IJIRSET
International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

e-ISSN: 2319-8753 | p-ISSN: 2347-6710

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 5, May 2024

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.423

9940 572 462 | 6381 907 438 | ijirset@gmail.com | www.ijirset.com

International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)

|e-ISSN: 2319-8753, p-ISSN: 2347-6710| www.ijirset.com | Impact Factor: 8.423| A Monthly Peer Reviewed & Refereed Journal |

|| Volume 13, Issue 5, May 2024 ||

| DOI:10.15680/IJIRSET.2024.1305014 |

Examining the factors influencing the profitability of selected two wheeler manufacturing companies in India – A Panel data analysis

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ABSTRACT: The objective of this study is to investigate the relationship between a company's profitability and cost of capital, with a focus on the Indian two-wheeler industry. The present investigation explores the correlation between an organization's cost of capital and its potential for profit, based on the theory that this relationship is significant. This study uses the Weighted Average Cost of Capital (WACC) with the Correlation of the chosen companies with respect to market as the indicator of the cost of capital and Net Profit as the primary measure of profitability to investigate the relationship between the two. The Capital Asset Pricing Model (CAPM) is utilised to calculate the costs associated with debt and equity, respectively. The information used in this analysis comes from a variety of financial sources, and Microsoft Excel is used to perform the required computations. The TVS MOTORS COMPANY Ltd., HERO MOTOCORP, and BAJAJ AUTOS data used in this analysis spans the years 2007–2023.The importance of considering factors other than cost of capital when assessing a company's financial performance is emphasised by this study.

KEYWORDS: profitability liquidity fundraising cost age of the company board size

I. INTRODUCTION

Any investment requires funding, regardless of whether it is a strategic one like starting a new firm or joint venture or an internal one like buying technology or equipment for an already-established organization. Additionally, funding is required for ongoing operations (such as inventory of products, supplies, and raw materials). This funding can come from external or internal sources, such as bank loans, supplier credit, government subsidies, common or preferred stocks, convertibles, and others, or it might come from equity.

The method of financing causes the permanent capital structure to vary from company to company; in other words, it may consist solely of equity capital (registered capital, retained profit, and reserve capital), or it may also include long-term debts (bank loans or other forms of external financing, including leasing and non-reimbursable financing, among others). The percentage of components in the engaged capital structure is what sets organizations apart in terms of capital structure.

Public limited companies raise capital in the form of debt, stock, or sometimes both to fund their ongoing and future business activities. The average necessary rate of return on all investment projects combined will be the firm's cost of capital. It is an idea that is crucial to understanding when making financial decisions. It is helpful as a benchmark for
1. Assessing financial choices
2. Creating a company's debt policy
3. Evaluating senior management's financial performance

The rate of return that the company requires to provide funds for funding its investment initiatives through the acquisition of different securities is known as the cost of capital for the company. It should be underlined that a weighted rate of return, or an overall rate of return, will be needed by all investors. The "average" of the opportunity costs—also known as the needed rates of return—of the various securities that have a claim on the company's assets is, thus, the cost of capital for the company. This rate accounts for both operating and financial risk associated with debt capital.

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II. REVIEW OF LITERATURE

In their paper, "A Case Study of the Telecommunications Industry: Cost of Capital and Profitability Analysis," The study by Keshari, Gautam, and Sharma clarifies the intricate connection between profitability and capital costs in the Indian telecom sector. They highlight the significance of growth and profitability by exposing differences in the cost of capital that are unique to each industry. Increased cost of capital has a negative impact on profitability, but growth has a positive correlation with it. The research also looks at how company risk and dividend decisions are impacted by the cost of capital, offering scholars and industry professionals in the telecom field insightful information.

1. Birru and Woldemariam Birru (2016) investigated "the impact of capital structure variables on the financial performance of Ethiopian commercial banks." The authors looked at the impact of debt ratios, loan-to-deposit ratios, size, tangibility, and debt/equity ratios on financial performance. Strong correlations have been found between financial performance metrics in Ethiopian banks and DR, DER, Size, and Tangibility.
2. Pouraghajan et al. (2012) examined the relationship between ROA, ROE, and WACC on corporate performance assessment using accounting standards on the Tehran Stock Exchange in their study, "Relationship Between Cost of Capital and Accounting Criteria of Corporate Performance Evaluation: Evidence from Tehran Stock Exchange." The Common Effects Method, Fixed Effects Method, and Random Effects Method were among the statistical techniques used in the study to analyse data from the statistical universe and a sample. This demonstrated significant correlations between the variables the writers investigated. The results of the study demonstrated the importance of resource management for profitability by demonstrating a higher relationship between larger businesses' cost of capital and accounting standards.
3. The research paper "New evidence from Asia on the impact of capital structure, operating efficiency, and non-interest income on bank profitability" Mehzabin et al. (2023a, 2023b, 2023c) examine the interplay between capital structure, operating efficiency, and non-interest income to perform a comprehensive analysis of the factors influencing bank profitability in Asia. Through the application of a fixed effect regression model to panel data spanning 15 years and covering 492 banks across 28 Asian countries, their findings shed light on key variables affecting bank profitability. Notably, they underscore the beneficial impact of total debt ratio on profit margins in line with agency cost theory, as well as the significance of effective cost control and non-interest income, particularly during periods of low interest rates, in sustaining bank profitability.
4. The research paper "Bibliometric analysis of asset pricing in a global scenario" Keshari and Gautam (2023) use bibliometric analysis to look at asset pricing patterns around the world, highlighting key components like leverage ratio, SIZE, ROA, and ROE. According to their analysis, most of the research is conducted in the USA and focuses on concepts such as risk, return, and international asset pricing. Interestingly, they note a peak in research output and citations in 2020, which they attribute to the Covid-19 pandemic's significant effects and major changes in the global market. This implies that, in the face of extreme economic hardship, there is a greater desire to understand the dynamics of asset pricing.
5. In their meta-analysis on capital structure and firm performance, Dao, and Ta (2020a, 2020b, 2020c, 2020d) synthesise data from several studies using Pearson correlation coefficients and meta-regression techniques. Their analysis, which relies on Hedges et al. (1985, 1988), supports both the trade-off model and Pecking order theory by confirming a negative correlation between capital decisions and corporate performance. Remarkably, the analysis reveals a small effect size, suggesting that the sample size is sufficient for a comprehensive analysis. Additionally, they identify significant variables such as industry type, publication status, and firm performance proxies using random-effects meta-regression in moderator analysis, offering a deeper comprehension of the intricate relationship between capital structure and firm performance.
6. Through the analysis of variables such as Tangible Assets (TA), Taxes (TX), Profit After Tax (PT), Fixed Assets (LA), Long-Term Debt to Assets (LTD), Short-Term Debt to Assets (STD), and Total Debt to Assets (TD), Riaz et al. (2022a, 2022b) look into the factors that affect capital structure and firm performance in the G-7 countries. Using EViews and Stata 13, they conducted an analysis that shows a strong positive correlation between debt levels and fixed assets, tangible assets, taxes, net cash, and profitability. Correlation matrices, moments from the generalised method, and ordinary least square summary statistics are the tools they use to achieve this. This clarifies the complex relationship between financial decisions and firm characteristics and offers crucial details regarding the factors influencing capital structure and firm performance in the G-7 economies.
7. Omwanza (2018) looks at the relationship between financial performance and cost of capital, specifically focusing on commercial banks that are listed on the Nairobi Securities Exchange Market. The study collects data from the target audience through a descriptive survey design and uses quantitative methods for analysis. In contrast to the findings of some earlier studies, such as Edelen and Kadlec (2013), which suggest connections between investor base, profitability, capital budgeting decisions, and discount rate, Omwanza's study shows that the cost of capital

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does not significantly affect financial performance. This finding contradicts the findings of other studies, including those by Khaled and Samer (2013) and Hamidreza, Fatemeh, and Hamid (2014), which contend that changes to a firm's capital structure can in fact affect its performance...

8. To investigate the relationship between savings and economic growth, the author of Misztal's (2011) study, "The Relationship Between Savings and Economic Growth in Countries with Different Levels of Economic Development," employs the ordinary least squares method (OLS) in conjunction with GDP and GDS metrics. The findings suggest a positive correlation between domestic savings rates and economic growth rates, meaning that higher savings rates stimulate economic growth. These results are in line with theories of economic growth and hold true for both advanced economies and emerging/developing economies. These results demonstrate the role that savings play in fostering economic growth and development and are in line with other economic research findings.
9. In the context of the Debt Ratio, Agha MBA (2015a, 2015b, 2015c) examines the relationship between tangibility, growth, and profitability as key determinants of capital structure in Pakistan's cement industry. The study presents several important findings using data from the companies' annual reports and E-View software. Interestingly, there is a non-statistically significant negative correlation found between the debt ratio and non-debt tax shield, liquidity, earnings volatility, and profitability. On the other hand, there is a positive correlation between the debt ratio and firm growth, size, and tangibility (asset structure). This study contributes to the body of existing literature by thoroughly analysing several factors influencing capital structure decisions within the context of Pakistan's cement industry.
10. In the empirical study conducted by Suresh et al. (2021), the dependent variable is the debt-equity ratio. The study examines the factors and decisions that impact capital structure in companies that are listed on the Bombay Stock Exchange (BSE). Multiple regression analysis is used in the study to assess the influence of various independent factors on the capital structure decisions made by these firms. The study contextualises its findings using two well-known theories: the Pecking Order Theory (POT), which favours internal financing over external debt, and the Trade-Off Theory (TOT), which balances the benefits of taxes against the costs of insolvency. The study by Suresh et al. emphasises the significance of financial considerations in influencing the capital structure choices of BSE-listed companies, demonstrating the usefulness of TOT and POT in creating business finance plans for the Indian market.
11. Financial metrics like EBITDA and Weighted Average Cost of Capital (WACC) are the focus of Markauskas and Saboniene's (2020a, 2020b, 2020c) in-depth examination of capital costs in the manufacturing sector. Their study's goal is to ascertain the most effective method for calculating this industry's cost of capital. Through the application of innovative techniques, such as tailoring WACC assessment protocols for less liquid markets and incorporating national credit rankings to measure risk premium, they aim to provide a thorough understanding of capital cost dynamics specific to the manufacturing sector. The authors also plan to conduct a case study with an emphasis on Lithuania's manufacturing sector, using the methodology they have chosen. Their aim is to offer valuable insights regarding the intricacies involved in determining capital cost within the manufacturing sector, so adding to the larger conversation about financial management in this field.

III. IDENTIFICATION OF RESEARCH GAPS

Previously, the researchers could not conduct a thorough analysis of the variables affecting ROI, such as profitability, liquidity, and fund-raising costs. The relationship between fund raising costs and return on investment has not received enough attention in the literature. There has been some research on the relationship between fundraising costs and Return on Investment, but the findings were conflicting. In the past, the company's age and the size of its board of directors were not taken into account. This is the present research gap for our research.

IV. STATEMENT OF THE RESEARCH PROBLEM

Return on Investment (ROI) is a yardstick to measure the overall profitability of an entity, which is influenced by different quantitative and qualitative factors like profitability ratios (gross profit ratio, net profit ratio, return on total assets, return on non-current assets and return on tangible non-current assets), liquidity ratios like current ratio, quick ratio and cash ratio and fund-raising cost like cost equity, cost of debt and weighted average cost of capital. Apart from these factors, age of company and board size also influences the overall efficiency of a firm.

A crucial consideration for companies in all sectors of the economy, the relationship between cost of capital and return on investment forms the basis of financial management and investment decision-making. In its most basic form, the cost of capital represents the amount of money that a business must spend to continue operating, using a combination of

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debt and equity financing. At the same time, return on investment functions as a gauge of the profitability brought about by these investments, demonstrating the effectiveness of capital allocation choices. A wide range of theoretical frameworks and empirical data have been examined by academics and practitioners as they investigate the relationship between the cost of capital and return on investment. Traditional financial theories have long maintained an indirect correlation between these two variables, arguing that higher the capital costs should result in similarly lower returns and vice versa. Return on investment is having adverse relationship with the fund-raising cost. Maintaining liquidity is essential for any business organization as it justifies the ability of the firm to pay its immediate financial obligations. Liquidity of a firm can be measured in terms of investment on current assets which can be converted into cash quickly. But too much liquidity leads to lowering the profitability of a firm. Liquidity of a firm has an adverse impact on the profitability of a firm.

Additionally, firm-level factors like capital structure decisions, managerial skill, and operational effectiveness further modify this relationship, producing different results for different businesses and industries.

The cost of capital-return on investment relationship requires a rigorous analytical framework and advanced statistical techniques to be empirically examined. Researchers calculate the cost of capital by using techniques like the weighted average cost of capital (WACC) formula and financial data from a wide range of companies in different industries. This structure incorporates the expenses of proportionately weighted debt and equity capital based on how each contributed to the capital structure. Simultaneously, return on investment is measured using a variety of financial measures, such as return on equity (ROE) and return on assets (ROA), depending on the research setting and data accessibility.

The present research question is what are the various factors like profitability, liquidity and fund-raising cost, board size and the age of the company also affect the overall profitability of the company.

V. RESEARCH METHODOLOGY

5.1 SCOPE OF THE STUDY

In order to understand the variables which, affect the Return on Investment of a company, we have taken three two-wheeler manufacturing companies like Bajaj Auto, TVS Motors and Hero Motors corporation. The data has been collected from the annual reports of the respective companies from 2006-07 to 2022-23.

5.2 RESEARCH OBJECTIVES

A. To understand the relationship among the ROI and various profitability, liquidity, fund raising cost, age of the company and size of the Board of Directors.
B. To understand how the profitability, liquidity and fund-raising cost affect the Return on Investment.
C. To understand how the age of the company and its size of board of directors affect the Return on Investment.

5.3 FRAMING OF RESEARCH HYPOTHESES

Null Hypothesis(H0): There is no relation between Return on Investment (ROI) and other independent variables
$H0=\beta1= \beta2= \beta3= \beta4= \beta5= \beta6 =\beta7= \beta8= \beta9= \beta10 = 0$
Alternative Hypothesis(H1): There is a relation between Return on Investment (ROI) and other independent variables
$H1 = \beta1\neq \beta2 \neq \beta3 \neq \beta4 \neq \beta5 \neq \beta6 \neq \beta7 \neq \beta8 \neq \beta9 \neq \beta10 \neq 0$

5.4 RESEARCH DESIGN

To understand the impact of various profitability, liquidity, fund-raising cost, age of the company and its board size, we collected the annual data from the respective company's annual reports.

Return on investment is calculated by taking Profit before tax (PBT) and interest expense is added and then divided by the total funds available. Cost of equity is calculated with the help of CAPM model and post-tax cost of debt is taken as cost of debt. Then weighted average cost of capital is calculated. Current ratio, quick ratio and cash ratios are taken as liquidity ratios and gross profit ratio, net profit ratio, return on total assets, return on non-current assets and return on tangible non-current assets are taken as profitability ratios. Age of the company and board size also considered as important independent variables for the analysis.

Return on Investment (ROI) is taken as the dependent variable and all profitability, liquidity and fund-raising cost, age of the company and board size are taken as independent variables.

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This is a time series data as the observations of the variables are collected with reference to time. The suitable time series modelling is Panel Regression Model and Correlation matrix. Pre and post regression test are to be conducted for the goodness of fit and robustness of the model.

5.5 METHODS FOR DATA COLLECTION & VARIABLES OF THE STUDY

Method of data collection:

The entire research work depends on the collection of the secondary data which is collected from the Annual Reports of the respective company. The entire data has been sourced from the annual reports which are either available at the company's website or BSE's website.

Name of the variable	Components of the variable	Formula of the variable
Return on Investment (ROI)	Profit before tax (PBT) and interest component from the income statement. Total funds available Net worth of the Company + total book value of the debt	ROI = $\frac{Profit\ Before\ tax+Interest\ Cost}{Total\ Funds\ available}$
Cost of Equity K_e	Risk free rate of return (Rf) Market return (Rm) Beta of the Company	$K_e = R_f + \beta\ (R_m - R_{f)}$
Cost of debt (Post tax) K_d	Interest cost All external liabilities Tax rate (30%)	Post tax cost of debt $K_d = \frac{Interest\ expense}{total\ external\ liabilities} * (1 - 0.30)$
Cost of Capital (WACC)	Weight of the equity Cost of equity Weight of debt, and Cost of debt	$WACC = (Weight\ of\ equity * K_e + Weight\ of\ debt * K_d)$
Gross Profit Ratio	Gross Profit = Net sales revenue minus cost of material consumed Net sales revenue	GP Ratio = $\frac{Gross\ Profit}{Net\ Sales\ Revenue} * 100$
Net Profit Ratio	Net Profit = Total Sales revenue minus total operating expenses and interest cost and tax	NP Ratio = $\frac{PAT}{Net\ Sales\ Revenue} * 100$
Return on Total Assets (ROTA)	Profit after tax (PAT) Total Net Assets	ROTA = $\frac{PAT}{Total\ Net\ Assets} * 100$
Return on Non-Current Assets (ROTNA)	Total Non-Current Assets Profit after tax	ROTNA = $\frac{PAT}{Total\ Non\ Current\ Assets} * 100$
Return on Tangible Non-current Assets (ROTNCA)	Profit after tax Net value of Plant, Property and Equipment (PPE)	ROTNCA = $\frac{PAT}{Net\ Block\ of\ Fixed\ Assets} * 100$
Current Ratio (CA)	Current assets like cash in hand, cash at bank, inventories, debtors, trade receivables, short term investments, pre-paid expenses and accrued incomes Current liabilities like sundry creditors, trade payables, outstanding expenses and incomes received in advance	$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$
Quick Ratio	Quick Assets = (Current assets – inventors and trade receivables) Current liabilities	$Quick\ Ratio = \frac{Quick\ Assets}{Current\ Liabilities}$
Cash Ratio	Cash and cash equivalents Current liabilities	$Cash\ Ratio = \frac{Cash\ and\ Cash\ Equiv}{Current\ Liabilities}$
Age of the Company	Age of the company is calculated by taking the year of establishment to the respective year and then the age of the company increases by one year	
Size of the Board of Directors	Number of members in the Board of Directors is collected from the annual reports of the respective company from the respective year	

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VI. SAMPLING

Three two-wheeler manufacturing companies listed in BSE and NSE are taken for further analysis. All the three companies are chosen based on the convenience of the researcher.

SI NO	Companies
1	TVS Motors Company Ltd
2	Hero MotoCorp
3	Baja Autos

DATA ANALYSIS AND INTERPRETATION

6.1 TECHNIQUES FOR DATA ANALYSIS

Table No.3: Correlation Matrix for alll the variables of Hero Motors, TVS Motors and Bajaj Auto

	ROI	AGE	BOD	CASH_RAT	COST_OF_	COST_OF_	CURRENT_	GROSS_PR	NET_PROF	QUICK_RA	RETURN_(	RETURN_(	SIZE_OF_N	WACC
ROI	**1.000**	0.189	0.453	0.152	0.122	0.090	0.070	0.326	0.559	0.230	0.513	0.479	-0.289	-0.045
AGE	**0.189**	1.000	0.593	0.266	0.525	-0.081	0.426	-0.035	0.184	0.504	-0.291	-0.302	0.655	0.111
BOD	**0.453**	0.593	1.000	0.325	0.196	0.187	0.319	-0.045	0.514	0.460	0.140	0.183	0.018	0.267
CASH_RAT	**0.152**	0.266	0.325	1.000	0.156	0.162	0.051	0.121	0.296	0.151	0.061	0.099	0.174	0.229
COST_OF_	**0.122**	0.525	0.196	0.156	1.000	-0.030	0.181	-0.082	0.277	0.211	-0.014	-0.009	0.319	0.175
COST_OF_	**0.090**	-0.081	0.187	0.162	-0.030	1.000	0.028	-0.163	0.140	0.059	0.046	0.117	-0.195	0.896
CURRENT_	**0.070**	0.426	0.319	0.051	0.181	0.028	1.000	-0.078	0.065	0.944	0.003	-0.196	-0.029	0.068
GROSS_PR	**0.326**	-0.035	-0.045	0.121	-0.082	-0.163	-0.078	1.000	0.279	-0.058	0.220	0.270	0.050	-0.394
NET_PROF	**0.559**	0.184	0.514	0.296	0.277	0.140	0.065	0.279	1.000	0.136	0.733	0.826	-0.185	0.116
QUICK_RA	**0.230**	0.504	0.460	0.151	0.211	0.059	0.944	-0.058	0.136	1.000	0.038	-0.164	-0.064	0.114
RETURN_(	**0.513**	-0.291	0.140	0.061	-0.014	0.046	0.003	0.220	0.733	0.038	1.000	0.925	-0.565	-0.041
RETURN_(	**0.479**	-0.302	0.183	0.099	-0.009	0.117	-0.196	0.270	0.826	-0.164	0.925	1.000	-0.478	0.034
SIZE_OF_N	**-0.289**	0.655	0.018	0.174	0.319	-0.195	-0.029	0.050	-0.185	-0.064	-0.565	-0.478	1.000	-0.006
WACC	**-0.045**	0.111	0.267	0.229	0.175	0.896	0.068	-0.394	0.116	0.114	-0.041	0.034	-0.006	1.000

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Table No: 3 Descriptive Statistics

	ROI	NET_PROFIT_RATIO	RETURN_ON_NON_CURRENT_ASSETS	LOGROTA	SIZE_OF_NON_CURRENT_ASSETS_OUT_OF_TOTAL_ASSETS	COST_OF_EQUITY	LOGKD	WACC	BOD	AGE	LOGCA	LOGQA	GROSS_PROFIT_RATIO
Mean	22.75395	8.916466	26.02805	2.498172	48.40996	-11.84246	0.250528	-7.347082	13.13725	46.00000	0.302280	-0.249338	33.70620
Median	22.87520	8.977235	22.49378	2.678753	52.49091	-10.69323	1.272627	-4.369000	13.00000	38.00000	0.414705	-0.105511	33.96549
Maximum	47.02547	17.77019	58.85301	3.795769	77.09229	19.90104	6.170769	26.24951	20.00000	78.00000	1.300290	1.135274	41.50127
Minimum	3.148019	1.633445	4.299236	0.923985	17.62720	-55.18199	-6.227652	-51.39163	7.000000	23.00000	-1.213586	-1.799809	23.49577
Std. Dev.	9.235527	4.330559	16.19385	0.752687	18.30221	17.93397	3.578695	17.33955	3.544120	18.01000	0.464208	0.700608	4.026604
Skewness	-0.050324	0.112623	0.445563	-0.440551	-0.333419	-0.390477	-0.428547	-0.562642	-0.046162	0.571353	-0.637978	-0.613863	-0.391603
Kurtosis	2.809732	2.012613	2.035803	2.256308	1.731415	2.736381	1.883361	2.975647	2.014207	1.710988	3.791501	2.666557	3.169397
Jarque-Bera	0.098456	2.179545	3.663036	2.825012	4.364711	1.443691	4.210673	2.692070	2.083162	6.305569	4.790888	3.439304	1.364478
Probability	**0.951964**	**0.336293**	**0.160170**	**0.243532**	**0.112776**	**0.485855**	**0.121805**	**0.260270**	**0.352896**	**0.042733**	**0.091132**	**0.179128**	**0.505484**
Sum	1160.451	454.7398	1327.430	127.4068	2468.908	-603.9654	12.77695	-374.7012	670.0000	2346.000	15.41630	-12.71625	1719.016
Sum Sq. Dev.	4264.748	937.6871	13112.05	28.32690	16748.55	16081.36	640.3528	15033.00	628.0392	16218.00	10.77444	24.54256	810.6770
Observations	51	51	51	51	51	51	51	51	51	51	51	51	51

Table No. 4. Results of Panel Regression Test

Dependent Variable: LOGROI
Method: Panel Least Squares
Date: 04/08/24 Time: 10:30
Sample: 2007 2023
Periods included: 17
Cross-sections included: 3
Total panel (balanced) observations: 51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGNPR	-0.459347	0.304911	-1.506496	0.1402
LOGRONCA	0.789879	0.583449	1.353810	0.1838
LOGROTA	-0.643557	0.713780	-0.901619	0.3729
LOGSIZE	-0.067977	0.406766	-0.167115	0.8682
COST_OF_EQUITY	**0.024567**	**0.008910**	**2.757210**	**0.0089**
LOGKD	0.043135	0.048850	0.883004	0.3828
WACC	**-0.025636**	**0.010100**	**-2.538145**	**0.0154**
LOGCA	**-0.789646**	**0.263829**	**-2.993019**	**0.0048**
LOGQA	0.359710	0.268163	1.341386	0.1878
LOGGPR	**1.745260**	**0.593705**	**2.939609**	**0.0056**
C	-2.281485	2.695478	-0.846412	0.4026

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.734788	Mean dependent var	3.012632

|e-ISSN: 2319-8753, p-ISSN: 2347-6710| www.ijirset.com | Impact Factor: 8.423| A Monthly Peer Reviewed & Refereed Journal |

|| Volume 13, Issue 5, May 2024 ||

| DOI:10.15680/IJIRSET.2024.1305014 |

Adjusted R-squared	**0.651037**	S.D. dependent var	0.535827
S.E. of regression	0.316530	Akaike info criterion	0.752766
Sum squared resid	3.807263	Schwarz criterion	1.245192
Log likelihood	-6.195530	Hannan-Quinn criter.	0.940936
F-statistic	8.773471	**Durbin-Watson stat**	**1.628180**
Prob(F-statistic)	**0.000000**		

Table No. 5 Correlation Matrix

	ROI	NET_PROFIT_RATIO	RETURN_ON_NON_CURRENT_ASSETS	LOGROTA	SIZE_OF_NON_CURRENT_ASSETS_OUT_OF_TOTAL_ASSETS	COST_OF_EQUITY	LOGKD	WACC	BOD	AGE	LOGCA	LOGQA	GROSS_PROFIT_RATIO
ROI	1.000000	0.558640	0.513452	0.445718	-0.289409	0.089686	-0.196584	-0.045267	0.453283	0.189148	0.018531	0.215597	0.326386
NET_PROFIT_RATIO	0.558640	1.000000	0.733403	0.842274	-0.184699	0.139956	-0.062317	0.116369	0.513902	0.183719	0.008161	0.117184	0.279118
RETURN_ON_NON_CURRENT_ASSETS	0.513452	0.733403	1.000000	0.913475	-0.564924	0.046321	-0.465840	-0.041082	0.139794	-0.290862	-0.016059	0.019284	0.220177
LOGROTA	0.445718	0.842274	0.913475	1.000000	-0.410209	-0.022263	-0.364809	-0.084127	0.204159	-0.176091	-0.043480	-0.046702	0.229950
SIZE_OF_NON_CURRENT_ASSETS_OUT_OF_TOTAL_ASSETS	-0.289409	-0.184699	-0.564924	-0.410209	1.000000	-0.195408	0.888392	-0.005555	0.017962	0.654575	0.010819	-0.055476	0.049681
COST_OF_EQUITY	0.089686	0.139956	0.046321	-0.022263	-0.195408	1.000000	-0.090216	0.896033	0.186892	-0.080952	0.027954	0.108838	-0.163104
LOGKD	-0.196584	-0.062317	-0.465840	-0.364809	0.888392	-0.090216	1.000000	0.145323	0.173925	0.760842	0.075061	0.069387	0.023545
WACC	-0.045267	0.116369	-0.041082	-0.084127	-0.005555	0.896033	0.145323	1.000000	0.267099	0.110808	0.085797	0.178898	-0.394470
BOD	0.453283	0.513902	0.139794	0.204159	0.017962	0.186892	0.173925	0.267099	1.000000	0.593455	0.294367	0.483980	-0.044518
AGE	0.189148	0.183719	-0.290862	-0.176091	0.654575	-0.080952	0.760842	0.110808	0.593455	1.000000	0.418665	0.503272	-0.034594
LOGCA	0.018531	0.008161	-0.016059	-0.043480	0.010819	0.027954	0.075061	0.085797	0.294367	0.418665	1.000000	0.897156	-0.147392
LOGQA	0.215597	0.117184	0.019284	-0.046702	-0.055476	0.108838	0.069387	0.178898	0.483980	0.503272	0.897156	1.000000	-0.190975
GROSS_PROFIT_RATIO	0.326386	0.279118	0.220177	0.229950	0.049681	-0.163104	0.023545	-0.394470	-0.044518	-0.034594	-0.147392	-0.190975	1.000000

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VII. HYPOTHESIS TESTING AND METHODS

- Correlation (A statistical measure that characterises how much two variables change together is called correlation. Stated differently, it measures the degree and direction of the association between two variables.)
- Panel Regression (Panel regression is a statistical technique used to examine data sets containing observations over several time periods and/or across several people, groups, or entities. It is also referred to as pooled regression or longitudinal regression.)

VIII. DATA INTERPRETATION

Results of the Correlation Analysis:

The age of the Company and the ROI is for all the three companies is positively associated with each other as per the correlation matrix where the degree of correlation is 0.189. ROI and Size of the Board of Directors is positively associated for all the three companies whose degree of correlation is 0.453. The fund-raising costs i.e., Cost of Debt and Weighted Average Cost of Capital are negatively related with ROI and Cost of Equity is positively related with ROI, but the degree of correlation is insignificant. The Net Profit Ratio, Gross Profit Ratio, return on Total Assets and Return on Total Non-current assets is positively associated with the Return on Investment whose degree of correlation is more than 0.50. The liquidity ratios like current ratio, quick ratio and cash ratios are positively associated with ROI, but the degree of correlation is insignificant.

Regression Analysis:

Checking normality of the variables is a pre-requisite for running Ordinary Least Square (OLS) regression technique. Table No. 1 shows the basic characteristics of the dataset. The p value of the Jarque-Bera test is considered for understanding whether the variables are normally distributed or not.

H_0 = the variable is normally distributed

H_1 = the variable is not normally distributed

Since the p value of all the variables is greater than 5% (0.05), we cannot reject the null hypothesis rather it should be accepted, meaning that all the variables are normally distributed and the variables satisfied the pre-condition of normally distributed.

The Gross Profit Ratio (LOGGPR) and Cost of Equity are significant and positively affect the dependent variable of ROI. For every one-unit increase in cost of equity, the ROI will increase by 0.024 units vice versa and for every one-unit increase in Gross Profit Ratio (LOG GP Ratio), the ROI will go up by 1.74 units and vice versa. For every one-unit increase in WACC, the ROI will come down by 0.025 units and for every one-unit increase in Current Ratio, the ROI will come down by 0.78 units. Other than the LOG GP Ration, Cost of equity, WACC and Current Ratio, the other variables are not significant in influencing the dependent variable ROI.

The adjusted R Square value is 0.651037 (65.1037) which is more than the acceptable level of 60% meaning that all the selected variables will explain 65.1037% of variation in the dependent variable and rest will be explained by the unknown variables. The p value of the F-statistic shows the robustness of the model which is highly significant.

Cross-Section dependence (Correlation) is tested with the help of Breusch-Pagan LM Test, Pesaran Scaled LM Tests and the results are displayed in the Table No. 4, where the p value of the Breusch-Pagan LM test and Pesaran Scaled LM test are more than 5%, we cannot reject the null hypothesis of no cross-section dependence of the variables.

IX. FINDINGS AND RECOMMENDATIONS

9.1 RESEARCH OUTCOME AND FINDINGS:

- All the profitability ratios i.e, GP Ratio, NP Ratio, ROTA, ROTNCA, and RONCA are positively correlated with the dependent variable ROI. The management has to focus on these ratios in order to increase the ROI. These results are strongly supporting the finance theory as the more investment on non-current assets, the more will be the ROI and vice versa.
- The liquidity and profitability are negatively associated with each other as per the finance theory. When more investments on current assets, the less will be the ROI and vice versa. Here, all the liquidity ratios like current ratio, quick ratio and cash ratios though they are positively associated with ROI, but insignificant. Meaning that the company is managing proper balance between the investment on current and non-current assets.
- Finance theory demonstrates that the WACC and ROI are negatively associated with each other. ROI always depends on the WACC which is independent in nature. The Correlation Matrix results shows that there is a negative relationship between WACC and ROI and Cost of Debt and ROI, but Cost of equity is positively

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associated with ROI. The average weight of the equity in TVS and Bajaj Auto is on an average it is 60%, but the weight of the equity in Hero Motors is it is 90%. This makes the difference in the results.

- Young companies are having growth potential compared with the aged companies. The average age of the Hero Motors, TVS Motors and Bajaj company are 31 years., 37 years and 70 years respectively. Expect Bajaj Auto, remaining two companies are growth potential companies, hence their age is positively associated with the ROI.
- Board diversification increases the size of the Board of Directors who will take wise decisions which will enhance the performance of the company. The Average number of board of directors of all the three companies for all the years on an average is 13, which signifies there is a better diversification in the BoD that is reflected in the ROI.

9.3 MANAGERIAL IMPLICATION:

All the three companies are doing well during the study period. The Gross Profit ratio is positively influencing the ROI meaning that the companies are effectively managing and controlling the cost of production, but the net profit ratio is not significant meaning that all the three companies are not properly managing their operating expenses, hence the net profit ratio is not influencing the ROI. Therefore, it is advisable to the Management of all the three companies to manage and control the operating expenses so that the ROI will go up.

The weighted average cost of capital (WACC) for all the three companies is negatively influencing the ROI, it is advisable to the management to minimize the WACC so as to maximize the ROI.

It seems that all the three companies are investing more on current assets, hence the current ratio is negatively influencing the ROI. It is advisable to the management of all the three companies to manage a balance between the investments of current and non-current assets.

9.4 LIMITATIONS OF THE STUDY

The research uses secondary data that is mostly obtained from websites that provide financial data and annual reports from businesses. But given that this data might be window dressing, there is reason for concern about its accuracy. This approach has the potential to misrepresent the actual financial standing of the investigated companies, which include Bajaj Auto, Hero MotoCorp, and TVS Motors Company Ltd. Even though the data provides insightful information about these companies' performance, it is important to recognise the potential for manipulation and proceed with caution when interpreting the results. It might be essential to take extra verification steps to guarantee the accuracy and consistency of the data.

The results of the three companies cannot be generalized for other companies. It is limited to these companies during the period only.

X. CONCLUSION

To conclude that Return on Investment (ROI) is a measure of overall performance of an entity and which is influenced by different factors over a period. It is evident that the results are strongly support the finance theory as well as the past research results, i.e., the liquidity ratios are negatively influencing the ROI, profitability ratios are positively influencing the ROI and fund-raising costs are negatively associated with ROI during the study period of these three companies. Hence the management of the three companies has to focus on the variables which are significant in influencing the ROI.

XI. SCOPE FOR FUTURE RESEARCH

Subsequent investigations may extend their range to incorporate additional variables not covered in this work. These variables include corporate governance practices, the proportion of independent directors on the board, the number of women serving on the board, technological advancements, and the impact of pandemic situations. They also include political and economic factors. Examining these factors could offer a more comprehensive comprehension of the dynamics affecting the profitability-cost of capital relationship in the context of the chosen Indian two-wheeler companies. Future studies may provide more profound understandings of the complex relationship between organisational performance and its determinants by examining these variables.

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INTERNATIONAL STANDARD SERIAL NUMBER INDIA

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