Automobile Companies: Anova

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	64703.7	10783.94	90294755.7
BAJAJ	6	111060.2	18510.04	18481341
HERO MOTOR	6	143941.1	23990.18	3040662.6
MAHINDRA & MAHINDRA	6	157655.6	26275.94	35909277.1
MARUTI	6	237442.2	39573.69	190535236.2
TATA MOTORS	6	972987.1	162164.52	2803609267.3

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ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	98400916013	5	19680183203	37.5831	4.842E-12	2.53355
Within Groups	15709352699	30	523645090			
Total	1.1411E+11	35				

Above analysis shows that the F value (37.5831) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that EVA of Automobile Companies differs over the years.

Market Value Added: MVA focuses on how well a firm has maximized shareholders' wealth. It offers a judgment on the company's past, present & future use of investment capital. Higher the MVA better is for the company since it shows that shareholders' value have increased over time. Companies with high MVA are attractive to investors because it indicates about positive returns as well as strong leadership, sound governance. MVA can be interpreted as the amount of wealth that management has created for investors over & above their investment. **MVA = Market Cap – BV of Equity**

Exhibit – 13: Market Value Added (MVA)

Millions	**Ashok Leyland**	**Bajaj**	**Hero Motor**	**Mahindra & Mahindra**	**Maruti**	**Tata Motors**
2014	66,535	4,81,330	3,92,781	2,92,122	3,81,946	6,34,464
2015	1,02,873	4,83,191	4,74,921	3,92,362	8,62,716	10,17,702
2016	1,92,820	4,26,884	4,24,502	3,36,708	5,77,062	3,49,608
2017	2,03,469	6,12,857	5,34,986	3,32,448	13,89,001	8,06,813
2018	2,67,956	6,90,169	6,11,732	4,68,338	22,51,168	2,52,677
2019	2,72,578	5,85,649	5,02,910	3,32,032	15,21,675	75,528
Mean	1,84,372	5,46,680	4,90,305	3,59,002	11,63,928	5,22,799
SD	84,534	99,136	78,711	62,402	6,93,883	3,58,071
CV	0.458	0.181	0.161	0.174	0.596	0.685
CAGR (%)	32.6	4.0	5.1	2.6	31.8	-34.7

Maruti reported the maximum mean value in terms of MVA followed by Tata Motors, Bajaj. Ashok Leyland had the maximum CAGR of 32.6% indicating the maximum growth in MVA over the years.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (MVA of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (MVA of Automobile Companies differ over years)

Exhibit – 14: MVA: Automobile Companies: Anova

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	1106231	184371.8	7146063097
BAJAJ	6	3280079	546679.9	9827954988
HERO MOTOR	6	2941832	490305.3	6195466053
MAHINDRA & MAHINDRA	6	2154010	359001.7	3893959879
MARUTI	6	6983567	1163927.9	4.8147E+11
TATA MOTORS	6	3136793	522798.8	1.2821E+11

ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3.307E+12	5	6.614E+11	6.2327	0.000447919	2.53355
Within Groups	3.184E+12	30	1.061E+11			
Total	6.491E+12	35				

Above analysis shows that the F value (6.2327) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that MVA of Automobile Companies differs over the years.

Enterprise Value: EV is a measure of a company's total value. It looks at the entire market value rather than just the equity value, so all ownership interests & assets claims from both Debt & Equity are included. Acquisition of assets through cash or issue of shares increases EV, irrespective of its productivity. On the other hand, a reduction in capital intensity, like reduction in the working capital, reduces the EV. EV could also be negative if the company have abnormally high amounts of cash that may not be reflected in the market value of the stock as well as the market capitalization. **EV = Market Cap + BV of Debt**

Exhibit – 15: Enterprise Value (EV)

Millions	Ashok Leyland	Bajaj	Hero Motor	Mahindra & Mahindra	Maruti	Tata Motors
2014	1,60,205	5,80,672	4,51,396	7,72,211	6,15,070	17,51,881
2015	2,01,129	5,90,740	5,40,139	8,84,000	11,16,281	22,42,363
2016	3,03,563	5,60,778	5,14,052	8,51,548	8,93,391	17,89,670
2017	3,45,527	7,90,954	6,39,549	9,48,102	17,75,781	21,95,291
2018	4,32,138	8,89,304	7,32,541	11,91,211	26,93,515	20,04,100
2019	4,72,357	8,10,498	6,35,399	11,63,385	20,13,256	17,03,517
Mean	3,19,153	7,03,825	5,85,513	9,68,410	15,17,882	19,47,804
SD	1,23,588	1,42,682	1,02,155	1,71,664	7,82,350	2,34,202
CV	0.387	0.203	0.174	0.177	0.515	0.120
CAGR (%)	24.1	6.9	7.1	8.5	26.8	-0.6

Tata Motors reported the maximum mean value in terms of EV followed by Maruti, Mahindra & Mahindra. Maruti had the maximum CAGR of 26.8% indicating the maximum growth in EV over the years.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (EV of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (EV of Automobile Companies differ over years)

Exhibit – 16: EV: Automobile Companies: ANOVA

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	1914918	319153.0	15273966882
BAJAJ	6	4222947	703824.5	20358067474
HERO MOTOR	6	3513078	585513.0	10435713155
MAHINDRA & MAHINDRA	6	5810457	968409.5	29468689432
MARUTI	6	9107293	1517882.2	6.12072E+11
TATA MOTORS	6	11686822	1947803.6	54850461302

ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.134E+13	5	2.268E+12	18.3312	2.5184E-08	2.53355
Within Groups	3.712E+12	30	1.237E+11			
Total	1.505E+13	35				

Above analysis shows that the F value (18.3312) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that EV of Automobile Companies differs over the years.

Cash Flow Return on Investment: CFROI is a metric that analyses a company's cash flow in relation to its capital employed. This ratio is used by investors who believe that cash flow is the underlying driver of value in a company, as opposed to earnings or sales. It is most informative when compared to WAAC, as it allows investors to see the discrepancy between the amount a company paid to raise funds & the return it receives from those funds. **CFROI= Cash Flow from Operations/Capital Employed**

Exhibit – 17: Cash Flow Return On Investment (CFROI)

Year	Ashok Leyland	Bajaj	Hero Motor	Mahindra & Mahindra	Maruti	Tata Motors
2014	-0.08	46.15	60.40	1.89	24.43	28.60
2015	1.93	29.95	47.28	5.10	29.62	25.70
2016	-5.72	38.64	52.83	5.38	32.81	22.89
2017	4.87	26.34	48.76	6.58	32.57	18.35
2018	11.61	29.04	44.89	4.24	33.50	12.81
2019	13.76	19.01	22.89	-1.53	19.75	11.03
Mean	4.39	31.52	46.18	3.61	28.78	19.90
SD	7.33	9.56	12.63	2.97	5.55	7.07
CV	1.667	0.303	0.274	0.822	0.193	0.355
CAGR (%)	-381.50	-16.26	-17.64	-195.91	-4.16	-17.36

Hero Motor reported the maximum mean value in terms of CFROI followed by Bajaj & Maruti. CAGR of all the companies are negative indicating that CFROI have dropped over the years.

Hypothesis:

H_0: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6$ (CFROI of Automobile Companies doesn't differ over years)

H_1: $\mu_1\neq\mu_2\neq\mu_3\neq\mu_4\neq\mu_5\neq\mu_6$ (CFROI of Automobile Companies differ over years)

Exhibit – 18: Cfroi: Automobile Companies: ANOVA

ANOVA: Single Factor

Groups	*Count*	*Sum*	*Average*	*Variance*
ASHOK LEYLAND	6	26.3632	4.3939	53.6721
BAJAJ	6	189.1294	31.5216	91.3493
HERO MOTOR	6	277.0565	46.1761	159.6254
MAHINDRA & MAHINDRA	6	21.6582	3.6097	8.7991
MARUTI	6	172.6749	28.7791	30.8220
TATA MOTORS	6	119.3812	19.8969	49.9358

ANOVA: Variation

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	8236.565	5	1647.3130	25.0730	7.063E-10	2.53355
Within Groups	1971.019	30	65.7006			
Total	10207.584	35				

Above analysis shows that the F value (25.0730) is more than the table value (2.53355) so, null hypothesis is rejected. Therefore it is concluded that CFROI of Automobile Companies differs over the years.

T-Test: It is used to test the null hypothesis that the variances of two populations are not equal. If t Stat value lies between - t Critical two tail and + t Critical two test we don't reject Null Hypothesis.

EVA is an attempt to figure out the economic value created by a company after meeting its obligations. From EVA stand point, if a company is making profits it does not necessarily mean that it is creating positive EVA likewise if a company is making losses it neither means, creation of negative EVA.

Exhibit –19: T-Test: Two-Sample Assuming Unequal Variances -Ashok Leyland

	EVA/ SH	MVA/SH	ROE	P/E	Economic Profit /SH	EPS
Mean	3.730	64.135	13.010	-4.830	3.409	3.382
Variance	10.682	791.750	220.673	1766.824	1.324	13.252
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	10	5	6	5	6	
t Stat	**0.17401**	**5.24494**	**1.54185**	**-0.47680**	**0.01735**	
P(T<=t) one-tail	0.43267	0.00167	0.08702	0.32681	0.49336	
t Critical one-tail	1.81246	2.01505	1.94318	2.01505	1.94318	
P(T<=t) two-tail	0.86533	0.00334	0.17405	0.65361	0.98672	
t Critical two-tail	**2.228139**	**2.570582**	**2.446912**	**2.570582**	**2.446912**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value lies between -2.228139 & +2.228139. Therefore, we reject Null Hypothesis stating that variances are equal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value lies between -2.446912 & +2.446912. Therefore, we reject Null Hypothesis stating that variances are equal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value lies between -2.570582 & +2.570582. Therefore, we reject Null Hypothesis stating that variances are equal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value lies between -2.446912 & +2.446912. Therefore, we reject Null Hypothesis stating that variances are equal.

Exhibit –20: T-Test: Two-Sample Assuming Unequal Variances - Bajaj

	EVA/ SH	MVA/SH	ROE	P/E	Economic Profit /SH	EPS
Mean	63.967	1889.227	25.139	18.386	70.459	134.394
Variance	220.717	117372.2	20.006	7.871	899.626	678.857
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	8	5	5	5	10	
t Stat	**-5.7517**	**12.5105**	**-10.1233**	**-10.8435**	**-3.9418**	
P(T<=t) one-tail	0.00021	0.00003	0.00008	0.00006	0.00138	
t Critical one-tail	1.85955	2.01505	2.01505	2.01505	1.81246	
P(T<=t) two-tail	0.00043	0.00006	0.00016	0.00012	0.00277	
t Critical two-tail	**2.306004**	**2.570582**	**2.570582**	**2.570582**	**2.228139**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value doesn't lie between -2.306004 & +2.306004. So, we accept Null Hypothesis stating that variances are unequal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.228139 & +2.228139. So, we accept Null Hypothesis stating that variances are unequal.

Exhibit –21: T-Test: Two-Sample Assuming Unequal Variances - Hero Motor

	EVA/ SH	MVA/SH	ROE	P/E	Economic Profit /SH	EPS
Mean	120.131	2455.194	33.446	19.437	62.105	152.848
Variance	76.240	155262.4	16.385	5.502	478.560	1124.048
Observations	6	6	6	6	6	6

Hypothesized Mean Difference	0	0	0	0	0	
df	6	5	5	5	9	
t Stat	**-2.3132**	**14.2609**	**-8.6607**	**-9.7234**	**-5.5524**	
P(T<=t) one-tail	0.03000	0.00002	0.00017	0.00010	0.00018	
t Critical one-tail	1.94318	2.01505	2.01505	2.01505	1.83311	
P(T<=t) two-tail	0.06001	0.00003	0.00034	0.00020	0.00036	
t Critical two-tail	**2.446912**	**2.570582**	**2.570582**	**2.570582**	**2.262157**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value lies between -2.446912 & +2.446912. Therefore, we reject Null Hypothesis stating that variances are equal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.262157 & +2.262157. So, we accept Null Hypothesis stating that variances are unequal.

Exhibit –22: T-Test: Two-Sample Assuming Unequal Variances - Mahindra & Mahindra

	EVA/ SH	**MVA/SH**	**ROE**	**P/E**	**Economic Profit /SH**	**EPS**
Mean	36.562	506.053	8.259	24.452	71.560	42.711
Variance	145.040	24730.3	1.427	15.367	341.027	235.216
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	9	5	5	6	10	
t Stat	**-0.7724**	**7.1830**	**-5.4858**	**-2.8253**	**2.9438**	
P(T<=t) one-tail	0.22984	0.00041	0.00137	0.01507	0.00734	
t Critical one-tail	1.83311	2.01505	2.01505	1.94318	1.81246	
P(T<=t) two-tail	0.45968	0.00081	0.00275	0.03014	0.01469	
t Critical two-tail	**2.262157**	**2.570582**	**2.570582**	**2.446912**	**2.228139**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value lies between -2.262157 & +2.262157. Therefore, we reject Null Hypothesis stating that variances are equal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.446912 & +2.446912. So, we accept Null Hypothesis stating that variances are unequal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.228139 & +2.228139. So, we accept Null Hypothesis stating that variances are unequal.

Exhibit –23: T-Test: Two-Sample Assuming Unequal Variances - Maruti

	EVA/ SH	**MVA/SH**	**ROE**	**P/E**	**Economic Profit /SH**	**EPS**
Mean	131.004	3853.044	16.956	24.960	150.465	193.998
Variance	2088.003	5276284	6.207	39.307	5216.241	5172.584
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	8	5	5	5	10	
t Stat	**-1.8109**	**3.9000**	**-6.0261**	**-5.7354**	**-1.0462**	
P(T<=t) one-tail	0.05387	0.00570	0.00091	0.00113	0.16005	
t Critical one-tail	1.85955	2.01505	2.01505	2.01505	1.81246	
P(T<=t) two-tail	0.10775	0.01141	0.00181	0.00226	0.32010	
t Critical two-tail	**2.306004**	**2.570582**	**2.570582**	**2.570582**	**2.228139**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value lies between -2.306004 & +2.306004. Therefore, we reject Null Hypothesis stating that variances are equal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.446912 & +2.446912. So, we accept Null Hypothesis stating that variances are unequal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value lies between -2.228139 & +2.228139. Therefore, we reject Null Hypothesis stating that variances are equal.

Exhibit –24: T-Test: Two-Sample Assuming Unequal Variances - Tata Motors

	EVA/ SH	**MVA/SH**	**ROE**	**P/E**	**Economic Profit /SH**	**EPS**
Mean	53.767	171.229	8.654	25.105	39.753	19.902
Variance	267.774	12787	12.064	223.452	119.127	65.129
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	7	5	7	8	9	
t Stat	**4.5464**	**3.2696**	**-3.1360**	**0.7502**	**3.5822**	
P(T<=t) one-tail	0.00132	0.01110	0.00824	0.23732	0.00296	
t Critical one-tail	1.89458	2.01505	1.89458	1.85955	1.83311	
P(T<=t) two-tail	0.00265	0.02221	0.01647	0.47464	0.00591	
t Critical two-tail	**2.364624**	**2.570582**	**2.364624**	**2.306004**	**2.262157**	

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between EVA per Share & EPS, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between EVA per Share & EPS, Variance is Equal)
Here, t Stat value doesn't lie between -2.364624 & +2.364624. So, we accept Null Hypothesis stating that variances are unequal.

EVA per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between MVA per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between MVA per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.570582 & +2.570582. So, we accept Null Hypothesis stating that variances are unequal.

ROE & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROE & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROE & EVA/CE, Variance is Equal)
Here, t Stat value doesn't lie between -2.364624 & +2.364624. So, we accept Null Hypothesis stating that variances are unequal.

P/E & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between ROA & EVA/CE, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between ROA & EVA/CE, Variance is Equal)
Here, t Stat value lies between -2.306004 & +2.306004. Therefore, we reject Null Hypothesis stating that variances are equal.

Economic Profit per Share & EPS

H_0: $\mu_1^2 = \mu_2^2$ (There is significant relationship between Economic Profit per Share, Variance is not Equal)
H_1: $\mu_1^2 \neq \mu_2^2$ (There is significant no relationship between Economic Profit per Share, Variance is Equal)
Here, t Stat value doesn't lie between -2.262157 & +2.262157. So, we accept Null Hypothesis stating that variances are unequal.

Conclusion

Value based Analysis has proved to be more effective in analysing the Financial performance and Shareholders value and hence it is preferred over the traditional analytical tools. EVA, MVA and EV are considered as the yardstick for calculating the value generated by a firm as it takes into account the Cost of Capital.

Anova Findings

The study reveals that:

1. Ashok Leyland reported maximum CAGR of 23.2% followed by Maruti, indicating the maximum growth in Revenue. F value (300.3469) is more than the table value (2.53355) so; null hypothesis is rejected indicating Revenue differs over the years.
2. Ashok Leyland reported maximum CAGR of 63.2% followed by Maruti, indicating the maximum growth in NOPAT. F value (129.0401) is more than the table value (2.53355) so; null hypothesis is rejected indicating NOPAT differs over the years.
3. Ashok Leyland reported the maximum CAGR of 18.1% followed by Hero Motor indicating the maximum growth in Capital Employed. F value (139.4485) is more than the table value (2.53355) so, null hypothesis is rejected indicating CE differs over the years.
4. Bajaj reported the minimum mean value in terms of D/E ratio followed by Hero Motor, Maruti, which indicates minimum risk in terms of Bankruptcy. F value (80.4519) is more than the table value (2.53355) so; null hypothesis is rejected indicating D/E differs over the years.
5. Tata Motors reported the minimum mean value in terms of WACC followed by Ashok Leyland & Mahindra & Mahindra. F value (6.632882) is more than the table value (2.53355) so; null hypothesis is rejected indicating WACC differs over the years.
6. Tata Motors reported the minimum mean value in terms of EVA followed by Maruti, Hero Motor. Ashok Leyland had the maximum CAGR of 75.7% indicating the maximum growth in EVA over the years. F value (37.5831) is more than the table value (2.53355) so; null hypothesis is rejected indicating EVA differs over the years.
7. Maruti reported the minimum mean value in terms of MVA followed by Tata Motors, Bajaj. F value (6.2327) is more than the table value (2.53355) so; null hypothesis is rejected indicating EVA differs over the years.
8. Tata Motors reported the maximum mean value in terms of EV followed by Maruti, Mahindra & Mahindra. F value (18.3312) is more than the table value (2.53355) so; null hypothesis is rejected indicating EV differs over the years.

9. Hero Motor reported the maximum mean value in terms of CFROI followed by Bajaj & Maruti. F value (25.0730) is more than the table value (2.53355) so, null hypothesis is rejected indicating CFROI differs over the years.

T-Test Conducted with selected Automobile Companies revealed that

EVA per Share & EPS: Ashok Leyland, Hero Motor, Mahindra & Mahindra, Maruti: Null Hypothesis is rejected stating that variances are equal.

Bajaj, Tata Motors: Null Hypothesis is accepted stating that variances are unequal

EVA per Share & EPS: Ashok Leyland, Bajaj, Hero Motor, Mahindra & Mahindra, Maruti, Tata Motors: Null Hypothesis is accepted stating that variances are unequal

ROE & EPS: Ashok Leyland: Null Hypothesis is rejected stating that variances are equal.
Bajaj, Hero Motor, Mahindra & Mahindra, Maruti, Tata Motors: Null Hypothesis is accepted stating that variances are unequal

P/E & EPS: Ashok Leyland, Tata Motors: Null Hypothesis is rejected stating that variances are equal. Bajaj, Hero Motor, Mahindra & Mahindra, Maruti: Null Hypothesis is accepted stating that variances are unequal

Economic Profit per Share & EPS: Ashok Leyland, Maruti: Null Hypothesis is rejected stating that variances are equal.

Bajaj, Hero Motor, Mahindra & Mahindra, Tata Motors: Null Hypothesis is accepted stating that variances are unequal.

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