Analysing capital structure of leading Auto-ancillaries companies in India: A panel data analysis

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Abstract
Background: *The Indian auto ancillaries industry is one of the crucial industries in India and contributes 2.3% to the total GDP. (source: ACMA report 2019). The Auto-ancillaries industry is an essential sub-sector of the automobile manufacturing sector and the most prominent feeder industry that has put India on the global map for quality and innovation. The paper studies the impact of capital structure on company's financial performance of select leading Auto-ancillaries companies listed at the Bombay Stock Exchange (BSE).*
Materials and Methods: *Annual financial standalone data have been considered to analyse the firm's capital structure. The paper studies the relationship between of capital structure and the company's financial performance. Period of study ranges from 2010-2011 to 2020–2021. Ratio analysis and Panel data analysis has been applied to perform the empirical study. Return on Capital Employed is used to measure the company's financial performance.*
Results: *The empirical result showed that the Debt Ratio and Long Term Debt to Equity Ratio have a negative and significant impact on the company's financial performance. Controlled variables Fixed Asset Turnover Ratio is a significant determinant of the company's financial performance of select leading Auto-ancillaries companies in India.*
Conclusion: *The empirical analysis of trends of the Capital structure revealed a financial hierarchy of capital structure indicates a pecking order approach. The empirical analysis of relationship of capital structure on company's financial performance of the leading Auto-ancillaries companies was consistent with the agency theory. The paper's findings will assist the financial managers in maximising company's financial performance by taking optimal capital structure*
Keywords: Capital Structure, Firm performance, Auto-ancillaries companies

I. Introduction

Capital structure sources from debt (fixed-interest sources of financing) and equity capital (variable dividend securities/source of funds). The capital structure decision relates to choosing the proportion of these sources to finance the investment requirements (Khan and Jain 2013). "Capital structure is fundamentally concerned with how the firm decides to distribute its cash flows into two broad constituents, a fixed constituent that is reserved for meeting the obligations toward debt capital and a residual constituent that fits equity shareholders" (Chandra 2012).

Typically, the firm performance implies organisational position in manufacturing of products and services, functioning of different units of the firm, the performance of its employees and outcomes of their work in total. At the same time, the firm performance can be viewed in a broader context as part of the firm's business expansion.

Since 1958 after the seminal work of Modigliani and Miller elucidating the relationship between capital structure and firm performance many horizons has been opened. Even after 63 years of research, this topic intrigues many researchers as literature on Capital structure studies has shown contradictory findings. Many studies have shown that capital structure significantly impacts strong performance, while others have shown no impact. Many researchers agree that a relationship exists between capital structure and firm performance (Hung, et al. 2009). While many empirical studies have concluded that the relationship between capital structure and firm performance is positive and negative (Abor, 2005), others concluded that the relationship is negative.

II.   Auto-Ancillaries Industry in Indian Economy

The Indian auto ancillary industry is one of the crucial industries in India and contributes 2.3% to the total GDP. The Auto-ancillaries industry is an essential sub-sector of the automobile manufacturing sector and the most prominent feeder industry that has put India on the global map for quality and innovation. The sector employs more than 5 million people directly and indirectly in the year 2018-19. The Auto-ancillaries industry's turnover increased from INR 1.1 lakh cr (USD 24 billion) in Financial Year 2009-10 to INR 3.89 lakh cr (USD 57 billion) 2018-19 (Automotive Component Manufacturers Association.

III.   Review of Literature

Ahmad and Bhuyan (2020) examined firm-level characteristics and firm performance of service sector firms listed in the Australian Stock Exchange (ASX). They used a panel regression approach on data collected for an eleven-year period (2009–2019), examining the effect of capital structure and leverage. To measure firm performance four variables were used: return on assets, return on equity, operating margin ratio and return on capital employed. The analysis of data revealed a significant relationship between return on equity (ROE) and leverage. Leverage impacts firm performance at a statistically significant level in service sector firms. The paper states that the Australian services sector firms are not benefitting from the use of debts to finance their operations.

Chipeta and Mcclelland (2018) in their study tested the validity of the trade-off and pecking order theories of capital structure for non-financial firms listed on the Johannesburg Stock Exchange. This paper attempted to address this issue within the context of South Africa by testing the validity of the trade-off and pecking order models using real and simulated data sets. The result showed that the firms with reported financial surpluses at low and high levels of leverage are associated with a statistically significant reduction in leverage. However, highly levered firms with financial deficits are associated with a significant increase in leverage. These alternative pecking order and trade-off specifications are stress tested under falsely generated debt ratios, and they correctly reject random debt financing in a majority of the simulations. Stronger evidence for the pecking order financing is documented as we progress from the pre-liberalisation to the post-financial-crisis epochs.

Li et al. (2018) study aimed to empirically test whether a small- and medium-sized enterprises (SME's) credit risk affects the SME's relationship between SME's between capital structure and firm performance. They used a 2012 cross-sectional sample of European SMEs from Austria, Belgium, Finland, France, Germany, Italy, Portugal, Spain, Sweden and the UK. The result of the study showed an SME's credit risk status drives the relationship between capital structure and performance. It also found that leverage is negatively related to performance for low credit risk SMEs which differs from high credit risk SMEs.

Chadha and Sharma(2016), in their study on the Capital structure in the Indian Manufacturing sector, studied the impact of financial leverage on a firm's financial performance. The paper had a sample size of 422 listed Indian manufacturing companies on the Bombay Stock Exchange (BSE) was taken to examine the relationship between leverage and firm performance for a period of 10 years from 2003–2004 to 2012–2013. Ratio analysis and panel data approaches have been applied to perform the empirical study. Return on the asset, return on equity and Tobin's Q are used as the proxy for measuring the firm's financial performance. They used ROA, ROE and Tobin's Q are used as the proxy for determining a firm's financial performance parameters. They found that the financial leverage has no impact on the firm's financial performance parameters of ROA and Tobin's Q. Other independent variables viz. size, age, tangibility, sales growth, asset turnover and ownership structure are significant determinants of a firm's financial performance of the Indian manufacturing sector.

MS, Narayana, and BH (2016) in their study investigated the relationship between leverage and profitability of the selected automobile companies in India. The sample size consisted of the top Five Indian Auto - LCVs & HCVs companies listed, and the study period ranged from 2005- 2015. The empirical findings of the study revealed that there is a positive correlation between Degree of Operating Leverage (DOL), Degree of Combined Leverage (DCL) and Earning per share (EPS) and a negative correlation between Degree of Financial Leverage (DFL), Debt-equity Ratio (DER) and Earning per share (EPS) among the majority of the companies selected for the study.

Patel (2014) in his paper studied the impact of leverage on the profitability of Sabar Dairy. He found through his study that Degree of Operating leverage(DOL), Degree of Financial Leverage(DFL), Degree of Total Leverage(DTL), and Return on Capital Employed(ROCE), Return on Equity(ROE), Earning per Share(EPS) have a positive relationship and Degree of Operating leverage and Return on Asset(ROA), Degree of Total Asset and Return on Asset also positive relationship while Debt-Equity Ratio and Return on Asset have an inverse relationship. He concluded that Sabar Dairy has used operating leverage, financial leverage, and total leverage satisfactorily.

Gill and Nahum (2013) studied the relationship between capital structure and firm performance of 272 American listed firms on the New York Stock Exchange(NYSE). It illustrated a positive relationship between short-term Debt to total assets and profitability, long-term Debt to total assets and profitability, and among entire Debt to total assets and profitability in the manufacturing industry.

Khatik and Singh (2006) in their study examined the capital structure pattern and policy of IFFCO and Indo Gulf Corporation Ltd. In their study they found out that both companies IFFCO and Indo Gulf Corporation Ltd. Are pimararily using long-term debt in their capital structure planning. During the study period, both the companies had raised more long-term funds to meet their development and expansion needs . The study lso revealed that was that in the case of IFFCO, as is the nature of a cooperative business, their number of members increases regularly and, due to the increase of members, their equity capital also increases regularly. On the other hand, the share capital of Indo Gulf also increases during the study period.

Objectives of the Study
➢ To study the relationship between capital structure and the company's financial performance of select leading auto-ancillaries companies listed at Bombay Stock Exchange

IV. Research Methodology

Sampling Frame
The sample size consists of top 9 Auto-ancillaries companies with market capitalisation more than Rs. 1000 crore. Leading Auto-ancillaries consist of 74% of the market share in terms of market capitalisation. (SOURCE: https://www.bseindia.com/markets/, Date of access: 14/01/2021)

Source of Data
For this study, the data is collected from secondary sources. The secondary sources are reports of RBI Reports, Publications from the Ministry of Commerce and, Government of India, Different financial websites and various Newspaper, Journals, articles, the official website of AICMA (www.acma.in), SIAM (www.siamindia.com). The study is primararily based on secondary data collected from the firm's Annual report and various databases like the Capital Line database, CMEI powress database, moneycontrol, etc

Period of study
The data for 11 years ranging from 2010-2011 to 2020-2021 was collected and considered.

Research tools used
In the course of analysis of the study, accepted accounting techniques was used, and statistical technique like Panel data and Regression Analysis will be applied to generate the result. To analyse data software like SPSS, EViews, etc was used.

V. Research Model Specification

Dependent Variables
A dependent variable is the one that we can test in a scientific experiment to get its values.

Measurement	Formula
Return on Capital Employed (ROCE)	ROCE = EBIT/Capital Employed (Wherein EBIT is earnings before interest and taxes and capital employed is calculated by reducing current liabilities from total assets alternatively by adding fixed assets and working capital requirement)

*Source: Authors estimation

Independent Variables
The variables that the researcher changes during their study are the independent variable. An independent variable is a variable that we can change or control.

Variables	Measurement	Formula
Capital Structure	Debt Ratio (DR)	Total Liabilities / Total Assets
	Long-term Debt to Equity Ratio	Long-term Debt/owner's equity

* Source: Authors estimation

Control Variables:
A controlled variable is one that the scientist holds constant (controls) during an experiment. A controlled variable is also known as a continuous variable or sometimes as a "control" only. Control variable is not part of the study, but it is essential because it can affect the results.

Variables	Measurement	Formula
Controlled Variable	Fixed Asset Turnover Ratio (FATR)	Net Sales / Average Fixed Asset

*Source: Authors estimation

For analysing the impact of Capital structure on the financial performance of the Auto-Ancillaries Industry as a whole following panel regression models have been developed:

Model 1: Return on Capital Employed (ROCE) has been used as a proxy for a firm's performance with Debt Ratio (DR), Long Term Debt to Equity (LTDE) and Fixed Asset Turnover Ratio (FATR) as the independent variables.

Hypothesis
H_0 There is no significant relationship between capital structure and financial performance of the leading Auto-Ancillaries companies in India.

$ROCE_{it} = \beta o + \beta 1 (DR)_{it} + \beta 2 (LTDE)_{it} + \beta 3 (FATR)_{it} + \mu_{it}$ **…………... MODEL**

Where,

$ROCE_{it}$	= Return on Capital Employed of firm i at time t.
DR_{it}	= Debt Ratio of firm i at time t
$LTDE_{it}$	= Long Term Debt to Equity of firm i at time t
$FATR_{it}$	=Fixed Asset Turnover Ratio of firm i at time t.
β_o	= common y-intercept.
$\beta_1 - \beta_6$	= coefficients of the concerned explanatory variables.
μ_{it}	= the error term of firm i at time t.

VI.   Analysis and Interpretation

Fig 1: Contribution of each component to Capital Employed (in percentage)
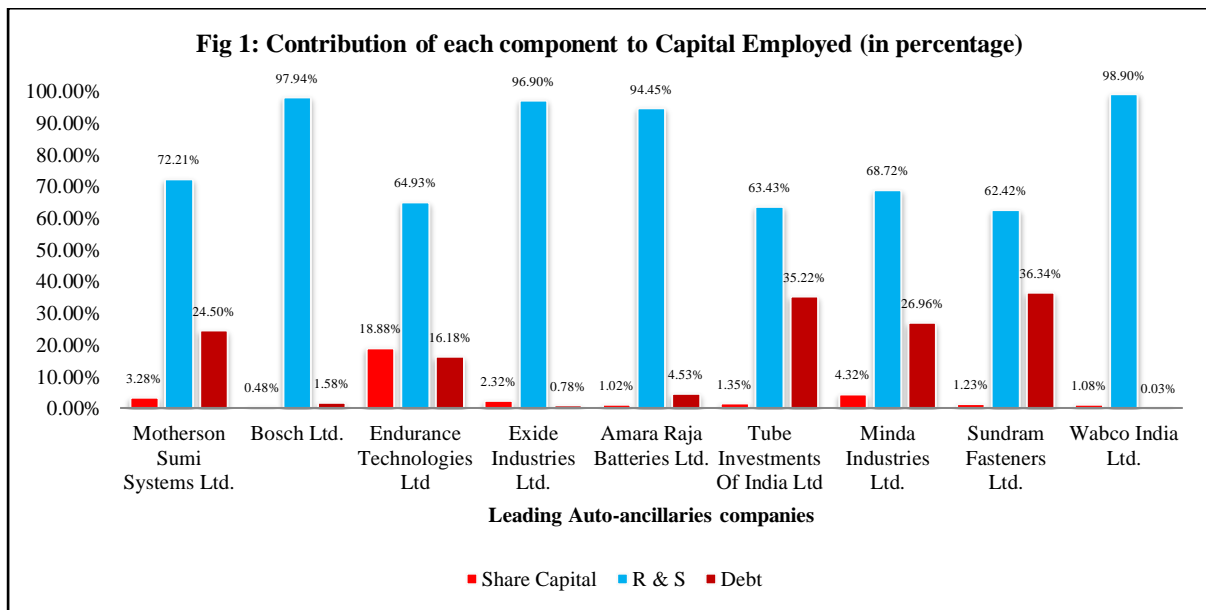
Source: Secondary data, Computed by Author Period: 2010-2021

It is clear from Fig 1 that the maximum of the funds has been utilised through the Reserves and surplus for all the leading Auto-Ancillaries companies in India. Companies like Wabco India Limited, Exide Industries Limited, Bosch India Limited and Amaraja Batteries Limited have more than 90% of the capital employed through Reserves & Surplus, showing firm reliance on internal sources and less dependency on external sources. The high contribution in % for R&S of Wabco India Limited at 98.90% also matches the lowest mean value for the debt-equity Ratio and zero% borrowings, which show the company, have paid off all its Debt from internal sources during the study period. It can also be observed that companies, namely Bosch Limited, Exide Industries Limited, and Amaraja Batteries Limited, also have Reserve and Surplus above 90% vis-a-vis low debt contribution to Total Capital employed. It can also be ascribed to the fact that it takes the benefit of 'equity trading.

As seen in Figure 1, after retained earnings, the second resort for the funding requirements by the maximum firm is fulfilled through Debt. Sundaram Fasteners has the highest Debt in their total capital employed at 36.34%. In comparison, Wabco India Limited had the lowest at 0.03%, which is reflected in the corresponding CAGR of debt-equity Ratio for both these companies. Equity capital as a source of finance is opted as the second choice by three companies, namely Exide Industries Limited, Bosch Limited and Wabco India Limited. It is evident from the low % of share capital to total capital employed displayed in Table 6 for sample companies. The average % contribution of the share capital of all companies falls within the range of 1% - 4.50%%. This financial hierarchy indicates a pecking order approach where internal funds are given the first preference, then if needed, external Debt and lastly, equity issue.

Section 2

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ROCE	99	.03	.31	.1809	.05952
DR	99	.13	.65	.3765	.14332
LTDE	99	.00	20.87	3.9762	4.82642
FATR	99	1.78	10.16	4.3131	1.56653
Valid N (listwise)	99				

Source: computed by authors from secondary data, Software: SPSS

Descriptive Statistics

In table 1 presents the descriptive statistics of all the variables used in the study. The maximum and minimum values and the standard deviations for each variable are also shown in Table 1. Based on the mean values presented, the mean DR of the sampled firms is 0.3765; this indicates that 37.65% of the total assets have been financed through total liabilities and the mean of LTDE is 3.9762. DR has a standard deviation of 0.14332, and LTDE has a standard deviation of 4.83. ROCE mean value is 0.1809, and the standard deviation is 0.05952.

Table 2: Correlation Analysis

		ROCE	DR	LTDE	FATR
ROCE	Pearson Correlation	--			
	Sig. (2-tailed)				
DR	Pearson Correlation	-.452**	--		
	Sig. (2-tailed)	<.001			
LTDE	Pearson Correlation	-.390**	.744**	--	
	Sig. (2-tailed)	<.001	<.001		
FATR	Pearson Correlation	.041	-.174	-.169	--
	Sig. (2-tailed)	.688	.086	.095	

**. Correlation is significant at the 0.01 level (2-tailed).

Source: computed from secondary data, Software: SPSS

Correlation Analysis

Table 2 presents the correlation analysis among the variables. ROCE is also negatively correlated with DR and LTDE at 1% level of significance. As seen in table 2, DR and LTDE are positively correlated.

Test of Stationarity

Unit Root Test of Stationarity: ROCE

Method	Statistic	Prob.**
Null: Unit root (assumes common unit root process)		
Levin, Lin & Chu t*	-6.35058	0.0000
Null: Unit root (assumes individual unit root process)		
Im, Pesaran and Shin W-stat	-3.59198	0.0002
ADF - Fisher Chi-square	44.4460	0.0005
PP - Fisher Chi-square	42.1074	0.0011

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: computed from secondary data, software: E-views, Period: 2010-2021

Unit roots or stationarity in panel datasets is checked with four types of panel data unit root test. Levin Lin Shu assumes a common unit root process. Im, Pesaran and Shin W-stat, ADF- Fisher chi-square and PP-Fisher chi-square assumes individual unit root process. The results of all these tests as obtained in Table 3 and 4 reveal that the ROCE do not contain a panel unit root in their levels. It implies that the data of ROCE of the leading Auto-ancillaries companies during the period 2010-2010 to 2020–2021 are stationary in nature.

Selection of Panel Data Analysis Model
Hausman Test is conducted to choose between Fixed Effect model and Random Effect model. The result is significant i.e. $P < 0.05$, Hence Null Hypothesis is rejected and Fixed effect model is choosen over Random effect model.

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	26.109293	3	0.0000

Dependent Variable: Return on Capital Employed (ROCE)
A fixed-effect model was used for the analysis of the study. Result reveals the Fixed Effect Model results, and it has been found that LTDE and FATR are significant at 5%. Thus the null hypothesis stating that there is no significant relationship between capital structure and ROCE of the leading Auto-Ancillaries Industry is rejected. It suggests that the Debt Ratio is also significant at the 5% level. Thus it can be concluded that capital structure has a significant impact on the OPR of the Indian leading Auto-Ancillaries companies. Therefore the null hypothesis that capital structure has no meaningful relationship with ROCE is rejected.

As seen in Table 4 R^2 with 0.4414, the model's combined effect in explaining 44 % variation in the ROCE due to the explanatory variables. F-statistics value accepts the fitness of the model. Durbin Watson test of 1.19080 suggests there is no autocorrelation problem. Out of the three variables used in the fixed-effect model, one explanatory variable, Long-term Debt to Equity and one controlled Variable Fixed Asset Turnover Ratio, have a significant impact on Return on Capital Employed (ROCE) leading Auto-Ancillaries Industry.

Table 4: Regression result – Fixed Effect Model (Dependent Variable- ROCE)

Dependent Variable: ROCE
Method: Panel Least Squares
Date: 08/30/21   Time: 23:24
Sample: 1 99
Periods included: 11
Cross-sections included: 9
Total panel (balanced) observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIF
C	0.171015	0.031782	5.380848	0.0000	NA
DR	-0.020065	0.076509	-0.262258	0.7937	2.251523
LTDE	-0.006608	0.001903	-3.471814	0.0008	2.247660
FATR	0.010134	0.004693	2.159496	0.0336	1.034864

Effects Specification					

Cross-section fixed (dummy variables)

R-squared	0.441414	Mean dependent var		0.180892	
Adjusted R-squared	0.370788	S.D. dependent var		0.059519	
SE of regression	0.047212	Akaike info criterion		-3.155116	
Sum squared resid	0.193922	Schwarz criterion		-2.840556	
Log likelihood	168.1782	Hannan-Quinn criter.		-3.027844	
F-statistic	6.250040	Durbin-Watson stat		1.190810	
Prob(F-statistic)	0.000000				

Source: calculated from secondary data, Software: EViews

VII.   Conclusion

Numerous studies have tested the relationship of capital structure with firm performance. Many empirical studies results have shown both positive and negative relationships between capital structure and firm performance. Many recent studies have proved a negative relationship between leverage and firm performance (Ahmad and Bhuyan 2020), (Bajaj 2020) and Chadha and Sharma (2016). The empirical analysis of trends of the Capital structure revealed a financial hierarchy of capital structure indicates a pecking order approach. Leading Auto-ancillaries companies first prefer internal funds, then external Debt, and treat equity issues as their last resort. Leading Auto-ancillaries companies are more inclined towards internal financing than debt finance. This justified that large companies with huge internal funds do not rely on debt capital and finance their operations from internal funds.

It is found that the capital structure of the leading Auto-ancillaries companies does not follow the Modigliani and Miller theory of capital structure (1958), but this is consistent with the agency theory as the higher the leverage amounts to high agency cost of external borrowings.

Thus, the findings of the study would be contributing to the extant literature on capital structure In taking its capital structure decisions as it is based on the most recent data and covers the period post-recession of 2008–2009 It is recommended that firm should establish the point at which the weighted average cost of capital is minimised and to maintain the optimal capital structure and thereby maximise the shareholder's wealth. The size of the firm is a more important factor that determines the performance. The managers are suggested to consider the above factors before making any decisions for improving the operating and financial performance of the firm.

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