

# “An empirical analysis of financial leverage and financial performance: Empirical evidence from Indian listed firms”

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# AN EMPIRICAL ANALYSIS OF FINANCIAL LEVERAGE AND FINANCIAL PERFORMANCE: EMPIRICAL EVIDENCE FROM INDIAN LISTED FIRMS

## Abstract

The purpose of this paper is to examine the determinants of financial performance, firm liquidity and financial leverage of Indian listed firms. This study uses both static models (pooled, fixed, and random effects) and Generalized Moment Methods (GMM). Financial leverage (FINLE) is defined by the ratio of total liabilities to total assets, whereas the current ratio and the quick ratio are used as firm liquidity factors. Further, a set of financial performance determinants such as return on assets, profit after tax, return on capital employed, return on equity, and Tobin-Q are used as independent factors. The results indicated that profit after tax, return on equity, return on capital employed, and Tobin-Q are the most significant financial success variables that influence financial leverage of Indian listed companies. Furthermore, profit after tax, return on capital invested, return on equity, and Tobin-Q are considered to have a substantial effect on financial leverage among the financial success indicators. In the case of firm liquidity, the findings show that the current ratio and the quick ratio have a substantial effect on the financial leverage of Indian listed companies.

## Keywords

capital structure, Tobin-Q, liquidity, GMM, firms, panel data, India

## JEL Classification

C23, C26, G32

## INTRODUCTION

The financial judgment made by management is very critical in deciding the optimum capital structure. The management of a company itself must lay out its capital structure in such a way as to increase its business worth, and this decision is very critical. However, companies have a varying degree of flexibility, and administrators are seeking to achieve the right collection to achieve an optimum capital structure (Salim & Yadav, 2012). The concept of capital structure and its relationship to market value and performance has been a perplexing subject in corporate finance and accounting literature since the seminal work of Modigliani and Miller (1958). Modigliani and Miller (1958) argued that under very conservative conditions of ideal financial markets, homogeneous aspirations of investors, a tax-free economy, and no transaction costs, the capital structure is unrelated to the determination of firm valuation. According to this proposal, the worth of a company is determined by its actual properties, not by the combination of shares that it issues. If this plan does not hold certain arbitration procedures, a creditor will acquire the securities of an undervalued company and sell the shares of the overvalued firm in such a manner as to gain the same revenue streams. When buyers take advantage of these arbitrage possibilities, "the price of overvalued shares will fall and the price of undervalued shares will increase until all prices are equivalent."

Even though in the real world, these restrictive assumptions do not exist, which has led many scholars to introduce more rationalization of this proposal and its underlying assumptions, suggesting that the capital structure affects the company's value and effectiveness, especially after the seminal paper by Jensen and Meckling (1976) that showed that the amount of financial leverage in the firm's capital structure was influenced (Harris & Raviv, 1991; Graham & Harvey, 2001). Modigliani and Miller (1958) suggested that policies should not influence the value of a company in the optimal stock market, but later contend that firm value can be improved by adjusting the capital structure due to the tax benefit of the debt. Modigliani and Miller (1958) argued that on the very conservative principles of optimal financial markets, homogeneous aspirations of investors, a tax-free economy, and no transaction costs, the capital structure is unrelated to the determination of firm valuation. Investors prefer purchasing undervalued securities and selling overvalued shares to gain profits. When consumers see that there is an opportunity to purchase undervalued securities at a premium below the equilibrium, they will sell at the inflated price and invest in securities that are undervalued to capitalize on these arbitrage opportunities.

This study investigates the factors that affect the financial leverage of Indian listed firms. Financial leverage (FINLE) of Indian listed firms is calculated by the ratio of total liabilities to total assets, whereas current ratio and quick ratio are used as firm liquidity factors. Further, a set of financial performance determinants such as return on assets, profit after tax, return on capital employed, return on equity, and Tobin-Q are used as independent factors. This paper is organized as follows: Section 1 presents a summary of review of literature of the current investigation. Section 2 shows the aims of the current research. Section 3 displays the research methodology and data collection of this paper. Section 4 presents data analysis and results of the study. Finally, last section provides conclusion and recommendations of the current study.

## 1. LITERATURE REVIEW

Many empirical studies have investigated the link between financial leverage and financial performance determinants in different countries (Ebaid, 2009; Bajaj et al., 2019; Dawar, 1984; Tripathy & Rahman, 2020; Mardones & Cuneo, 2020; Deesomsak et al., 2004).

Ebaid (2009) examined the effect of preference of capital structure on firm success in Egypt as one of the developing or transformation economies. The results showed that the choice of the capital structure alternative has a weak-to-no impact on the output of a company in general terms. Tripathy and Rahman (2020) explored the relationship between financial results and leverage for 56 food processing firms listed on the BSE from 2000 to 2018. The findings suggest that the leverage was strongly and favorably correlated with a firm's success. The results obtained are also stable through the estimation processes. Via the capital structure prism and the ownership structure for the period 2000 to 2015, Mardones and Cuneo (2020) explained the financial performance of companies in Latin America. The study found a

beneficial correlation between the financial profitability, development, and size of the institution. With regard to the ownership structure of Chilean companies, financial reports of the first major shareholder have a beneficial effect on a company's ownership structure. In general, the findings are similar with those of previous research.

Many of the analyses used capital structure considerations as financial leverage calculated by total liabilities/total assets in the company's financial leverage. This demonstrates the degree to which the borrowed money is being used by a company (Pandey, 2007). Many previous studies used the leverage ratio to calculate capital structure determinants (Chen et al., 2017; Deitiana & Habibuw, 2015; Mandiefe, 2016; Singh & Sharma, 2016). Bose et al. (2017) indicated that leverage ratio was reported as a percentage of total debt separated by total assets.

In most study reviews, the liquidity of companies was measured by using two variables: the current ratio and the rapid ratio. Edi and Binti (2010) have suggested a major correlation between the current ratio and profitability of 172 listed companies

trading in Malaysia. Deitiana and Habibuw (2015) have shown that there is no effect between the liquidity ratio and financial profitability of companies. Although the fast ratio tests the short-term liquidity status of a firm and measures the capacity of a company to fulfill its short-term commitments for the most liquid assets.

Many empirical experiments have analyzed the firm's financial results by utilizing various proxies, such as "return on assets, net profit margin, return on capital employed, return on equity, and Tobin-Q". Return on assets (ROA) is a percentage of gross assets that can be measured by net profit as the first indicator for the calculation of financial results of previous research using different metrics to calculate financial performance. For example, Darayseh and Chazi (2018), Rani and Studies (2017), and Zheng et al. (2018) used asset returns (ROA) as a proxy for calculating financial efficiency. Mak and Kusnadi (2005), for a sample of companies in Malaysia and Singapore, indicated a negative correlation between board size and company value, calculated as Tobin's Q. Profit after tax

is basically the sum of money that stays with a taxpayer once all the required allowances have also been produced. It is like a barometer telling you how much profit a company has actually earned. Many of the prior research used ROE (N. Gupta & H. Gupta, 2014; Vätavu, 2015; Salim & Yadav (2012). Salim and Yadav (2012) indicated that firm performance (ROE) has a negative relationship with "short-term debt (STD), long-term debt (LTD), and total debt (TD)". This article used firm size (LOGS) as a controlling variable of this study. This is known as sales logarithm. The majority of research have discovered a positive correlation between company size and leverage ("Deesomsak et al., 2004; Rajan & Zingales, 1995"). This is associated with the trade theory (TOT), where larger companies are more likely to use more debt. Ooi (1999) suggested that there was an inversion of scale and company control. The larger size helps companies to produce higher returns on resources and revenues, resulting in better financial profitability for businesses through the ability to generate a higher value of output.

**Table 1.** Empirical studies of capital structure in different countries

Study by	Variables	Time	Data	Sample and country	Tools used
Mukumbi et al. (2020)	"Financial leverage, firm liquidity, tangibility of assets, return on assets, and return on equity".	2013–2017	Secondary	16companies / Nairobi	Regression analysis
Handoo and Sharma (2014)	"Total debt ratio, long term debt ratio, short term debt ratio, profitability, growth, assets tangibility, size, cost of debt, liquidity, financial distress, tax rate, and debt serving capacity".	2001–2010		870 firms / India	Regression analysis
Chakraborty (2010)	"Book leverage and market leverage, profitability, tangibility, firm size, growth opportunities, non-debt tax shields, and uniqueness".	1995–2008		1169 firms / India	OLS regression and GMM
Gupta and Gupta (2014)	"Debt equity ratio, long term debt, debt asset ratio, gross profit margin, net profit margin, return on capital employed, return on assets, and return on equity".	2009 to 2013		20 companies / India	Multiple regression
Li and Islam (2019)	"Leverage ratios, growth rate, profit margin, average value of beta, average market share, average value of price-earnings ratio, high technology, Tobin's-q, and GDP contribution".	1999 to 2012		20 industries / Australia	Regression analysis
Thippayana (2014)	"Leverage ratios, total book-value debt, long-term book-value debt, long-term book-value debt, long-term book-value debt, firm size, profitability, asset tangibility, growth opportunity, and business risk or volatility".	2000 to 2011		144 firms / Thailand	Regression analysis
Abor (2005)	"Earnings before interest and taxes to equity, short term debt to the total capital, long term debt to total capital, and total debt to total capital".	1998–2002		22 firms / Ghana	Regression analysis
Salim and Yadav (2012)	"Return on equity, return on asset, Tobin s Q, earning per share, long term debt, short term debt, total debt ratios, and growth".	1995–2011		237 companies / Malaysia	Regression analysis

**Table 1 (cont.).** Empirical studies of capital structure in different countries

Study by	Variables	Time	Data	Sample and country	Tools used
Güner (2016)	"Natural log of sales, growth opportunities, non-debt tax shields, profitability, and liquidity".	2008 and 2014	Secondary	131 firms / Turkish	Regression analysis
T. P. V. Le and Phan (2017)	"Financial performance (ROA and ROE), growth, tangibility, taxation, risk, investment, cash flow, profitability, liquidity, dividend, long-term debt-to-total-assets ratio, short-term debt-to-total-assets ratio, and total debt-to-total-assets ratio".	2007–2012		Firms / Vietnam	Multiple regression analysis and GMM
Serghiescu and Văidean (2014)	"Profitability, enterprise size, asset tangibility, liquidity, and asset turnover".	2009–2011		20 companies / Romania	Multiple regression
Vătavu (2015)	"Long-term debt, short-term debt, total debt and equity, rate of return on assets, and rate of return on equity".	2003–2010		196 companies / Romania	Multiple regressions
Sayeed (2011)	"Leverage, Agency Costs (TW, LP, JM), bankruptcy costs, effective tax rate, non-debt tax shield, profitability, asset size, collateral value of assets, and age, as well as industry-specific dummy variables".	1999–2005		46 companies / Bangladesh	OLS regression
Dinh and Pham (2020)	"Return on equity, financial leverage, Self-financing ratio, long-term assets proportion, debt to asset ratio, fixed asset ratio, and growth rate".	2015 to 2019		30 pharmaceutical enterprises / Vietnam	Regression Analysis
Ullah et al. (2020)	"Return on equity, debt to equity, asset turnover, growth, total debt to total assets, taxation, exports, and firm size".	2008–2017		"90 textile firms listed in Pakistan"	Regression estimation model
Nguyen and Nguyen (2020)	"Return on equity, earnings per share, long-term debt-to-total-assets ratio, total debt-to-total-assets ratio, return on asset, sales growth, short-term debt-to-total-assets ratio, firm size, liquidity, and tangibility".	2013 and 2018		488 listed companies / Vietnam	Generalized Least Square (GLS) is
Al-Homaidi et al. (2020a)	"Fundamental information about Islamic banks, financial ratios, corporate governance, financial statements, corporate social responsibility, and zakat information, among other things".	2005–2014		3 firms/Yemen	Regression estimation model
Al-Homaidi et al. (2020b)	"Voluntary disclosure factors, profitability indicators as return on equity profit after tax and return on assets".	2005 to 2014		3 banks/Yemen	Regression estimation
Senan et al. (2021a)	"Return on assets, working capital cycle, assets size, financial leverage, profit after tax, quick ratio, return on capital employed, return on total assets, current ratio, net profit margin, return on equity, and monetary policy rate".	2008 to 2018	98 banks/ Indian	Regression estimation	
Senan et al. (2021b)	"Return on assets, asset size, earnings per share, corporate social responsibility, financial leverage, profit after tax, inflation rate, return on equity, and age of Islamic banks".	2005 to 2016	3 Islamic institutions/ Yemen	Regression estimation	

## 2. AIMS

The purpose of this paper is identifying the factors that influence financial performance, firm liquidity, and leverage ratios in Indian listed companies. The main objective is achieved by two sub-objectives presented below:

- To analyze the effect of financial performance variables on financial leverage of Indian companies listed on the Bombay Stock Exchange from 2007 to 2018.
- To examine the impact of firm liquidity factors on financial leverage of Indian firms listed on the Bombay Stock Exchange from 2007 to 2018.

Financial leverage (FINLE) of Indian listed firms is considered as a dependent variable, whereas current ratio and quick ratio are used as firm liquidity factors. Further, a set of financial performance factors such as return on assets, profit after tax, return on capital employed, return on equity, and Tobin-Q are used as independent fac-

tors. Although there are many empirical studies (Dawar, 1984; Chakrabarti & Ah. Chakrabarti, 2019; Tripathy & Rahman, 2020) that tested the determinants of capital structure in India, they ignored the influence of financial performance determinants and firms' liquidity factors on financial leverage of 1,333 Indian listed firms from 2007 to 2018. To the best of the authors' knowledge, this is the first empirical study that addresses this issue during the study period.

### 3. METHODOLOGY

#### 3.1. Sample data

The main objective of this review is to investigate the determinants of financial performance, firm liquidity and leverage ratio of Indian listed firms. This analysis also examines the influence of financial performance factors on financial leverage of Indian listed companies and the influence of firm liquidity factors on financial leverage of Indian listed firms on the Bombay Stock Exchange based on the following two criteria: accessibility of data for the study period and non-financial companies. The study focuses on balanced panel data for 1,333 Indian companies collected over a 12-year period from 2007 to 2018. Capital structure of Indian listed firms is calculated by financial Leverage (FINLE), whereas the current ratio (CURR) and the quick ratio (QURR) are used as firm liquidity factors. Further, a set of financial performance factors such as return on assets (REOA), profit after tax (PATX), return on capital employed (ROCEM), return on equity (ROEQ), and (Tobin-Q) are used as independent factors.

#### 3.2. Model specification

The study uses both static models (pooled, fixed and random effects) and the Generalized Moment Method (GMM). The definition of the panel data structure (Chowdhury & Rasid, 2017) is used in this work and shown as follows:

$$\gamma_{nt} = \alpha + \beta x_{nt} + \varepsilon_{nt}, \quad (1)$$

where  $\gamma_{nt}$  represents the dependent factor (capital structure),  $\alpha$  is the predictor variable interrupt

term,  $\beta$  is  $k \times 1$ . The function variable to be calculated and the test vector is  $x_{nt}$ , which is  $1 \times k$ ,  $t = 1, \dots, T$ ;  $n = 1, \dots, N$ . The above-mentioned model can be represented in the functional and functional form as follows:

$$\begin{aligned} \text{Financial leverage} &= \\ &= f(\text{Financial performance}; \text{Firm liquidity}). \end{aligned} \quad (2)$$

The model above assumes that the leverage of companies in India is a function of company financial performance and firm liquidity factors. One model was developed to explore the factors that could decide the leverage of companies in India as follows:

$$\begin{aligned} \text{Financial leverage}_{it} &= \alpha_i + \beta_1 \text{QURR}_{it} + \\ &+ \beta_2 \text{QURR}_{it} + \beta_3 \text{REOA}_{it} + \beta_4 \text{PAT}_{it} + \\ &+ \beta_5 \text{ROEQ}_{it} + \beta_6 \text{ROCE}_{it} + \beta_7 \text{TobinQ}_{it} + \\ &+ \beta_8 \text{LOGSA}_{it} + \varepsilon_{it}, \end{aligned} \quad (3)$$

where capital structure is measured by financial leverage;  $\alpha_i$  is a constant term;  $i = 1, \dots, N$  and  $t = 1, \dots, T$ . All other factors are as calculated in Table 2 and Figure 1. These issues are addressed to conduct the empirical study by using the Generalized Moments Model (GMM) recommended by Arellano and Bover, 1995. Such claims propose the implementation of a dynamic model of financial performance firms following Saona (2016), which assumes the following form:

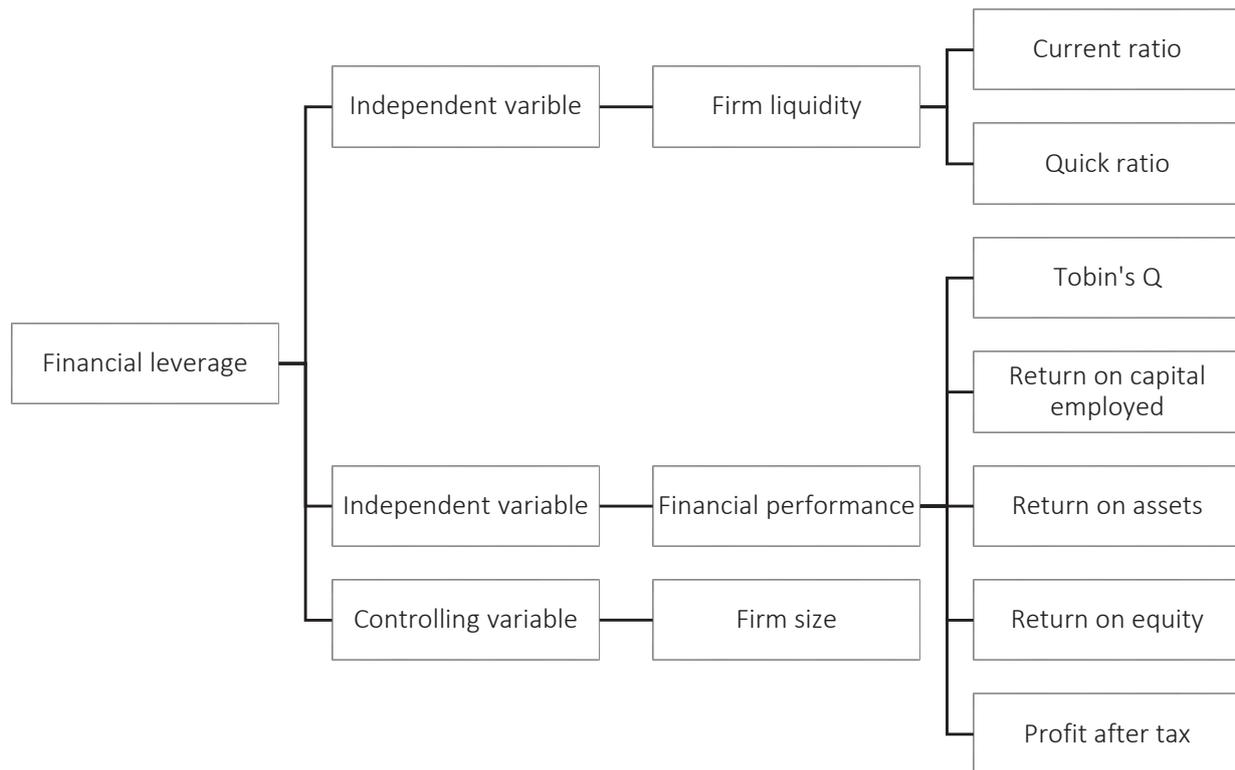
$$\begin{aligned} \text{Financial leverage}_{it} &= \beta_0 + \\ &+ \beta_1 \text{Financial leverage}_{it-1} + \\ &+ \sum_{j=1}^5 \delta_j X_{it} \sum_{k=1}^2 \theta_k Y_t + \eta_i + \mu_t + \varepsilon_{it}, \end{aligned} \quad (4)$$

where  $X_{it}$  is the vector of the financial output of the capital structure,  $Y_t$  is the vector of a firm's liquidity ratios, and the specific impact, reflective report, and stochastic error are defined by  $i$ ,  $t$  and  $\varepsilon_{it}$ .

$$\begin{aligned} \sum_{j=1}^5 \delta_j X_{it} &= \delta_1 \text{REOA}_{it} + \delta_2 \text{PAT}_{it} + \\ &+ \delta_3 \text{ROEQ}_{it} + \delta_4 \text{ROCE}_{it} + \delta_5 \text{TOBIN}_{it}, \end{aligned} \quad (5)$$

and

$$\sum_{k=1}^2 \theta_k Y_t = \theta_1 \text{QURR}_{it} + \theta_2 \text{QURR}_{it}. \quad (6)$$



**Figure 1.** Financial performance and firm liquidity

### 3.3. Definition of indicators

#### 3.3.1. Dependent indicator

One common measure, financial liquidity (FINLE), was used by previous research to calculate the capital structure of firms. Following prior studies, financial leverage was used to measure the firms' capital structure (e.g., Chen et al., 2017; Deitiana & Habibuw, 2015; Mandiefe, 2016; Singh & Sharma, 2016). Leverage ratio is presented as a percentage of total debt divided by total assets (Bose et al., 2017).

#### 3.3.2. Independent variables

In this analysis, two types of independent parameters were used (see Figure 1). Firm liquidity factors measured by two proxies, namely, current ratio (CR) and quick ratio (QR), are used (independent). Another independent predictor group is financial performance determinants (independent) measured by five proxies presented in Table 2. Below is a discussion of both groups of independent indicators (Table 2).

## 4. RESULTS

### 4.1. Descriptive analysis

Table 3 shows the outcomes of the descriptive analysis of dependent and independent indicators of this review during the period of the study from 2007 to 2018. The dependent indicator – financial leverage of Indian listed companies – is calculated by financial leverage (FINLE), while independent variables are measured by two groups of variables. The first group is firm liquidity calculated by two proxies, namely, current ratio (CURR) and quick ratio (QURR). The second group is financial performance ratios measured by five indicators such as return on assets (REOA), profit after tax (PATX), return on capital employed (ROCEM), return on equity (ROEQ), and Tobin's Q (Tobin-Q).

The outcomes indicate the average values of *FINLE*, *CURR*, *QURR*, *REOA*, *PATX*, *ROEQ*, *ROCE*, *TOBIN\_Q*, and *LOGSA* are 1.057%, 2.706%, 1.754%, 0.047%, 1835.20%, 9.132%, 7.073%, 1.03%, and 7.61%, respectively, and median values are 0.51%, 1.29%, 0.78%, 0.04%, 81.75%, 9.23%, 5.310%, 0.495%, and 7.730%, respectively. Maximum val-

**Table 2.** Measuring variables of the current review

Variables	Acronym	Measurements	Evidence	
<b>Independent variables (firm liquidity and financial performance factors)</b>				
Firm liquidity	Current ratio	CURR	Current ratio (CURR) is a “current total asset to current total liability”.	Elgattani and Hussainey (2020)
	Quick ratio	QURR	Quick Ratio (QURR) is a “liquid assets to current liabilities”.	Senan et al. (2021a)
Firm performance	Return on assets	REOA	Return on assets (REOA) is a “net profit to total assets”.	Al-Homaidi et al. (2020b) and Senan et al. (2021a)
	Profit after tax	PATX	Profit after-tax (PATX) is a “net income – dividends on preferred stock)/average outstanding shares”.	Al-Homaidi et al. (2020b), Senan et al. (2021a), Senan et al. (2021b)
	Return on equity	ROEQ	Return on equity (ROEQ) is a “net profit to total equity”.	Dinh and Pham (2020), Ullah et al. (2020), Nguyen and Nguyen (2020), Al-Homaidi et al. (2020a)
	Return on capital employed	ROCEM	Return on capital employed (ROCE) is a “earnings before interest and taxes to employed capital”.	Senan et al. (2021a)
	Tobin-Q	Tobin-Q	Tobin-Q is a “market capitalization over a total asset of the company”.	Farhan et al. (2019)
<b>Controlling variable (firm size)</b>				
Firm size	LOGSA	Firm size (LOGSA) is a “natural logarithm of total assets”.	Farhan et al. (2019) and Nguyen and Nguyen (2020)	
<b>Dependent variable (firm financial leverage)</b>				
Capital structure	Financial Leverage	FINLE	Leverage ratio (FINLE) is a “total debt to total assets”.	Chen et al. (2017), Deitiana and Habibuw (2015), Mandiefe (2016)

ues are 629.110%, 692.000%, 486.00%, 0.960%, 336120%, 233.24%, 170.420%, 56.05%, and 15.45%, while minimum values are 0.00%, 0.00%, 0.00%, -4.31%, -119062%, -608.24%, -198.71%, 0.00%, and -2.300%. The standard deviation of *FINLE*, *CURR*, *QURR*, *REOA*, *PATX*, *ROEQ*, *ROCE*, *TOBIN\_Q*, and *LOGSA* are 7.456%, 12.637%, 7.737%, 0.101%, 12029%, 23.761%, 12.815%, 1.726%, and 2.320%, respectively.

#### 4.2. Correlation coefficient matrix

Table 4 presents the link between a dependent variable (financial leverage factor) and independent variables (performance and liquidity) of Indian

listed companies from 2007 to 2018. The study demonstrated that capital structure of Indian listed firms measured by financial leverage (*FINLE*) has a negative relation to financial performance (*CURR*, *QURR*, *REOA*, *PATX*, *ROEQ*, *ROCE*, and *TOBIN\_Q*) and firm liquidity (*CURR* and *QURR*). The findings of the analysis suggest that firm liquidity (*CURR*) has a positive link with *QURR* and *TOBIN\_Q*, whereas it has a negative association with *REOA*, *PATX*, *ROEQ*, *ROCE*, and *LOGSA*.

Firm liquidity (*QURR*) has a negative correlation with *REOA*, *PATX*, *ROEQ*, *ROCE*, and *LOG*, whereas it has a positive association with *TOBIN\_Q* and *LOGS*. Most financial performance

**Table 3.** Descriptive statistics

Indicators	FINLE	CURR	QURR	REOA	PATX	ROEQ	ROCE	TOBIN_Q	LOGSA
Mean	1.057	2.706	1.754	0.047	1835.20	9.132	7.073	1.030	7.608
Median	0.510	1.290	0.780	0.040	81.75	9.230	5.310	0.495	7.730
Maximum	629.11	692.00	486.00	0.960	336120	233.240	170.42	56.05	15.450
Minimum	0.000	0.000	0.000	-4.310	-119062	-608.24	-198.71	0.000	-2.300
Std. dev.	7.456	12.637	7.737	0.101	12029	23.761	12.815	1.726	2.320
Skewness	64.077	28.761	30.020	-12.700	13.09	-5.944	0.457	8.484	-0.440
Kurtosis	4673.06	1110.45	1389.60	449.507	234.31	112.667	28.171	164.34	3.995
Observations	15,995	15,991	15,991	15,996	15,996	15,994	15,996	15,996	15,996

Notes: *FINLE* is financial leverage, *CURR* is current ratio, *QURR* is quick ratio, *REOA* is return on assets, *PATX* is profit after tax, *ROEQ* is return on equity, *ROCEM* is return on capital employed, Tobin-Q is Tobin's Q, and *LOGSA* is firm size.

**Table 4.** Correlation matrix

Indicators	FINLE	CURR	QURR	REOA	PATX	ROEQ	ROCE	TOBIN_Q	LOGSA
<b>Dependent variable (Capital structure)</b>									
FINLE	1	-0.017	-0.018	-0.069	-0.021	-0.321	-0.096	-0.048	0.026
<b>Independent variable (Firm liquidity factors)</b>									
CURR	-	1.000	0.285	-0.018	-0.009	-0.027	-0.033	0.124	-0.199
QURR	-	-	1	-0.006	-0.004	-0.025	-0.025	0.013	-0.202
<b>Independent variable (Financial performance factors)</b>									
REOA	-	-	-	1	0.136	0.510	0.656	0.281	0.205
PATX	-	-	-	-	1	0.107	0.150	0.125	0.294
ROEQ	-	-	-	-	-	1	0.775	0.248	0.192
ROCE	-	-	-	-	-	-	1	0.411	0.271
TOBIN_Q	-	-	-	-	-	-	-	1	0.165
LOGSA	-	-	-	-	-	-	-	-	1
<b>Multicollinearity diagnostics</b>									
VIF	3.389	3.312	1.762	1.110	2.552	3.699	1.306	1.226	

indicators (*REOA*, *PATX*, *ROEQ*, *ROCE*, and *TOBIN\_Q*) have a beneficial partnership with other variables of this study.

Using the variance inflation factor, the analysis, therefore, explores the association between the independent parameters (*VIF*). The results of the *VIF* indicate that the predictors do not have a multicollinearity problem. All *VIF* values are well below 3.699, suggesting that this study does not present a problem of multicollinearity between the independent factors. Table 4 presents the *VIF*.

### 4.3. Regression analysis

The outcomes of the fixed effects model reveal that, as defined in the fixed effect model in Table 5 for financial leverage, the value of the modified R-square is 0.207 (*FINLE*), which indicates that both firm liquidity indicators and financial efficiency factors contribute about 20 percent to the financial leverage (*FINLE*).

Concerning firm liquidity, the results indicated that the current ratio (*CURR*) has an insignificant positive effect on the leverage ratio, while the quick ratio (*QURR*) has a negative and negligible effect on the structure of capital of Indian listed firms measured by financial leverage (*FINLE*). With regard to financial performance indicators, the outcomes indicated that financial performance calculated by *ROEQ* and *TOBIN\_Q* have a strongly significant negative effect on financial leverage ( $P$ -value < 0.01), while *ROCE* has a positive and significant impact on financial leverage

( $P$ -value < 0.01). *LOGSA* has a negative effect on financial leverage ( $p$ -value < 0.1). Financial performance measured by *REOA* and *PATX* has a negligible influence on financial leverage. Models of pooled, fixed and random effects match as the  $p$ -value is less than 0.05. The outcomes indicated that the value of Durbin-Watson statistics is between 1.5-2.4, which means that there is no serial correlation problem in this study.

Similar to N. Gupta and H. Gupta (2014), and Abor (2005), this study has shown that the leverage (*FINLE*) has a favorable link with the financial output of the selected companies. This is backed by Salim and Yadav (2012) who revealed that *REOA* has a negative association with corporations' leverage, as well as Le and Phan (2017) who suggested that there is a substantially negative link between the financial leverage and company results. This is similar to Majumdar and Chhibber (1999) who disclosed that factors of the financial leverage directly affect the financial output of the business, and Hammes (1998) who noted a negative association between company debt and productivity.

### 4.4. GMM estimation

Generalized Moment Methods (GMM) are carried out to validate the effects of the above approximate models. To monitor problems with the association between the lagged dependent indicators and the word of error, a two-step GMM model is implemented. Chowdhury and Rasid (2017) reported that "by solving the problem of association between the lagging of the predictor variables

**Table 5.** Regression analysis

Variable	Pooled				Fixed				Random			
	Coeff.	Std. error	t-statistic	Prob.	Coeff.	Std. error	t-statistic	Prob.	Coeff.	Std. error	t-statistic	Prob.
C	0.268	0.199	1.349	0.177	2.136	0.617	3.460	0.001***	0.353	0.229	1.543	0.123
<b>Independent variable (Firm liquidity factors)</b>												
CURR	0.016	0.008	2.088	0.037	0.006	0.009	0.643	0.520	0.015	0.008	1.926	0.054**
QURR	-0.034	0.013	-2.724	0.007***	-0.011	0.014	-0.781	0.435	-0.031	0.013	-2.409	0.016***
<b>Independent variable (Financial performance factors)</b>												
REOA	-0.658	0.711	-0.925	0.355	-0.237	0.753	-0.315	0.753	-0.522	0.711	-0.734	0.463
PATX	0.000	0.000	-2.789	0.005***	0.000	0.000	-0.380	0.704	0.000	0.000	-2.370	0.018***
ROEQ	-0.197	0.004	-54.422	0.000***	-0.217	0.004	-54.144	0.000***	-0.202	0.004	-55.119	0.000***
ROCE	0.241	0.008	29.804	0.000***	0.302	0.010	31.397	0.000***	0.254	0.008	30.576	0.000***
TOBIN_Q	-0.303	0.036	-8.327	0.000***	-0.169	0.052	-3.232	0.001***	-0.294	0.039	-7.602	0.000***
LOGSA	0.166	0.026	6.464	0.000***	-0.136	0.082	-1.665	0.096*	0.146	0.030	4.956	0.000***
R-squared	0.167	-	-	-	0.273	-	-	-	0.167	-	-	-
Adjusted R-squared	0.167	-	-	-	0.207	-	-	-	0.167	-	-	-
S.E. of regression	6.807	-	-	-	6.642	-	-	-	6.670	-	-	-
No. observations	15,995	-	-	-	15,995	-	-	-	15,995	-	-	-
Sum squared resid	740,336	-	-	-	646,157	-	-	-	710,916	-	-	-
F-statistic	401.225	-	-	-	4.109	-	-	-	401.25	-	-	-
Durbin-Watson stat	1.957	-	-	-	2.225	-	-	-	2.034	-	-	-
Prob. (F-statistic)	0.000	-	-	-	0.000	-	-	-	0.000	-	-	-
Housman test	0.000											

Notes: \*, \*\*, \*\*\* significant at 1%, 5% and 10%, respectively.

and the error term and the indigeneity of some of the explanatory variables”, GMM can solve only the ‘set effect’ issues. In addition, by augmenting instruments, the GMM system helps to deal with poor instrument issues.

GMM’s outcomes presented in Table 6 verify that an order connection is not needed for the mistake. The second-order correlation, p-value of the Arrellano and Bond test, shows that in the FINLE model, there is no important order association. In

**Table 6.** GMM estimation model

Variables	Coef.	Std. err.	T	Pro.
Lag leverage	0.047	0.017	2.760	0.006***
<b>Independent variable (Firm liquidity factors)</b>				
CURR	0.026	0.012	2.110	0.035**
QURR	-0.042	0.020	-2.130	0.034**
<b>Independent variable (Financial performance factors)</b>				
REOA	-0.301	0.878	-0.340	0.732
PATX	0.000	0.000	-2.740	0.006***
ROEQ	-0.215	0.061	-3.540	0.000***
ROCE	0.291	0.085	3.410	0.001***
TOBINQ	-0.393	0.092	-4.250	0.000***
SALES	0.230	0.069	3.350	0.001***
CONSTANT	-0.430	0.471	-0.910	0.361
Arellano-Bond test for AR(1): z = -1.70 Pr > z = 0.089				
Arellano-Bond test for AR(2): z = 0.24 Pr > z = 0.807				
Sargan test: chi2(695) = 5,451.95 Prob. > chi2 = 0.387				
Hansen test: chi2(695) = 1,020.34 Prob. > chi2 = 0.000				

Notes: \*, \*\*, \*\*\* significant at 1%, 5% and 10%, respectively.

**Table 7.** Comparison of OLS and robust regression results

Variable	Pooled				Robustness test			
	Coeff.	Std. error	t-statistic	Prob.	Coeff.	Std. error	z-statistic	Prob.
C	0.268	0.199	1.349	0.177	0.216	0.012	17.996	0.000***
<b>Independent variable (Firm liquidity factors)</b>								
CURR	0.016	0.008	2.088	0.037**	0.001	0.000	2.170	0.030**
QURR	-0.034	0.013	-2.724	0.007***	-0.010	0.001	-12.874	0.000***
<b>Independent variable (Financial performance factors)</b>								
REOA	-0.658	0.711	-0.925	0.355	-1.096	0.043	-25.514	0.000***
PATX	0.000	0.000	-2.789	0.005***	0.000	0.000	-7.690	0.000***
ROEQ	-0.197	0.004	-54.422	0.000***	0.063	0.000	289.547	0.000***
ROCE	0.241	0.008	29.804	0.000***	-0.085	0.000	-173.441	0.000***
TOBIN_Q	-0.303	0.036	-8.327	0.000***	-0.020	0.002	-9.019	0.000***
LOGSA	0.166	0.026	6.464	0.000***	0.050	0.002	31.999	0.000***
R-squared	0.167	-	-	-	-	-	-	0.253
Adjusted R-squared	0.167	-	-	-	-	-	-	0.252
S.E. of regression	6.807	-	-	-	-	-	-	7.895
No. observations	15995	-	-	-	-	-	-	15995
Sum squared resid	740336	-	-	-	-	-	-	996064
Prob. (F-statistic)	0.000	-	-	-	-	-	-	0.000

Notes: \*, \*\*, \*\*\* significant at 1%, 5% and 10%, respectively.

addition, the Sargent test indicates that the value of this test is greater than 0.05 ( $FINLE = 0.387$ ), supporting the use of the dynamic panel data template.

According to the findings of this report, CURR has a favorable and important effect on capital structure ( $p$ -value > 0.05), while QURR has a significant negative impact on capital structure ( $p$ -value 0.05), calculated by financial leverage. In terms of financial success metrics, the findings show that PATX and ROCE have a favorable and high significant influence on capital structure ( $p$ -value > 0.01), while ROEQ and TOBINQ have a highly negative and significant impact on capital structure ( $p$ -value > 0.01) ( $FINLE$ ), except for financial success (REOA) that has a negligible effect on financial leverage ( $FINLE$ ) in this report. At the 1% stage ( $p$ -value 0.01), firm scale (SALES) has a favorable and highly important impact on capital structure, as determined by financial leverage of Indian listed entities in this study.

The results are not supported by N. Gupta and H. Gupta (2014) that capital structure has a posi-

tive link with financial outcomes. Similarly, Salim and Yadav (2012) indicated that REOA has a negative correlation with companies' financial leverage. Le and Phan (2017) suggested that there is a significant negative relationship between financial leverage and company results. Similarly, Hammes (1998) noted a negative association between company debt and productivity.

#### 4.5. Robustness test

Table 7 presents a comparison between the results of a robust regression with Generalized Moment Methods (GMM) estimator and ordinary least squares (OLS). In the case of a robust regression, coefficient estimates do not deviate significantly from the GMM and OLS regressions. This illustrates a proper estimate of the expectations of regression. Table 7 shows that the robustness test has the same outcomes that were produced by the GMM estimator and OLS regression. Besides, the predicted findings are not influenced by prominent discoveries.

## CONCLUSION

This study investigates the factors that affect the financial performance, liquidity, and financial leverage of Indian listed firms. The study uses both static models (pooled, fixed, and random effects) and Generalized Moment Methods (GMM). The results indicated that profit after tax, return on equity, return on capital em-

ployed, and Tobin's Q are the most important financial performance factors that affect financial performance of Indian listed firms. In addition, profit after tax, ROE, return on capital worked, and Tobin's Q are found to influence financial leverage. However, in the case of firm liquidity, it is revealed that the current ratio and the quick ratio have a significant impact on the financial leverage of Indian listed firms.

By presenting new empirical evidence, this study aimed to fill a challenging gap in the existing body of literature on financial performance and liquidity factors of the leverage of Indian listed industries. The findings of this study make valuable contributions to the current stock of literature by comprehensively clarifying and objectively evaluating the current state of the financial leverage of Indian listed firms. More precisely, this study provides evidence for variables that could affect the financial leverage of Indian listed firms between 2007 and 2018.

The study results help firm managers to consider the influence of financial performance determinants and firm liquidity ratios on financial leverage (FINLE) and allow them to assess a sustainable capital structure, taking into account the regulations laid down by the country's central bank. To the best of the authors' knowledge, this is the first study to test the impact of financial performance factors and firm liquidity ratios on capital structure measured by financial leverage (FINLE). However, the study's findings provide a basis for a more detailed analysis of firms' capital structure.

It is suggested that regulators and policymakers regard the financial performance determinants and firm liquidity ratios in such a way that the financial leverage of listed Indian firms can be strengthened. By adding some other financial performance variables, liquidity ratios, and firm-specific factors, future research may explore this issue. There is also a need to compare factors of companies' capital structure, financial results and liquidity proxies between listed and other companies.

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