

Capital Structure and Firm Performance: An Empirical Study of Indian Companies using Age and Size as Moderators

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Abstract

Purpose: The main aim of this research is to explore the moderating effect of age and size of the firm on the relationship between selected capital structure and performance variables of non-financial Indian companies listed on an index of National Stock Exchange (NSE) named NSE 500 for a period of 21 years (2000-2020)

Design/methodology/approach: Pooled Ordinary Least Square Method, Fixed Effect and Random Regression Model

Findings: The empirical results show that selected variables of capital structure have a negative impact on financial performance variables. Further, with the inclusion of age and size as moderating variables under the selected Regression Model results showed that both the moderating variables play a significant moderating role in the relationship between capital structure and firm performance.

Research implications/ limitations: The study has important implications for financial managers in taking capital structure decisions in large, medium and small sized firms and also for new and old firms, for lenders while taking lending decisions towards new and old firms, for investors while making investment decisions and for policy makers when designing debt policies for the sector or industry.

Originality: This may probably be the first study that explores the impact of capital structure on the performance of Indian listed firms using age and size as moderators. Moreover, this paper also lays down some groundwork upon which a more detailed evaluation of Indian firms' capital structure and its impact on performance with liquidity, tangibility, and industry type as moderating variable

Keywords: Capital structure, Size, Age, Moderating effect, Firm Performance, India, NSE

Introduction

The assets of the company can be financed either by increasing the owner claims or the creditor claims. The owner claim increases when the firm raise funds by issuing ordinary shares or by retaining the earnings

while creditors claim increases by the borrowings. The term capital structure is used to represent the proportionate relationship between debt and equity. Equity includes paid up share capital, share premium and reserves and surplus (retained earnings) and debt includes borrowings from capital markets and borrowings from financial institutions.

Capital Structure is sum of two factors; one, the relationship between various long-term source of financing such as equity capital, preference share capital and debt capital and two, the decision about different sources of finances, its quantum and the proportion in which these should be employed. The value of a firm is derived from the influence of these factors on the short-term and the long-term planning of the enterprise.

According to the definition by Gerestenbeg, “Capital Structure of a company refers to the composition or make up of its capitalization and it includes all long-term capital resources”. While it is more clearly spelt by James C. Van Horne, “The mix of a firm's permanent long-term financing represented by debt, preferred stock, and common stock equity”.

Capital Structure discussion has always been the most debated agenda in the boardrooms and relevant enigma among the researchers. The past researchers had identified various moderating variables on the relationship between capital structure and firm performance. The identified variables are corporate governance by (La Rocca, 2007), (Ngatno et al., 2021), (Iqbal&Javed, 2017) and (Javeed et al., 2017), competitive intensity by (Ahmed & Afza, 2019), intangible assets by (Zeb & Rashid, 2016)-, profitability by (Almahadin&Oroud, 2020) and (Kartika Buana&Khafid, 2018), liquidity by (Adeel Akhtar et al., 2019), (Abdul Hakeem et al., 2016) and size by (Mirza, 2015), (Li-Ju Chen Shun-Yu Chen, 2011), (Zulvia&Roza Linda, 2019), (Corvino et al., 2019), (Hussain et al., 2020), (Gunardi et al., 2020) and (Nodeh et al., 2015). Furthermore, with size as moderating variable, the studies conducted on the firms of France, Germany, United Kingdom shows a positive effect of size on leverage while Indonesian firms shows a negative effect of size on leverage while there are findings that the firms of France, Germany, Italy, UK, Taiwan and

firms in Indian food industry shows that size plays a moderating role in the relationship between capital structure and firm performance. The studies conducted with moderating variables in developing countries are limited in number and hence it presents a scope for the current study which is conducted on all the listed non-financial firms on NSE 500 and shows the role of age and size as moderating variable on the relationship between capital structure and firm performance using regression models.

The first set of regression analysis showed that all the variables of capital structure have a significant negative impact on firm performance under Pooled OLS, Fixed Effect and Random Effect Regression Models. Further, age as the control variable showed a significant negative impact on the selected performance variables while size is having a significant negative impact on performance measured by ROA and Tobin's Q.

The other set of regression analysis with age and size of the firm as moderating variables shows mixed results. Under Pooled OLS regression analysis, firm age shows mixed moderating effect while size shows negative moderating effect on the relationship between capital structure and firm performance. Under Fixed and Random Effect Regression methods, firm age had a significant positive impact on the relationship while size is having an insignificant impact on the relationship between capital structure and firm performance. The results are in line with the studies of (Mirza, 2015), (Li-Ju Chen Shun-Yu Chen, 2011), (Zulvia&Roza Linda, 2019), (Corvino et al., 2019), (Hussain et al., 2020), (Gunardi et al., 2020) and (Nodeh et al., 2015). The study can be extended further to all the listed non-financial and financial firms in developing countries with other moderating variables which may be perceived to be impactful and similar to the ones taken in this study like age and size.

The research paper is further divided into five sections where section 2 deals with detailed review of literature, section 3 provides the theoretical model of study and research methodology while section 4 explains results and discussions with the last section presenting the conclusion of the study.

Review of Literature

Corporate Governance as moderating variable: Firm Performance and Leverage

(La Rocca, 2007) concluded that corporate governance variable had a significant moderating effect on relationship between capital structure and firm value. Another study (Ngatno et al., 2021) with corporate governance as moderating variable between capital structure and firm performance revealed that commissioner size can strengthen the relationship between capital structure and firm performance while board size and shareholder size had no impact on the relationship between capital structure and firm performance and also revealed that capital structure is positively related with privately owned rural banks performance in Indonesia. A study on Pakistani manufacturing firms (Iqbal&Javed, 2017) examined the effect of Corporate Governance Index (CGI) as moderating variable and the result revealed that Corporate Governance index (CGI), board structure and transparency and disclosure has significant positive effect on the relationship between capital structure with performance while ownership structure does not have any impact on the same and also capital structure had a positive relationship with financial performance and (Javeed et al., 2017) study on listed non-financial firms in Pakistan with moderating effect of corporate governance, it is found that there is significant positive moderation of board independence and ownership concentration while a significant negative moderation of managerial ownership between leverage and firm value. Similar study on Pakistani non-financial firms (Ahmed & Afza, 2019) had explored the moderating role of competitive intensity between capital structure and firm performance and showed a negative relation between capital structure and firm performance. Further, product market competition had negatively moderated the relationship between capital structure and firm performance which shows that high product market competition can be used as a substitute for debt financing.

(Zeb & Rashid, 2016) studied the moderating effect of intangible assets on beverage industry of Pakistan and also studied the relationship between return on assets, capital

structure and firm value where debt equity ratio and return on assets had a positive relation with Tobin's Q and it is also found that intangible assets enhanced the relationship between return on assets, capital structure and the firm value. (Almahadin&Oroud, 2020) have investigated the moderating role of profitability between the relationship between capital structure and firm value in Jordanian firms and the result revealed that debt ratio negatively influence firm value as measured by Tobin's Q and profitability also played a moderating role between capital structure and firm value. (Adeel Akhtar et al., 2019) investigated the textile firms of Pakistan and studied the relationship between capital structure and firm performance with liquidity as a moderator. The analysis revealed that debt equity ratio had a negative impact on EPS and it is also acts as the significant moderator between the debt ratio, debt to equity performance variables (return on assets and earnings per share) respectively.

(Abdul Hakeem et al., 2016) revealed that liquidity is a good mediator between the firm's financial performance and dividend payout among listed manufacturing firms in Nigeria as the firms with good liquidity had good performance, so they pay good dividends. (Ganiyu & Abiodun, 2012) had studied the factors affecting leverage in Nigerian firms under food and beverage industry and found that board size, firm size and profitability had a positive effect on leverage while board skill and CEO duality had a negative relationship with leverage. The study also showed that corporate governance had an important implications on the financing decisions of food and beverages firms.

(Kartika Buana & Khafid, 2018) analysed various factors affecting capital structure with profitability as moderating variable on real estate companies listed in the Indonesia Stock Exchange and the study concluded that asset structure had a significant positive effect on the capital structure while business risk had a significant negative effect on the capital structure and profitability moderates the effect of asset structure and not business risk on the capital structure.

(Vijaya kumaran & Vijaya kumaran, 2019) studied the

impact of corporate governance on capital structure decisions of Chinese firms and it is found that managerial ownership has a significant positive impact on leverage while state and foreign ownership had a negative influence on leverage decisions.

Size as moderating variable: Determinants of Capital Structure, Firm Performance and Leverage

(Mirza, 2015) studied the France, Germany and the United Kingdom firms with moderating effect of size on leverage and the result showed that size positively affects leverage because larger companies are able to borrow more and earn more profit as debt is considered cheaper than equity. Further, in small and medium firms profitability had a positive effect on leverage and in large firms profitability had a negative effect on leverage.

(Ghalandari, 2013) had investigated firms listed on Tehran Securities Exchange and showed significant positive relationship between capital structure, dividend and firm value without growth opportunities as moderator and significant negative relationship between capital structure, dividend and firm value with growth opportunities as moderator.

(Li-Ju Chen Shun-Yu Chen, 2011) studied listed companies in Taiwan and concluded that firm size and industry type moderates the relationship between profitability and leverage and shows that profitability had a significant negative influence on leverage

(Zulvia&Roza Linda, 2019) studied the determinants of capital structure with firm size as moderating variable of Indonesian manufacturing companies and showed that growth and business risk had a positive effect on capital structure and profitability had a negative effect on capital structure and also size strengthens the positive influence of tangibility on debt-equity ratio.

(Corvino et al., 2019) identified that firm size played a key role in moderating the relationship between relational capital (RC) and firm performance in France, Germany, Italy and the UK firms performance under defined conditions of competitive advantage.

(Hussain et al., 2020) analysed the moderating position of company size and the interest rate on the capital structure of listed sugar market firms in Pakistan and the results showed that firm size and interest rate had a strong and negative effect on capital structure. Further, it also showed that profitability, firm size, and non-debt tax shield had a significant negative effect while tangibility and interest rates had a significant positive effect on debt to capital ratio and also revealed that the moderators size and interest rate plays an important influence on its capital structure. (Odaló et al., 2016) had studied the effect of company size on the financial performance of listed agricultural companies in Kenya and the result showed that company size had significant positive affect on financial performance.

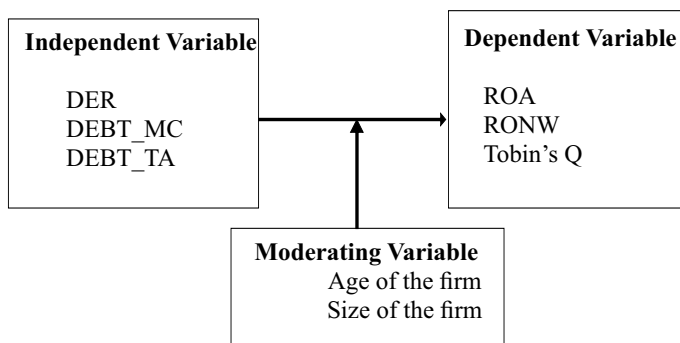
(Desai & Desai, 2021) examined the determinants of capital structure of Indian food processing industry and assessed the moderating effect of firm size on this relationship and found that tangibility, tax rate, and cash flow as significant determinants of long-term debt and tangibility, while liquidity and profitability are significant determinants of short-term debt. The study also highlighted that the positive relation between profitability and short-term debt ratio for small size companies whereas negative relation for medium and large size companies. It explained that increasing profits induce small firms to borrow more but as firms grow up in size, they replace debt with own funds showing inverse relationship. The study also concluded that size play a moderating role in the relationship between capital structure and performance of Indian food processing industry.

(Gunardi et al., 2020) found that tangibility, profitability, inflation and GDP as significant determinant and liquidity as insignificant determinant of capital structure and firm size as moderating variable of capital structure determinants of the construction companies listed in the Indonesia Stock Exchange. Another study (Nodeh et al., 2015) had identified the role of bank size as moderator on relationship between board size and board independence with Malaysian banks financial performance, where board independence and board size positively impacts firm financial performance with firm size as the moderator.

Methodology

The data collection comprises of listed firms on National Stock Exchange (NSE) popularly known as NSE 500 companies for a period of 21 years (2000-2021) using Centre for Monitoring Indian Economy (CMIE) proress database. The data collected consists of both financial and non-financial firms but for the current study only non-financial firms were taken as sample because their functioning is different from financial firms. Hence, the final sample consists of 388 non-financial firms across diversified sectors and the panel data regression analysis (Pooled OLS Regression, Fixed and Random Effect Regression) was used to know the impact of capital structure on performance of firms with age and size of the firm as moderating variables.

Theoretical Model of the Study



Variables used in the study

Capital structure variables: The capital structure variables identified for the study are Debt Equity Ratio, defined as total debt (short and long term) divided by total equity, Debt to Market Capitalization, defined as total debt (short and long term) divided by NSE market capitalization of the company and Debt to Total Assets, calculated as total debt (short and long term) to total assets of the business. The firm capital structure refers to company funding from both internal and external sources of finance.

Performance Variables: Performance is measured with the help of three ratios namely Return on Net Worth, calculated as Reported net profit for the year divided by the net worth of the company, Return on Total Assets, defined Reported net profit for the year divided by the total assets of

the company and Tobin's Q as the indicator of measuring firm market performance and calculated as market capitalization to book value of the firm.

Moderating Variables: The moderating variables used in the study are size of the firm which is defined as log of total assets of the firm and firm's age which is defined as log of the total number of years since inception.

Results and Discussion

This study consists of three categories of variables: capital structure, performance, and moderating variables mentioned in 3.2 above. The purpose of this study was to determine the effect of capital structure decisions on non-financial companies' performance listed on NSE 500. Various regression methods are used to examine the effect of capital structure on firm performance using identified variables of capital structure and firm performance. Furthermore, the regression analysis was conducted to identify the relationship between capital structure, performance, with moderating effects of age and size of the firm. Here the capital structure variables are independent variable, firm performance variables are dependent variables, and firm size and age are the moderating variable. The regression equation for analysing the moderation effect can be formulated as follows:

$$ROA = \beta_0 + \beta_1 DER_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DER_{i,t} + \beta_5 SIZE * DER_{i,t} + \epsilon_{i,t}$$

$$ROA = \beta_0 + \beta_1 DMC_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DMC_{i,t} + \beta_5 SIZE * DMC_{i,t} + \epsilon_{i,t}$$

$$ROA = \beta_0 + \beta_1 DTA_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DTA_{i,t} + \beta_5 SIZE * DTA_{i,t} + \epsilon_{i,t}$$

$$RONW = \beta_0 + \beta_1 DER_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DER_{i,t} + \beta_5 SIZE * DER_{i,t} + \epsilon_{i,t}$$

$$RONW = \beta_0 + \beta_1 DMC_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DMC_{i,t} + \beta_5 SIZE * DMC_{i,t} + \epsilon_{i,t}$$

$$RONW = \beta_0 + \beta_1 DTA_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DTA_{i,t} + \beta_5 SIZE * DTA_{i,t} + \epsilon_{i,t}$$

$$Tobin's Q = \beta_0 + \beta_1 DER_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DER_{i,t} + \beta_5 SIZE * DER_{i,t} + \epsilon_{i,t}$$

$$Tobin's Q = \beta_0 + \beta_1 DMC_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DMC_{i,t} + \beta_5 SIZE * DMC_{i,t} + \epsilon_{i,t}$$

$$Tobin's Q = \beta_0 + \beta_1 DTA_{i,t} + \beta_2 AGE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE * DTA_{i,t} + \beta_5 SIZE * DTA_{i,t} + \epsilon_{i,t}$$

Where: β_0 = Constant, β = Regression coefficient and ϵ_{it} = error term

In the above equation, if the coefficient of the interaction between the independent variables (DER, DMC and DTA) and th moderator variables (AGE and SIZE) is statistically significant then it can be said to be moderator and vice versa.

Table 4.1: Descriptive Statistics

Descriptive	DER	DMC	DTA	ROA	RONW	TOBIN_Q	FIRM_AGE	FIRM_SIZE
Mean	-0.398	-0.611	-0.750	7.953	16.084	2.070	1.430	4.156
Median	-0.260	-0.600	-0.600	7.070	16.100	1.200	1.450	4.170
Maximum	3.640	4.950	0.490	131.040	3242.860	98.030	2.200	6.990
Minimum	-2.000	-2.000	-2.000	-331.510	-3167.940	0.000	0.300	-1.000
Std. Dev.	0.667	0.777	0.478	12.037	76.479	3.091	0.330	0.857
Skewness	-0.486	0.211	-1.140	-4.965	-7.375	9.772	-0.590	-0.732
Kurtosis	3.687	3.258	3.648	128.711	1081.824	217.872	3.478	6.370
Jarque-Bera	371.842	49.122	1484.804	5017664	360000000	12138384	534.876	4344.907
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	-2506.99	-2952.49	-4759.83	60227.11	119507.60	12955.08	11338.44	32107.57
Sum Sq. Dev.	2797.509	2915.498	1446.975	1097093	43452079	59797.04	861.406	5671.951
Observations	6296	4829	6345	7573	7430	6258	7927	7726

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.1 indicates the descriptive statistics of the data collected of non-financial companies listed on NSE 500 for a period of 21 years (2000 to 2020). The mean and median values of the capital structure variables as measured by Debt Equity Ratio is -0.398 and -0.260 , Debt to Market Capitalization Ratio is -0.611 and -6.000, Debt to Total Assets Ratio is -0.750 and -0.600, mean and median values of the firm performance variables as measured by Return on Asset is 7.953 and 7.070 , Return on Net Worth is 16.084 and 16.100 and Tobin's Q is 2.070 and 1.200 and firm age

and firm size is having a mean of 1.430 and 4.156 respectively and a median of 1.450 and 41.170 respectively.

The Standard deviation of Return on Net Worth is high in all the selected variables which shows that there is a huge variations in the values. The skewness measures the degree of asymmetry of the series, all the variables except Debt to Market Capitalization and Tobin's Q are negatively skewed as the value is less than 0. Kurtosis measures the convexity of the curve so all the variables are having Leptokurtic curve.

Table 4.2: Correlation Matrix

Correlation	DER	DMC	DTA	ROA	RONW	TOBIN_Q	FIRM_AGE	FIRM_SIZE
DER	1							
DMC	0.815	1						
DTA	0.939	0.792	1					
ROA	-0.464	-0.531	-0.389	1				
RONW	-0.176	-0.152	-0.090	0.370	1			
TOBIN_Q	-0.317	-0.648	-0.277	0.376	0.101	1		
FIRM_AGE	-0.048	-0.025	-0.062	-0.070	-0.014	-0.057	1	
FIRM_SIZE	0.049	-0.011	0.037	-0.110	0.002	-0.042	0.199	1

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.2 indicates that the Pearson's correlation coefficient value between capital structure and performance variables. There a high degree of positive correlation between all the capital structure ratios i.e. debt to market capitalization, debt to total assets and debt to equity ratio and also between debt to total assets and debt to market capitalization ratio. Further, all the selected capital

structure variables have a negative correlation with all the selected performance variables i.e. return on assets, return on net worth and Tobin's Q. On the other hand, firm age is having a negative correlation with all selected capital structure and performance variables while firm size is having a mixed correlation (negative and positive) with capital structure and performance variables

Table 4.3: Pooled OLS Regression with Firm Age and Firm Size as control variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Model X	Model Y	Model Z	Model X	Model Y	Model Z	Model X	Model Y	Model Z
DER	-5.646 (0.000) **	--	--	-10.696 (0.000) **	--	--	-1.561 (0.000) **	--	--
DMC	--	-5.385 (0.000) **	--	--	-15.786 (0.000) **	--	--	-1.393 (0.000) **	--
DTA	--	--	-8.760 (0.000) **	--	--	-13.420 (0.000) **	--	--	-2.031 (0.000) **
AGE	-1.839 (0.000) **	-1.390 (0.000) **	0.368 (0.439)	-10.023 (0.001) **	-0.985 (0.812)	-8.189 (0.029) *	-0.714 (0.000) **	-0.441 (0.000) **	-0.754 (0.000) **
SIZE	-0.635 (0.000) **	-0.942 (0.000) **	-0.080 (0.665)	-1.582 (0.191)	1.019 (0.526)	-0.746 (0.609)	-0.123 (0.024) *	-0.090 (0.001) **	-0.142 (0.008) **
Constant	10.571 (0.000) **	9.495 (0.000) **	-0.111 (0.898)	32.753 (0.000) **	-1.165 (0.891)	19.116 (0.005) **	2.700 (0.000) **	1.627 (0.000) **	1.891 (0.000) **
Observations	6205	4821	6245	6194	4750	6107	5155	4824	5145
Adjusted R square	0.200	0.281	0.131	0.011	0.024	0.006	0.132	0.411	0.124
F-statistic	518.885	629.054	313.851	24.527	39.410	12.974	261.717	1123.636	243.302
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(p-values in the bracket); *significant at 5% level **significant at 1%

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.3 shows the results of Pooled OLS regression method showing that all the selected capital structure ratios had a significant negative impact on the performance of NSE 500 non-financial firms as their regression coefficients are negative and statistically significant which means that with increasing level of debt in capital structure ratios, the financial performance will decline. Further, the control variable, firm age, has a significant negative impact on

performance measured by ROA, RONW and Tobin's Q under Model X, ROA and Tobin's Q under Model Y and RONW and Tobin's Q under Model Z as old firms lack innovation, are less adaptive to new technology, rigid in terms of style and managerial governance which leads to

lower returns while control variable, firm size, also has a significant negative impact on performance as measured by ROA and Tobin's Q suggesting that with increase in size, efficient use of available resources reduces, leading to decline in firm performance.

Table 4.4: Fixed Effect Model (FEM) Regression with Firm Age and Firm Size as control variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Model X	Model Y	Model Z	Model X	Model Y	Model Z	Model X	Model Y	Model Z
DER	-5.746 (0.000) **	--	--	-10.974 (0.000) **	--	--	-1.417 (0.000) **	--	--
DMC	--	-5.756 (0.000) **	--	--	-16.334 (0.000) **	--	--	-1.289 (0.000) **	--
DTA	--	--	-8.974 (0.000) **	--	--	-13.435 (0.000) **	--	--	-1.855 (0.000) **
AGE	-1.714 (0.000) **	-1.112 (0.002) **	0.482 (0.310)	-9.431 (0.002) **	0.251 (0.952)	-7.686 (0.040) *	-0.775 (0.000) **	-0.488 (0.000) **	-0.824 (0.000) **
SIZE	-0.533 (0.000) **	-0.336 (0.034) *	0.194 (0.347)	-1.676 (0.216)	2.063 (0.255)	-1.582 (0.334)	-0.403 (0.000) **	-0.230 (0.000) **	-0.447 (0.000) **
Constant	9.920 (0.000) **	6.207 (0.000) **	-1.587 (0.102)	32.179 (0.000) **	-7.925 (0.409)	21.900 (0.005) **	4.079 (0.000) **	2.371 (0.000) **	3.459 (0.000) **
Observations	6205	4821	6245	6194	4750	6107	5155	4824	5145
Adjusted R square	0.215	0.297	0.139	0.015	0.026	0.009	0.168	0.433	0.163
F-statistic	74.692	89.351	44.924	5.040	6.423	3.426	46.267	160.952	44.521
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(p-values in the bracket); *significant at 5% level **significant at 1%

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.4 shows the results of Fixed Effect Regression Method of showing that all the selected capital structure

ratios had a significant negative impact on the performance of NSE 500 non-financial firms as their regression coefficients are negative and statistically significant. This suggest that with increasing level of debt in capital structure ratios, the financial performance will decline. Further, the control variable, firm age, has a significant negative impact on performance measured by ROA, RONW and Tobin's Q under Model X, ROA and Tobin's Q under Model Y and RONW and Tobin's Q under Model Z as old firms lack innovation, are less adaptive to new technology, rigid in

terms of style and managerial governance while control variable, firm size, also has a significant negative impact on performance as measured by ROA and Tobin's Q only

showing that with increase in size efficient use of available resources reduces, leading to decline in firm performance.

Table 4.5: Random Effect Model (REM) Regression with Firm Age and Firm Size as control variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Model X	Model Y	Model Z	Model X	Model Y	Model Z	Model X	Model Y	Model Z
DER	-5.725 (0.000) **	--	--	-10.813 (0.000) **	--	--	-1.441 (0.000) **	--	--
DMC	--	-5.488 (0.000) **	--	--	-15.786 (0.000) **	--	--	-1.321 (0.000) **	--
DTA	--	--	-8.910 (0.000) **	--	--	-13.473 (0.000) **	--	--	-1.887 (0.000) **
AGE	-1.738 (0.000) **	-1.301 (0.000) **	0.451 (0.342)	-9.791 (0.002) **	-0.985 (0.812)	-7.986 (0.033) *	-0.766 (0.000) **	-0.474 (0.000) **	-0.813 (0.000) **
SIZE	-0.556 (0.000) **	-0.773 (0.000) **	0.107 (0.591)	-1.596 (0.203) **	1.019 (0.526)	-0.987 (0.514)	-0.355 (0.000) **	-0.184 (0.000) **	-0.391 (0.000) **
Constant	10.048 (0.000) **	8.586 (0.000) **	-1.125 (0.242)	32.398 (0.000) **	-1.165 (0.891)	19.755 (0.006) **	3.798 (0.000) **	2.118 (0.000) **	3.130 (0.000) **
Observations	6205	4821	6245	6194	4750	6107	5155	4824	5145
Adjusted R square	0.204	0.283	0.132	0.012	0.024	0.006	0.128	0.384	0.124
F-statistic	530.300	634.967	317.463	24.841	39.410	13.129	252.172	1001.684	243.557
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman Test	0.0491	0.000	0.1927	0.030	0.0009	0.0487	0.000	0.000	0.000
(p-values in the bracket); *significant at 5% level **significant at 1%									

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.5 shows the results of Random Effect Regression Method showing that all the selected capital

structure ratios had a significant negative impact on the performance of NSE 500 non-financial firms as their regression coefficients are negative and statistically significant which means with increasing level of debt in capital structure ratio's the financial performance will decline. Further, the control variable, firm age, has a significant negative impact on performance measured by ROA, RONW and Tobin's Q under Model X, ROA and Tobin's Q under Model Y and RONW and Tobin's Q under Model Z old firms lack innovation, are less adaptive to new

technology, rigid in terms of style and managerial governance which leads to lower returns while control variable, firm size, also has a significant negative impact on performance as measured by ROA and Tobin's Q only showing that with increase in size efficient use of available resources reduces, leading to decline in firm performance.

The Hausman test was also conducted and the results showed for all variables and model that Fixed Effect Model is appropriate except for Return on Assets under Model Z where Random Effect model is appropriate as the p-value is greater than 0.05.

Table 4.6: Age and Size as Moderator with Debt Equity Ratio as Independent Variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Pooled	FEM	REM	Pooled	FEM	REM	Pooled	FEM	REM
DER	-2.556 (0.005) **	-2.681 (0.003) **	-2.652 (0.003) **	1.642 (0.847)	1.472 (0.863)	1.589 (852)	-3.051 (0.000) **	-2.750 (0.000) **	-2.800 (0.000) **
AGE	-1.853 (0.000) **	-1.716 (0.000) **	-1.745 (0.000) **	-15.722 (0.000) **	-15.066 (0.000) **	-15.538 (0.000) **	-0.443 (0.006) **	-0.517 (.001) **	-0.506 (0.001) **
SIZE	-0.880 (0.000) **	-0.782 (0.000) **	-0.806 (0.000) **	-0.583 (0.671)	-0.709 (0.638)	-0.599 (.669)	-0.073 (0.244)	-0.361 (0.000) **	-0.315 (0.000) **
AGE*DER	-0.097 (0.841)	-0.066 (0.890)	-0.0728 (0.879)	-16.510 (0.000) **	-16.346 (0.000) **	-16.471 (0.000) **	0.633 (0.002) **	0.608 (0.002) **	0.612 (0.002) **
SIZE*DER	-0.699 (0.000) **	-0.704 (0.000) **	-0.703 (0.000) **	2.745 (0.131)	2.661 (0.143)	2.723 (0.133)	0.124 (0.138)	0.096 (0.239)	0.101 (0.216)
Constant	11.606 (0.000) **	10.954 (0.000) **	11.096 (0.000) **	36.462 (0.000) **	35.927 (0.000) **	36.206 (0.000) **	2.085 (0.000) **	3.510 (0.000) **	3.242 (3.242)
Observations	6205	6205	6205	6194	6194	6194	5155	5155	5155
Adjusted R square	0.202	0.216	0.205	0.013	0.017	0.013	0.134	0.170	0.129
F-statistic	314.984	69.473	321.736	17.472	5.180	17.598	160.086	43.126	154.075
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman Test	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.012

(p-values in the bracket); *significant at 5% level **significant at 1%

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.6 shows the moderating effect of firm age and firm size measured on the relationship between debt equity ratio and the performance as measured by ROA, RONW and Tobin's Q. The Pooled, Fixed and Random Effect regression model shows the significant negative impact of DER on ROA and Tobin's Q respectively means with increase in debt the performance ratio ROA and Tobin's Q will decline.

The coefficient of interaction term (AGE* DER) showed mixed results. The results concluded a statistically significant negative impact on RONW while a statistically significant positive impact on Tobin's Q with AGE* DER as interaction term and debt equity ratio as independent variable. Hence, we can conclude that Firm Age has a moderating effect on the relationship between debt equity ratio and RONW and debt equity ratio and Tobin's Q respectively.

On the other hand, the coefficient of interaction term (SIZE*DER) showed statistically significant negative impact only on ROA with SIZE* DER as interaction term and debt equity ratio as independent variable and hence it can be concluded that Firm Size has a negative moderating effect on the relationship between debt equity ratio and ROA. Furthermore, the value of F-statistics indicates that test is appropriate and good.

Table 4.7: Age and Size as Moderator with Debt to Market Capitalization Ratio as Independent Variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Pooled	FEM	REM	Pooled	FEM	REM	Pooled	FEM	REM
DMC	-6.254 (0.000) **	-6.805 (0.000) **	-6.401 (0.000) **	-48.551 (0.000) **	-47.289 (0.000) **	-48.551 (0.000) **	-2.253 (0.000) **	-2.110 (0.000) **	-2.158 (0.000) **
AGE	-1.052 (0.033) *	-0.810 (0.097)	-0.966 (0.048) *	10.835 (0.054)	11.938 (0.034) *	10.835 (0.053)	-0.124 (0.182)	-0.159 (0.083)	-0.149 (0.103)
SIZE	-0.938 (0.000) **	-0.300 (0.106)	-0.745 (0.000) **	1.501 (0.4359)	2.387 (0.263)	1.501 (0.435)	-0.082 (0.011) *	-0.229 (0.000) **	-0.183 (0.000) **
AGE*DMC	0.519 (0.307)	0.460 (0.360)	0.499 (0.321)	17.882 (0.002)	17.706 (0.002) **	17.882 (0.002) **	0.487 (0.000) **	0.509 (0.000) **	0.503 (0.000) **
SIZE*DMC	0.021 (0.911)	0.083 (0.656)	0.036 (0.848)	1.389 (0.523)	1.024 (0.640)	1.389 (0.523)	0.031 (0.394)	0.014 (0.688)	0.0205 (0.565)
Constant	8.973 (0.000) **	5.602 (0.000) **	7.960 (0.000) **	-20.824 (0.051)	-26.726 (0.021) *	-20.824 (0.051)	1.121 (0.000) **	1.879 (0.000) **	1.631 (0.000) **
Observations	4821	4821	4821	4750	4750	4750	4824	4824	4824
Adjusted R square	0.281	0.296	0.283	0.026	0.027	0.026	0.415	0.436	0.387
F-statistic	377.589	82.237	381.489	25.889	6.336	25.889	684.014	150.275	609.645
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(p-values in the bracket); *significant at 5% level **significant at 1%

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets; RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception;

Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.7 shows the moderating effect of firm age and firm size measured on the relationship between debt to market capitalization ratio and the performance as measured by ROA, RONW and Tobin's Q. The Pooled, Fixed and Random Effect regression model shows the

significant negative impact of DMC on ROA, RONW and Tobin's Q respectively means with increase in debt the selected performance ratios will decline.

The coefficient of interaction term (AGE* DMC) shows a statistically significant positive impact on RONW and Tobin's Q with AGE* DMC as interaction term and debt to market capitalization ratio as independent variable. Hence,

we can conclude that Firm Age has a positive moderating effect on the relationship between debt to market capitalization ratio and RONW and debt to market capitalization ratio and Tobin's Q respectively. Furthermore, the value of F-statistics indicates that test is appropriate and good

Table 4.8: Age and Size as Moderator with Debt to Total Assets Ratio as Independent Variable

Dependent Variable	ROA			RONW			Tobin's Q		
	Pooled	FEM	REM	Pooled	FEM	REM	Pooled	FEM	REM
DTA	-26.695 (0.000) **	-26.955 (0.000) **	-26.880 (0.000) **	-1.595 (0.916)	0.728 (0.962)	-1.419 (0.925)	-4.702 (0.000) **	-4.337 (0.000) **	-4.403 (0.000) **
AGE	7.784 (0.000) **	8.025 (0.000) **	7.962 (0.000) **	-14.054 (0.039) *	-13.377 (0.049) *	-13.986 (0.040) *	0.108 (0.671)	-0.031 (0.902)	-0.009 (0.973)
SIZE	0.300 (0.371)	0.563 (0.104)	0.484 (0.157)	-0.735 (0.790)	-2.070 (0.469)	-0.827 (0.765)	0.021 (0.838)	-0.288 (0.006) **	-0.234 (0.023) *
AGE*DTA	10.540 (0.000) **	10.723 (0.000) **	10.674 (0.000) **	-8.031 (0.300)	-7.809 (0.314)	-8.005 (0.301)	1.121 (0.000) **	1.032 (0.000) **	1.047 (0.000) **
SIZE*DTA	0.609 (0.123)	0.556 (0.158)	0.570 (0.148)	-0.015 (0.996)	-0.646 (0.840)	-0.070 (0.983)	0.228 (0.054)	0.215 (0.064)	0.218 (0.060)
Constant	-12.340 (0.000) **	-13.953 (0.000) **	-13.484 (0.000) **	27.538 (0.032) *	32.173 (0.016) *	27.805 (0.030) *	-0.102 (0.849)	1.583 (0.004) **	1.250 (0.023) *
Observations	6245	6245	6245	6107	6107	6107	5145	5145	5145
Adjusted R square	0.151	0.160	0.152	0.006	0.009	0.006	0.127	0.166	0.127
F-statistic	222.393	48.444	225.523	8.017	3.202	8.039	151.095	41.915	150.896
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(p-values in the bracket); *significant at 5% level **significant at 1%

DER: Debt Equity Ratio; DMC: Total Debt to Market Capitalization Ratio; DTA: Total Debt to Total Assets Ratio; ROA: Return on Assets=Net Profit for the year by Total Assets;RONW: Return on Net Worth= Net Profit for the year by Net Worth; Tobin_Q: Tobin's Q=Ratio of Market Capitalization to book value of Total Assets; Firm Age: Firm_Age= Log of number of years since inception; Firm_Size: Firm Size= Natural logarithm of total assets

The Table 4.8 shows the moderating effect of firm age and firm size measured on the relationship between debt to total assets ratio and the performance as measured by ROA, RONW and Tobin's Q. The Pooled, Fixed and Random Effect regression model shows the significant negative impact of DTA on ROA, RONW and Tobin's Q respectively means with increase in debt the selected performance ratios will decline.

The coefficient of interaction term (AGE* DTA) shows a statistically significant positive impact on ROA and Tobin's Q with AGE* DTA as interaction term and debt to total assets ratio as independent variable. Hence, we can conclude that Firm Age has a positive moderating effect on the relationship between debt to total assets ratio and ROA and debt to total assets ratio and Tobin's Q respectively. Furthermore, the value of F-statistics indicates that test is appropriate and good

Conclusion

This study shows a negative relationship between the selected variables of capital structure as measured by Debt Equity Ratio, Debt to Market Capitalization ratio and Debt to Total Assets ratio and firm performance as measured by Return on Assets, Return on Net Worth and Tobin's Q with control variables, age and size of the firm. The Pooled OLS, Fixed Effect Regression Model and Random Effect Regression Model results show a significant negative impact of capital structure on firm performance with control variables, firm age and firm size also showing significant negative impact on the firm performance. It can be reasoned that firms lack innovation, are less open to adopting new technology, rigid in terms of style and managerial governance and with increase in size, efficient use of available resources reduces and in few cases it tends to suffer due to highly diverse businesses, geographies and culture.

The inclusion of age and size of the firm as moderating variable on the relationship between capital structure and firm performance shows that both the variables play a key moderating role on the relationship. Under Pooled OLS, Fixed Effect Regression Model and Random Effect Regression Model with firm age as moderator, with increase in age, the negative impact between Debt Equity Ratio, Debt to Market Capitalization ratio, Debt to Total Assets ratio and Tobin's Q, Debt to Market Capitalization ratio and Return on Net Worth, Debt to Total Assets and Return on Assets will reduce but the impact will increase with decrease in age between Debt to Equity and Return on Net worth. On the other hand, with firm size as moderator under Pooled OLS, Fixed Effect Regression Model and Random Effect Regression Model, the impact will reduce

between Debt Equity Ratio and Return on Assets with increase in size of the firms.

The significant negative impact of capital structure on Indian non-financial firms is due to the limited capability of companies to raise equity capital in an emerging country like India where efforts to create multiple sources of debt funding is way more than creating pool of equity capital, debt being part of the accepted traditional thesis of established businesses, changing economic policies, regulatory landscape and persistent high yields in the country. This study also has important implications for financial managers, lenders, investors and policy makers. For instance, empirical results indicate that financial managers should consider the effects of increasing age and size on leverage and performance before adjusting the debt levels, lenders should carefully inflict debt agreements considering their impact on firm performance with age and size of the firms. Investors should consider the firm's sustainable debt level, age of the firm, size of the firm and its ability to generate free cash flow before making investment decisions. Lastly, policy makers should use these variables to guide their monetary and regulatory perspectives and create a conducive macro structure which will reduce the negative implications on capital structure and performance of the firms..

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