Linkage between Altman Z score and other financial performances of Ashok Leyland Limited in India – Comparative Analysis

¹V.L. Govindarajan, Dr N Purusothaman²

¹Assistant Professor, Department of Commerce, DRBCCC Hindu College, Pattabiram, Chennai – 72

²Assistant Professor, Department of Commerce, Partician College of Arts and Science, Adyar, Chennai.

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 ended on 31st March 2007 to 31st March 2019. IGR and SGR under Du Pont analysis and Altman Z score 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) and Yaghoub Alavi Matin et al.2011). All the parameters have been analyzed with descriptive analysis, Karl Pearson's correlation for its validity. The coefficient of determination has also been tested through linear regression analysis and result of co efficient of correlation proved that IGR, SGR and Altman Z score has significant relationship with each other at 1% levels. Dividend per share, Operating profit per share, Return on Capital employed and Inventory turnover ratio has significantly predicted SGR and Asset Turnover only significantly predicts Altman Z score of Ashok Leyland Limited for the study period.

Keywords: Altman Z score, DuPont Analysis, ROA, Ashok Leyland Limited

1 Introduction

1.1 Financial performance: Company analysis is an thing of Economy-Industry-Company analysis sequence. Financial analysis starts with a historical analysis of earnings and dividend and its growth rate. Growth of economy depends on growth and development of corporate sector. The literature review of Fiori et al (2009) financial performance be measured based on profitability, solvency, liquidity and repayment capacity. Griffin and Mahon (1997) stated that the most popular financial measures are size, ROA, ROE, asset age and 5 years ROS. Babalola et al (2012) in Nigeria, Swati Goyal in India measured financial performances based on Profit After Tax. Bert Scholtens (2006), Brammer et al (2006) measured financial performance based on Profit after Tax and Market capitalization as stock market performances. Zhi Tang et al (2011) measured financial performances based on ROA. 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. 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.

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.

Dr. D P Singh (2012) examined working capital management and profitability in the IT and Telecom industry in India by using Working capital ratio, Sales to Total Asset ratio, Cash conversion cycle and selected 11 companies in India 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.

Dr. 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.

Sharma et al (2015) have remarked in their studies that SAIL's corporate profitability and working capital management component has strong relationship. The profitability ratio has been negatively related with working capital turnover ratio while it has positively related with CR, LR, DTR and ITR. The profitability and working capital management variables of SAIL's exhibit a downward trend for studied period except in 2013-14.

Ogbodo & Egbunike (2016) aimed at determining the relation between HR performance ratios (proxy taken were Revenue per employee and Net income per employee) and firm's financial performance (Proxy taken were Return on Assets and Net Profit Margin) in Nigeria. The sample under study was Insurance companies & Banks that were quoted on Nigerian Stock Exchange for the financial year 2012-13. The panel data was generated taking this sample and data for financial years 2008-09 to 2011-12 and was analysed using multiple regression. The results showed that Net income per employee had a positive and significant influence on ROA and Net profit margin while Revenue per employee had a negative and significant influence on ROA and Net profit margin. The authors advocated that firms should disclose soft and hard both the factors that are contributing towards accomplishment of firm's goals and objectives. Also, statutory bodies should develop models to recognize, measure and report Human resource in balance sheet as an asset.

Dr. S. Vijaylakshmi et.al. (2017), in the article titled, "A Study on Financial Performance Analysis of Bharti Airtel Limited", took a period of 5 years from 2011-2016 for the financial assessment of the company selected. The financial tools employed to measure the financial position was ratio analysis. Under ratio analysis short term and long term ratios were used to see the liquidity, profitability and stability level of the company. It can be concluded from the study that the liquidity level of the company keeps on varying. Profitability of the company is not as good as the sales is decreasing and income is also not stable. Bharti Airtel needs to improve their debt position also.

J.Pavithra. et.al. (2017) in paper titled, "A Study on the Analysis of the Financial Performance with Reference to Jeppiaar Cements Pvt. Ltd." made a conclusion about the financial performance analysis of Jeppiaar Cements Pvt. Ltd. The period of the study was taken for 5 years from 2009-2013. Comparative financial statements, ratio and trend analysis was employed to study the financial position over the years. It was found that the debtor's turnover ratio had an increasing trend which is not considered a good sign for the company and concluded overall profitability position to be good. The current ratio showed fluctuation but the creditworthiness of the company was observed to be good.

Dr K Aparna et al (2018) studied availability of number of economies for producing on a large scale and small size firms by availing particularly the internal economies, 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.

Dr Krishn Awatar Goyal et al (2019) analyzed the financial performance of TCS Limited under Dupont analysis, Altman B model and found that Company has gained momentum in a positive direction and it can be estimated that in the coming years the upward trend in the sales, operating income, net profit of the company will be observed. The financial health of the company is very sound and it doesn't indicate any sign of the bankruptcy.

1.2 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 Altman coined the following guideline to be used to classify as either financially sound or Bankruptcy.

Table-1.2.1: 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))

Table -1.2.2: Altman Z score of Ashok Leyland Limited

Year	$1.20X_1$	$1.40X_2$	$3.30X_3$	$0.60X_4$	$0.99X_5$	Altman Z Score
31-03-2019	-0.041	0.617	0.462	0.876	1.55	3.465
31-03-2018	-0.052	0.561	0.482	1.452	1.49	3.933
31-03-2017	-0.037	0.582	0.346	1.044	1.47	3.405
31-03-2016	0.026	0.561	0.277	1.488	1.52	3.820
31-03-2015	-0.031	0.508	0.205	0.942	1.05	2.674
31-03-2014	-0.068	0.456	0.092	0.294	0.80	1.574
31-03-2013	-0.091	0.448	0.211	0.268	0.97	1.806
31-03-2012	-0.048	0.462	0.261	0.408	1.11	2.193
31-03-2011	0.025	0.505	0.307	0.431	1.12	2.388
31-03-2010	0.144	0.529	0.228	0.477	0.84	2.218
31-03-2009	0.041	0.501	0.151	0.181	0.77	1.644
31-03-2008	-0.052	0.920	0.421	0.501	1.42	3.210
31-03-2007	0.221	0.971	0.401	0.671	1.60	3.864

(Source of variables from the annual reports of Ashok Leyland Limited)

1.3 Growth Performance under Du-Pont Analysis

Return on Investment (ROA) is Profit margin *Assets turnover. ie $PAT/Sales * Sales/Total \text{ Assets}$. 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 $ROA * Equity \text{ multiplier}$. I e $PAT/Sales * Sales/Total \text{ Asset} * Total \text{ Asset}/Shareholder \text{ Fund}$. (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 pay out ratio

Sustainable growth rate(SGR) is $ROE * b / 1 - ROE * b$

Under DU PONT analysis

- Operating Efficiency (as measured by profit margin)

- b. Assets use efficiency (as measured Sales / Total Assets)
- c. Financial Leverage (as measured by Equity Multiplier)

Table -3.1: Internal Growth Rate and Sustainable Growth rate of Ashok Leyland

Year ended on	ROA	ROE	Retention r	IGR	SGR
31-03-2019	0.1088	0.2380	0.5665	06.49	15.47
2018	0.0990	0.2370	0.6802	06.25	19.19
2017	0.0871	0.1996	0.7340	06.84	17.06
2016	0.0304	0.0720	0.6044	01.83	04.49
2015	0.0251	0.0817	0.6175	01.52	05.31
2014	0.0022	0.0089	1.00	-	-
2013	0.0331	0.1373	0.6320	02.04	09.52
2012	0.0474	0.1955	0.5299	02.56	11.48
2011	0.0595	0.2376	0.5786	03.56	15.87
2010	0.0455	0.1823	0.5291	02.46	10.61
2009	0.0240	0.0902	0.3008	00.70	02.74
2008	0.0841	0.2206	0.5744	05.04	14.41
2007	0.0986	0.2373	0.5530	05.70	15.07

Internal Growth Rate = Average return on Asset * Average retention rate

$$= 0.05729 * 0.6077 = 0.0348 \text{ or } \mathbf{03.48\%}$$

Sustainable Growth Rate = Average Return on Equity * Ave retention rate

$$= 0.16446 * 0.6077 = 0.0999 \text{ or } \mathbf{09.99\%}$$

2. Statement of the Problem

This study was descriptive in nature and expands the comparative knowledge in the area of Du Pont Analysis with Altman Z score of Ashok Leyland Limited have significant impact on financial performance is the considerable attention. In this study Profitability ratios and Per share ratios were treated as independent financial variables and Edward Altman's Z score, IGR and SGR were used as dependent financial variables. An empirical comparative study have been applied with these financial variables to what extent these variables impact on Du Pont growth rate measures and Altman Z score of Ashok Leyland Limited in India for the period ended from 31st March 2007 to 31st March 2019

3. Objectives of the study

1. To Calculate the Internal Growth Rate (IGR) and Sustainable Growth Rate (SGR) under Du Pont analysis of Ashok Leyland Limited
2. To determine the Altman Z score of Ashok Leyland Limited
3. To find any relationship between Altman Z score and Du Pont growth rates
4. To determine whether independent variables has any cause and effect impact on IGR,SGR and Altman Z score of Ashok Leyland Limited

4. Research Methodology

The study is based on secondary data consists of the annual reports of Ashok Leyland Limited collected through moneycontrol.com for the 13 years period from 31st March 2007 to 31st March 2019. Various reports like magazines, published books and web sites were also referred for the present study. The information used is primarily from historical annual reports available to the public and the same does not indicate the current situation of the company.

Edward Altman's Z score, IGR and SGR under Du Pont analysis and ROI 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 KrishnAwatar(2019)). For the analysis Mean, Standard Deviation, one sample t test, Correlation coefficients and regression analysis have been applied for its validity.

5. Analysis and Interpretations

Table- 5.1: Descriptive Statistics

	N Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic	Std. Error
Internal Growth Rate	13	3.8146	2.11035	0.106	0.616
Sustainable Growth Rate	13	11.4238	5.26526	-0.282	0.616
Altman Z score	13	2.7842	0.87319	-0.018	0.616
Earnings Per Share	13	2.8600	1.91147	0.786	0.616
Dividend Per Share	13	1.3531	0.83481	0.521	0.616
Net Profit Per Share	13	3.9000	2.20915	-0.100	0.616
Operating Profit Per Share	13	62.1808	18.91013	0.779	0.616
Return On Capital Employed	13	11.3392	9.29878	1.044	0.616
Valid N (listwise)	13				

The above table-5.1 shows that the Mean value of Altman Z score is 2.78 and Proved that Ashok Leyland Limited financially sound (Under Healthy Zone) The Mean value of all other selected variables were also supporting Altman Z score.

Table 5.2 Correlation Co efficient of Selected dependent variables

		Internal Growth Rate	Sustainable Growth Rate
Sustainable Growth Rate	Pearson Correlation	0.841**	
	Sig. (2-tailed)	0.000	
Altman Z score	Pearson Correlation	0.597*	0.531
	Sig. (2-tailed)	0.031	0.062

Table 5.3 shows that IGR has positive significant relationship with SGR at 1% level. But Altman Z score has significant relationship with IGR at 5% level but has no any significant relationship with SGR

Table 5.3: Correlation Co efficient of Selected Independent variables

Variables		IGR	SGR	Z Score	Results		
					1	2	3
Earnings Per Share	Correlation	0.734	0.786	0.651	Yes	Yes	Yes
	Significance	0.004	0.001	0.016			
Dividend Per Share	Correlation	0.601	0.734	0.584	Yes	Yes	Yes
	Significance	0.030	0.004	0.036			
Net Profit Per Share	Correlation	0.728	0.795	0.716	Yes	Yes	Yes
	Significance	0.005	0.001	0.006			
Operating Profit Per Share	Correlation	0.583	0.679	0.639	Yes	Yes	Yes
	Significance	0.037	0.011	0.019			
Return on Capital Employed	Correlation	0.789	0.814	0.728	Yes	Yes	Yes
	Significance	0.001	0.001	0.005			
Asset Turnover	Correlation	0.683	0.599	0.950	Yes	Yes	Yes
	Significance	0.010	0.030	0.000			
Inventory Turnover	Correlation	0.381	0.201	0.637	No	No	Yes
	Significance	0.199	0.509	0.019			

Table 5.3 shows that all the selected independent variables (except Inventory Turnover) has positive and significant relationship with dependent variables of IGR, SGR and Altman Z score at 1% level, but Inventory

turnover only has no any significant relationship with IGR and SGR of Ashok Leyland Limited for the study period

Table 5.4: Co Efficient results of Ashok Leyland Limited

Variables	Model Summary		ANOVA		Standardized Coefficient		
	R	R Square	F	Sig	IGR	SGR	Altman Z score
(Constant) IGR	0.884	0.781	2.545	0.161	0.940		
(Constant) SGR	0.951	0.904	6.710	0.026		0.295	
(Constant) Altman Z score	0.978	0.956	15.463	0.004			0.296
Earnings Per Share					0.657	0.946	0.697
Dividend Per Share					0.153	0.057	0.510
Net Profit Per Share					0.978	0.651	0.153
Operating Profit Per Share					0.231	0.046	0.449
Return On Capital Employed					0.231	0.031	0.139
Asset Turnover					0.817	0.837	0.008
Inventory Turnover					0.242	0.025	0.080

Table -5.4 showed that the f value of IGR is 02.545 and insignificant at 0.05 levels (0.161) and proved that IGR and selected predictors has co linearity, which means the dependent variable of IGR has not significantly predicted because predictors has co linearity. F value of SGR IS 6.710 and has significant at 5% levels (0.026) and positively predicted by Dividend per share, Operating profit per share, Return on Capital employed and Inventory turnover ratio. F value of Altman Z score is 15.463, significant at 1% levels (0.004) and positively predicted by Asset turnover of Ashok Leyland Limited for the study period.

Conclusion

IGR has positive significant relationship with SGR at 1% level. But Altman Z score has significant relationship with IGR at 5% level but has no any significant relationship with SGR. All the selected independent variables has positive and significant relationship with dependent variables of IGR, SGR and Altman Z score at 1% level, but Inventory turnover only has no any significant relationship with IGR and SGR of Ashok Leyland Limited for the study period. Dividend per share, Operating profit per share, Return on Capital employed and Inventory turnover ratio has significantly predicts SGR AT 0.01 levels. Asset turnover ratio has significantly predicts Altman Z score at 0.05 levels. In future Automobile industry is reviewed for further implications.

References

- [1] Akinmulegun Sunday Ojo (2012). Akinmulegun Sunday Ojo, 'The effect of financial leverage on Corporate Performance of some selected companies in Nigeria', Journal of Canadian Social Sciences, vol-8, no-1, pp84-90.
- [2] John Mahon et al (2012). Steven L. Wartick, "Corporate Social Performance Profiling: Stakeholders perceptions to assess Corporate Reputation", Journal of Public Affairs, Vol-12, Issue1, 2012, pp12-28
- [3] Dr D P Singh, "Working Capital Management and Profitability in the IT and Telecom Industry in India", Indian Journal of Finance, March 2012, pp 54 -61
- [4] Dr Shuveer, S Bhanavat. "In search of prediction model for determination of shareholders wealth" Indian Journal of Accounting, Vol- XLIV(2) June 2013, pp 53-67
- [5] Dr Shiv Prasad, Dr Veena Kumari, 'An empirical study on Financial Health of ITDC through Z score Analysis" Indian Journal of Accounting, Vol -XLIV(2), June 2013 pp 26-34
- [6] Dr Sanjay et al, "An empirical study on effect of financial leverage on Firms performance and valuation of selected Pharmaceutical companies in India", Indian Journal of Accounting, Dec 2018, pp 101-110
- [7] Dr K Aparna et al, Size of Firms and its impact on Financial Performances of Select Indian Public Companies", Indian Journal of Accounting, Dec 2018, pp38-44

- [8] 'Investment Analysis and Portfolio management" Dr R P Rustagi, Sultan Chand Publications
- [9] Dr Shiv Prasad, Dr Veena Kumari, 'An empirical study on Financial Health of ITDC through Z score Analysis" Indian Journal of Accounting, Vol –XLIV(2), June 2013 pp 26-34
- [10] Dr Sanjay et al, "An empirical study on effect of financial leverage on Firms performance and valuation of selected Pharmaceutical companies in India", Indian Journal of Accounting, Dec 2018, pp 101-110
- [11] Sharma, D., Sharma, J. and Arif, M. (2015). Corporate profitability and working capital management: A case study of steel authority of India limited. Indian Journal of Accounting, XLVII (1), 100-107.
- [12] Ogbodo, C., & Egbunike, F. (2016). The Relationship between Human Resource Performance Ratios and Financial Performance of Nigerian Firms. Journal of Resources Development and Management, 70-85.
- [13] Vijaylakshmi, S. et.al. 2017. A Study on Financial Performance Analysis of Bharti Airtel Limited. International Journal of Business Marketing and Management, 2(2), 27-32.
- [14] Pavithra, J. et.al. 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.
- [15] Dr Krishn Awatar Goyal and Mala Rathi, A Study on Financial Performance nalysis of TCS: Trend and Du pont analysis, Indian Journal of Accounting, ISSN 0972-1479, Dec 2019, pp 81-89