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Article

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Cogent Economics & Finance

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Suggested Citation: Nikhil MN; Shenoy, Sandeep S.; Chakraborty, Suman; Lithin BM (2024) : Is the nexus between capital structure and firm performance asymmetric? An emerging market perspective, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 12, Iss. 1, pp. 1-19,
https://doi.org/10.1080/23322039.2023.2296195

Cogent Economics & Finance

ISSN: 2332-2039 (Online) Journal homepage: www.tandfonline.com/journals/oaef20

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To cite this article: Nikhil M. N., Sandeep S. Shenoy, Suman Chakraborty & Lithin B. M. (2024) Is the nexus between capital structure and firm performance asymmetric? An emerging market perspective, Cogent Economics & Finance, 12:1, 2296195, DOI: 10.1080/23322039.2023.2296195

To link to this article: https://doi.org/10.1080/23322039.2023.2296195

COGENT ECONOMICS & FINANCE
2024, VOL. 12, NO. 1, 2296195
https://doi.org/10.1080/23322039.2023.2296195

FINANCIAL ECONOMICS | RESEARCH ARTICLE

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Is the nexus between capital structure and firm performance asymmetric? An emerging market perspective

Nikhil M. N.[a], Sandeep S. Shenoy[a], Suman Chakraborty[b] and Lithin B. M.[a]

[a]Department of Commerce, Manipal Academy of Higher Education, Manipal, Karnataka, India; [b]School of Business and Management, SVKM's Narsee Monjee Institute of Management Studies, Indore, Madhya Pradesh, India

ABSTRACT

The nature of the relationship between leverage and firm performance has been a subject of investigation in extant literature. We re-examine the nature of the association by using a sample of 78 non-financial firms listed in the Nifty 100 index during the 2013-2023 period by applying the quantile regression technique and comparing the result with the linear regression approach (system GMM technique). Our empirical analysis demonstrates that leverage negatively impacts the performance of firms. Further, results show that the association is non-homogeneous among firms of different quantiles: leverage withers the performance of highly profitable firms (upper quantile) than low profitable firms (lower quantile). The identified concave relationship highlights the prominence of optimal capital structure and the role of finance managers in designing a sound financial policy that matches firm characteristics and borrowing requirements. The findings of our study draw insightful implications for managers and policymakers while contributing to the ongoing leverage and firm performance debate reported in previous studies.

IMPACT STATEMENT

Since the pioneering work of Modigliani and Miller, the debate on the relationship between Capital Structure (CS) and Firm Performance (FP) has been a subject of discussion. Consequently, the CS and FP linkage has garnered the attention of several academic scholars. However, the majority of the empirical studies have demonstrated a linear link between CS and FP, whereas the studies on the nonlinear relationship are scant in the existing scholarly studies. Thus, to provide more insights, we used quantile regression techniques, and our results corroborate that the CS and FP relationship is non-homogeneous among Indian firms. To succinctly put, the magnitude of the negative impact of leverage is found to be more around highly profitable firms. Our regression result highlights the importance of maintaining the right capital mix and suggests that large firms should refrain from excessive borrowing. Further, we contend that policymakers must strengthen corporate governance mechanisms and restrict the earnings management activities of the management. Overall, our robust findings enhance the existing body of knowledge while drawing significant implications for management, policymakers, and other stakeholders.

ARTICLE HISTORY
Received 1 September 2023
Revised 17 November 2023
Accepted 13 December 2023

KEYWORDS
Leverage; profitability; non-homogeneous; nonlinear relation; quantile regression; GMM; India

JEL CLASSIFICATION
C23; C26; C33; G30; G32

1. Introduction

Does the connection between Leverage (Lev) and Firm Performance (FP) exist? From the theoretical spectrum, the answer is yes. Since the seminal work of Modigliani & Miller (1958), empirical researchers have been on the hunt to examine the nature of the relationship between Lev and FP. The majority of the empirical studies have established a significant linear link between Lev and FP. Nevertheless, the existing evidence probes an interesting question: Can the stated association be nonlinear? In an

CONTACT Sandeep S. Shenoy sandeep.shenoy@manipal.edu Department of Commerce, Manipal Academy of Higher Education, Manipal, Karnataka 576104, India.

Supplemental data for this article is available online at https://doi.org/10.1080/23322039.2023.2296195

emerging nation like India, where the capital markets are still at an embryonic stage, does the impact of borrowings remain the same? Or vary between high and low-profitable firms? Interestingly, empirical evidence is lacking and motivated by the dearth of premises; the present study aims to bridge the gap that exists between knowledge and evidence.

The primary goal of financing decisions has been shareholders' wealth maximization, which, per se, impacts the firm's profitability (Mwangi et al., 2014). The irrelevant financing choice results in exorbitant errors and unreliable projects, adversely affecting the earning capacity of firms (Ghardallou, 2023). Therewithal, borrowing is an inevitable decision for any business organization. Consequently, in the extant literature, the leverage decision gained momentum. Following the pathbreaking of Modigliani & Miller (1958) and Modigliani & Miller (1963), modern theorists reinforced the connection between CS decisions and the performance of firms. Jensen & Meckling (1976) opined that the value of a firm can be maximized when the agency cost of debt and equity are minimized. Kraus & Litzenberger (1973) argued that the management must balance between the cost and benefit of debt to attain the maximum firm value. Myers & Majluf (1984) documented that firms should rely on internal sources of finance, and only the shortage of funds should compel them to issue debt and equity. However, the optimum CS differs from industry to industry (Das et al., 2022). As a result, the question of the perfect CS mix remains a subject of investigation.

The existing literature stipulates that debt enhances firms' performance (Abdullah & Tursoy, 2021; Abor, 2005; Berger & Bonaccorsi di Patti, 2006; Chen et al., 2023; Gill et al., 2011; Hadlock & James, 2002; Mishra & Dasgupta, 2019) since borrowing aligns management's interest with shareholders (Myers, 1977). Conversely, scholars in developing nations argue that debt is negatively related to FP (Abor, 2007; Zeitun & Tian, 2007; Le & Phan, 2017; Nikhil et al., 2023) since the underdevelopment of the capital market forces management to rely on costly bank loans (Dawar, 2014; Pandey, 2001). Few researchers contend that leverage and FP association are conditional on the firm size, level of agency problems, and regional perspectives (Abdullah & Tursoy, 2021; Ibhagui & Olokoyo, 2018; Le & Phan, 2017). These inconclusive findings and lack of consensus could be due to the use of the ordinary least square (OLS) method, where the regression coefficient generated for the CS variable yields an estimate that is unrepresentative of the overall performance distribution (Li et al., 2009). This compels us to deviate from the inappropriate least square methods used in the extant literature. Moreover, the ambiguity in the conclusion is largely due to the presumption of a linear linkage between CS and FP (Das et al., 2022; Ghardallou, 2023). Consequently, examining the heterogeneous linkage between leverage and firms at different segments of the distribution of performance variables is crucial. Thus, to close the existing research gaps, the present study aims to examine the direct relationship between CS and FP using the advanced regression method, i.e. the Generalized Methods of Moments (GMM) and employs the Quantile Regression (QR) technique to examine the covariate effects of CS on various points of performance distribution of firms (upper quantile: highly profitable firms and low profitable firms otherwise).

Our study contributes to the existing body of knowledge in multiple ways. First, by examining the heterogeneous impact of CS on the performance of Indian firms, the findings add new knowledge to the ongoing debate on optimal CS, specifically from an emerging country's perspective. Second, the study serves as a tool for practitioners, policymakers, and managers in corporate leverage decision-making. Further, the plausible explanation supplied in the present study urges the need for the advancement of the capital market in the Indian economy. Finally, the present research motivates scholars to investigate further the topics associated with CS decisions and the factors contributing to better FP.

The article is structured as follows. Section 2 reviews the literature on capital structure and firm performance. Section 3 deals with the research methodology employed. The results and discussion have been presented in sections 4 and 5, respectively, and section 6 represents concluding remarks.

2. Literature review

When the firms opt for debt financing, they essentially redistribute a portion of their anticipated future cashflows away from equity claimants in exchange for immediate cash upfront. Besides, the CS decisions significantly impact the firm's ability to deal with its competitive environment (Abor, 2007). As a result, the choice of CS mix is crucial. Theoretically, the prominence of CS and the exponential growth in

studies stemmed from the seminal work of Modigliani & Miller (1958). Being pioneers, they argued that the CS decision is irrelevant in determining the value of a firm by nullifying the difference between a levered firm and an unleveled firm. Despite the fact that their theory of 'capital structure irrelevance' lacked realistic assumptions, findings provided a boost in the emergence of several other CS theories, such as trade-off theory, agency theory, and pecking order theory, which extemporized the shortcomings of MM theory by claiming a linkage between leverage and firm value.

The trade-off theory developed by Kraus & Litzenberger (1973) explains the relationship between CS and firm value based on the costs and benefits of borrowing. The former arises due to the perceived probability of default, and the latter arises due to the interest tax shield benefit (Modigliani & Miller, 1963). Thus, the theory postulates that firms must maintain an optimal CS by balancing the cost and benefits of leverage. The agency theory, on the other hand, explains the CS of the firm on the basis of conflict of interest between shareholders, management, and creditors (Jensen & Meckling, 1976). The theory argues that borrowings compel managers to strive for higher performance, which aligns management's interest with shareholders and reduces disputes between management and shareholders (Myers, 1977). However, an increase in debt gives rise to an asymmetric relationship between equity holders and creditors. Thus, the theory corroborates that the firms must rely upon the leverage to an extent where the aforementioned agency costs are minimal. While the trade-off theory and agency theories outline optimal leverage points, the pecking order theory lays an order for the source of finance on the basis of information asymmetry and cost of financing (Myers & Majluf, 1984). The propagators contend that firms prefer internal sources of finance (retained earnings) over external sources (debt and equity). However, in the deficit of retained earnings, the debt is preferred over equity since they are less costly and involves lower information cost. Finally, as a last resort, firms enter into equity financing.

The advocates of these theoretical models often point to empirical support to strengthen their argument. Consequently, several researchers have empirically investigated the relationship between CS and firm performance (FP). Roden & Lewellen (1995), by employing 48 US firms for a sample period of 9 years starting from 1981 to 1990, examined the CS and found a positive association between CS and firms' profitability. Hadlock & James (2002) demonstrate that the higher profitability, the higher the leverage among 500 non-financial firms extracted from Compustat. Abor (2005) attempts to examine the impact of leverage on the ROE of firms listed under GSE (Ghana) over the period of 1988 to 2002. The study corroborates the direct relationship between debt and the ROE of the firms. A similar finding has been documented by Ruland & Zhou (2005), who argue for a positive relationship between leverage and valuation of firms derived from Compustat. Robb & David (2009) focus on the impact of bank financing and finds that external financing positively influences the revenue growth of US firms. Surprisingly, the result concludes that firms relying on debt appeared to have a 10% higher chance of listing among top revenue companies since returns on leverage weigh more than the interest expense among such companies. In addition, few others have documented the positive association between debt financing and firm performance (Abdullah & Tursoy, 2021; Chandrakumarmangalam & Govindasamy, 2010).

Conversely, numerous studies have shown the negative impact of leverage on FP (Chadha & Sharma, 2016; Dawar, 2014; Nikhil et al., 2023). Kester (1986) found the relationship between leverage and profitability among US and Japanese firms to be non-positive. These results are notable in the view that excess usage of cheaper debt sources leads to a higher interest cost and lower firm value. Wiwattanakantang (1999), from the perspective of Thailand, empirically claims the negative influence of debt on the ROA of 270 non-financial firms. Huang & Song (2006), using 1200 firms listed in China, corroborates the negative correlation between borrowing and profitability of the firms. Le & Phan (2017) find significant negative coefficients for three measures of leverage (Short-term debt, Long-term debt, and Total debt) in a panel regression analysis against accounting (ROA, ROE) and market (Tobin Q) measures of FP. Apart from this, some researchers have found an insignificant association between CS and FP (Negash, 2001; P. A. Phillips & Sipahioglu, 2004), in line with MM's irrelevance proposition. Due to the mixed findings, the relationship between CS decisions remains elusive despite several CS theories (Frank & Goyal, 2009).

Nevertheless, neoteric strand of literature has explored the asymmetric impact of leverage on FP; unlike other studies, scholars here have demonstrated a dynamic relationship between leverage and FP. Ku & Yen (2016), using the financial data of Taiwanese non-financial firms for the period from 2008 to

2012, examined the heterogenous impact of CS on FP. The study finds a non-homogeneous impact of leverage on FP, wherein the borrowing enhances the performance of companies on the high ROE quantiles. From Bangladesh's perspective, Das et al. (2022) examined the co-movement between the leverage and FP among 165 listed non-financial firms. Initially, the study finds that leverage hurts the profitability of Bangladesh firms. Further, the study finds a heterogeneous relationship between CS and FP where the detrimental impact of leverage is higher among firms in the upper quantile, highlighting the prominence of optimal CS. Ghardallou (2023) found a non-identical association between CS and FP and corroborated that the association varies with the different levels of quantiles of the firms. The finding implies that exorbitant borrowing adversely affects the performance of highly profitable firms.

Notwithstanding, the majority of aforesaid studies have focused on advanced nations, while limited attention has been paid to emerging countries like India. Due to institutional differences, emerging nations provide an unrivaled opportunity for academicians to draw unique conclusions. Although several researchers laid their interest in identifying the CS and FP association and the optimal CS among Indian companies, they have not examined the asymmetric relationship between CS and FP. Against this backdrop, the present research attempts to bridge the gap between knowledge and evidence and aims to provide more insights while setting out the implications for policymakers and managers.

2.1. Hypothesis development

The dynamic relationship between CS and FP can be dated back to the contemporary capital structure theories. While numerous theories within the CS fraternity exist, only a few seem to have enjoyed widespread advocacy. For instance, the trade-off theory suggests that debt financing among highly profitable firms will likely result in lower financing costs due to lower perceived bankruptcy costs and the advantage of the interest tax shield (Frank & Goyal, 2009; Kraus & Litzenberger, 1973). The agency theory expostulates that debt serves as a disciplinary force, specifically among profitable firms, since such firms are likely to have severe free cash flow problems (Hiwt & Smart, 1994; Jensen, 1986). As a result, a positive impact of debt financing on FP can be expected. Contrastingly, the pecking order theory argues that profitable firms prefer retained earnings over debt financing because they are easy to access and incur lower information costs (Myers & Majluf, 1984). Regardless of theoretical underpinnings, the aforementioned models have always sought empirical evidence to strengthen their inferences. On the other hand, the empirical shreds of evidence demonstrate that borrowings merely enhance the FP, specifically among developing economies. This is because the excess debt elevates the risk of insolvency (Chadha & Sharma, 2016; Kraus & Litzenberger, 1973) and the incremental conflict between lenders and owners (Kim & Sorensen, 1986), which negatively impacts the firm's present value and future borrowings (Abdullah & Tursoy, 2021; Myers, 1977). Moreover, the underdevelopment of the bond market compels firms to rely upon costly bank loans (Dawar, 2014; Neemey & Sahay, 2019). The majority of banks in developing countries are government-owned (Chadha & Sharma, 2016; Pandey & Sahu, 2019) and are less bothered about their lending activities, which further elevates the agency problem since such instances provide managers the opportunity for perk consumption (Allen et al., 2012; Dawar, 2014). In addition, access to such external sources of finance escalates the unfruitful investments that ultimately reduce the FP. As a result, the negative correlation between CS and FP is apparent in developing economies (Abor, 2005; Booth et al., 2001; Le & Phan, 2017; Nikhil et al., 2023; Zeitun & Tian, 2007).

Accordingly, from the Indian perspective, the majority of the scholars have demonstrated the negative effect of leverage on FP. Dawar (2014), for a set of S&P BSE 100 firms from 2003 to 2013, finds that debt negatively affects the FP. Similarly, Chadha & Sharma (2016) find a negative association between leverage and ROE of Indian manufacturing firms. Similar findings have been documented by Nanda & Panda (2018) for a set of manufacturing firms listed under the NSE and by Pandey & Sahu (2019) for a set of non-financial firms listed under the BSE 200. Farhan et al. (2020) conclude that among 379 listed service sector firms, the leverage is negatively related to the firm's profitability. Recently, Nepal & Deb (2023) and M N et al. (2023) have found a negative connection between leverage and FP among Indian manufacturing firms and non-financial firms listed under the Nifty 500 index, respectively.

Thus, against this backdrop, we contend that the leverage negatively influences the performance of Nifty 100 firms and, accordingly, the study's first hypothesis will be:

H1: There is a negative impact of leverage on the performance of Indian firms

Notwithstanding the evidence, in the Indian context, the consensus on the relationship between CS and FP is unclear and indecisive due to mixed findings. Sasidharan et al. (2023) found an insignificant relationship between borrowings and the performance of Indian firms, reiterating MM theory. Another study carried out by Tripathy & Shaik (2020) found that CS and FP share a significant positive relationship, whereby borrowing enhances the performance of 56 food processing firms listed in BSE. Another strand of literature argues that the stated relationship can be conditional on size and other factors (Abdullah & Tursoy, 2021; Ibhagui & Olokoyo, 2018; Le & Phan, 2017). Apart from this, the existing CS studies in India have assumed the linear linkage between CS and FP and employed traditional regression models, which yield inefficient and unrepresentative coefficients (Li et al., 2009). Theoretically, due to the perceived benefits of borrowings among profitable firms, the propagators of trade-off and agency theory argue that a stronger positive association between CS and FP can be anticipated among highly profitable firms compared to lower profitable firms (Berger & Bonaccorsi di Patti, 2006; Frank & Goyal, 2009; Jensen & Meckling, 1976; Kraus & Litzenberger, 1973). Further, the advocates of the pecking order theory contend that the positive linkage between CS and FP would be weaker among highly profitable firms since growth firms are inclined towards internal sources of finance in a ladder of preference (Abdullah & Tursoy, 2021; Myers & Majluf, 1984). As a result, the impact of CS on the performance of firms may vary between highly profitable and less profitable firms. Moreover, highly profitable firms are likely to have inflated access to debt, per se elevates the opportunistic behavior of managers, financial distress costs, and other adverse effects on FP (Chung et al., 2005; Das et al., 2022; Ghardallou, 2023). However, in emerging countries like India, the research question of whether CS and FP association differs among highly profitable and lower profitable firms remains unaddressed in the plethora of studies. The developing and emerging countries exhibit unique institutional and market structures (Booth et al., 2001; Mol-Gómez-Vázquez et al., 2023). Subsequently, examining the heterogeneous impact of CS on FP becomes pivotal in the academic fraternity. Thus, to fill the existing knowledge gap, we aim to test the covariate relationship between leverage and FP among Indian firms using the following hypothesis (the second hypothesis of the study):

H2: There is a heterogeneous impact of leverage on the performance of Indian firms.

3. Method

3.1. Data

The study uses secondary data of Indian non-financial firms wherein the firm-specific data have been gleaned from the Prowess IQ database, and the macroeconomic data from the official website of the World Bank. Few studies have employed the annual data of financial firms (Amare, 2021; Mishra & Dasgupta, 2019); however, due to the discrepancies in CS, the financial firms have been excluded from the sample (Le & Phan, 2017; Nikhil et al., 2023). The firms included in the sample are the top 100 joint stock companies (non-financial) listed under the Nifty 100 index[1], and the sample observation consists of the most recent financial period, from 2013 to 2023. Initially, the sample consisted of 78 non-financial firms. However, after deleting the extreme values, the final sample includes 515 firm-year observations.

3.2. Measures of variables

3.2.1. Dependent variable

To maintain consistency with prior studies, the response variable FP has been assessed using two measures: Return on Asset (ROA) and Return on Equity (ROE). Both measures have been extensively used in prior studies to gauge the accounting performance of firms (Abor, 2005; Amare, 2021; Chadha &

Sharma, 2016; Ghardallou, 2023; Le & Phan, 2017; Nikhil et al., 2023). While the ROA is calculated as the ratio of profit after tax to total assets, the ROE has been measured as the ratio of profit after tax to total equity. The former measures the firm's profit per rupee of total assets, and the latter assesses its efficiency in converting its equity financing into profits.

3.2.2. Independent variable

As the objective of the research is to examine the influence of CS on FP, CS is assigned as an independent variable. In line with the previous studies, the present study uses three proxies, namely total debt to total assets ratio (DA), short-term debt to total equity ratio (SDA), and long-term debt to total asset ratio (LDA), to measure the explanatory variable, i.e. leverage (Abdullah & Tursoy, 2021; Abor, 2007; Das et al., 2022; Ghardallou, 2023; Le & Phan, 2017).

3.2.3. Control variables

The study uses a vector of firm-specific, macroeconomic, and market structure variables as control variables to avoid spurious regression coefficients and to reduce selection bias. The firm size (Siz), measured as a natural log of total assets; firm growth (Grw), the ratio of the change in the sales to previous year sales; tangibility (Tang), the ratio of fixed assets to total assets; the ratio of total inventory to total current assets (Inv to Asst); GDP, annual change in GDP rate; inflation (Infl), percentage of consumer price index; and Herfindahl–Hirschman index (HHI), the sum of squared market shares of each firm in a given industry; have been controlled in the present research. The use of control variables is justified by the fact that such variables influence FP and cause inconsistent regression results. Thus, consistent with the prior studies, the aforementioned variables have been controlled in the present research (Amare, 2021; Chadha & Sharma, 2016; Dawar, 2014; Egbunike & Okerekeoti, 2018; Fosu, 2013; Killins, 2020; Ku & Yen, 2016; M N et al., 2023; Pandey, 2001; Pervan et al., 2019).

The operational definitions of the constructs are provided in Table 1.

3.3. Empirical method

Initially, we employed multivariate regression analysis to examine the linear relationship between CS and FP. The existing literature has applied traditional regression methods such as fixed effect models and random effect models (Das et al., 2022; Ghardallou, 2023; Ku & Yen, 2016). As a result, such studies have overlooked the possibility of endogeneity problems (Chen et al., 2023; Le & Phan, 2017). However, the existing reverse causality (endogenous relationship) between CS and FP leads to biased regression coefficients (Abdullah & Tursoy, 2021). Consequently, studies suggest employing the GMM regression model, which surpasses the traditional regression models and produces consistent coefficients in the presence of endogeneity, serial correlation, and heteroscedasticity issues (Das et al., 2022; Ghardallou, 2023; Le & Phan, 2017; Roodman, 2009). Subsequently, we have used the GMM method developed by

Table 1. Construct description.

Construct	Operational definition
Regressand: Firm Performance	
ROA	Profit After Tax to Total Asset
ROE	Profit After Tax to Total Equity
Regressor: Capital Structure	
DA	Total Debt to Total Asset
SDA	Total Short-term Debt to Total Equity
LDA	Total Long-term Debt to Total Asset
Control Variables	
Siz	Ln of Total Assets
Grw	$\frac{\text{Current year sales} - \text{Previous year sales}}{\text{Previous year sales}}$
Tang	Total Fixed Asset to Total Asset
Inv to Asst	Total Inventory to Total Current Asset
GDP	Percentage change in annual GDP rate
Infl	Percentage consumer price index
HHI	$\left(\frac{\text{Firm's sales in year t}}{\text{Total sales of industry in year t}}\right)^2$

Arellano & Bond (1991) to analyze the impact of CS on FP. Further, the use of GMM specification is justified by the presence of lagged dependent variables, which leads to serial correlation-free statistical inferences (Ghardallou, 2023; S. Nickell, 1981). Additionally, among the GMM models, the system GMM developed by Arellano & Bover (1995) and Blundell & Bond (2000) outperforms the difference GMM since it enhances the efficiency of estimators. Accordingly, we have used the two-step system GMM model to assess the nature of the relationship between CS and FP among Indian firms (refer to equation 1).

A plethora of studies have examined the impact of borrowings on FP, assuming a symmetric relationship between them. However, firms with higher profitability and operational efficiency may use huge amounts of debt effectively than small firms that prefer lower debt, resulting in higher productivity (Das et al., 2022; Margaritis & Psillaki, 2010). Consequently, the association between CS and FP can be nonlinear (Ghardallou, 2023). Thus, the present study uses Quantile Regression (QR) techniques to measure the varying impact of explanatory factors on a firm's profitability at multiple points (Koenker & Bassett, 1978). Moreover, in the presence of a dynamic relationship, outliers, and non-normal distribution of error terms, the QR method is more effective and robust than traditional regression models (Das et al., 2022; Ghardallou, 2023). Thus, we have employed the QR approach to examine the quantile differences in the explanatory variable, i.e. FP, explicitly considering the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles (refer to equation 2).

$$\Delta FP_{ij} = \alpha + \beta_1 \Delta Lev_{(t-1)j} + \beta_2 \Delta Siz_{ij} + \beta_3 Grw_{ij} + \beta_4 Tang_{ij} + \beta_5 Inv\ to\ Asst_{ij} + \beta_6 GDP_{ij} + \beta_7 Infl_{ij} + \beta_8 HHI_{ij} + \varepsilon \quad [1]$$

Where the regressand FP is measured using ROA and ROE, Lev is measured using DA, SDA, and LDA ratio, and the vector of firm-specific variables (size, growth, tangibility, and inventory to current asset), macroeconomic variables (GDP and inflation), and market structure variable (HHI), have been controlled in the regression model and ε being an epsilon, captures the unexplained portion of regressors.

To provide a comprehensive picture of the regression, the following quantile regression is used:

$$Y_{it} = X_{it}\alpha_0 + \epsilon\theta_{it},\ \ Quantile_{\theta}\left(\frac{Y_{it}}{X_{it}}\right) = X_{it} \quad [2]$$

$$Quantile_{\theta}\left(\frac{Y_{it}}{X_{it}}\right) = Inf\left[Z_i\left(\frac{Y}{X}\right)\emptyset\right] = \alpha\theta X_i \quad [3]$$

Where, Y_{it} represents different measures of FP, X_{it} denotes the vector of explanatory variables wherein α is the parameters to be estimated for the vector of regressors and the residuals are captured by ϵ, $Quantile_{\theta}\left(\frac{Y_{it}}{X_{it}}\right)$ shows $\emptyset^{th}$ conditional quantile of Y_{it} given the $X_{it}\emptyset^{th}$ ranges between 0 to 1. The conditional distribution function of the response variable is indicated by Z_i (refer to equation 3).

4. Results

4.1. Descriptive statistics and cross-correlation

Table 2 shows the summary statistics of the variables used in the study. The average performance of sample firms is 8.9% and 17.9%, as indicated by ROA and ROE, respectively. The mean value of TDA, SDA, and LDA reveals that about 16.7% of the total assets are financed using leverage, whereas 11.6% of assets and 6.3% are financed through long-term and short-term debts. The median value of the TDA is 0.10, while the SDA and LDA are 0.05 and 0.04, exhibits that debt sources are relatively accessible for Indian firms. Meanwhile, the highest volatility is observed among firm size and growth variables, implying scattered differences among the sample firms in terms of total assets and operating income. Additionally, the GDP widely disperses from −0.58 to 0.91 with a standard deviation (SD) of 0.38, manifesting the fact that the Indian economy is relatively less stable and uncertain during 2013 to 2023. The mean value of the tangibility variable shows that 26% of the total assets constitute fixed assets, on the other hand, on average, 11.5% of total current assets constitute inventories. This implies that firms focus on maintaining the optimum fixed assets and inventory for long-run growth and diversification. The mean value of inflation is 0.55, and SD is 0.15, indicating that inflation is slightly on the higher side and less eruptive. Besides, the HHI index ranges from 0.0001 to 1.7917, indicating greater deviation in the market concentration and dynamic market conditions.

Table 2. Descriptive statistics.

Variable	Mean	Median	S.D	Min	Max	VIF results
ROA	0.0891	0.0824	0.1218	−1.5255	0.5161	
ROE	0.1795	0.1563	0.2185	−1.5238	1.4788	
SDA	0.0639	0.0401	0.0762	0.0005	0.7079	1.252
LDA	0.1163	0.0584	0.1353	0.0006	0.6266	1.757
TDA	0.1651	0.1004	0.1711	0.0008	0.7485	2.172
Siz	12.1003	12.0000	1.5079	5.3968	16.0898	1.316
Grw	0.0808	0.0885	0.3057	−4.7244	0.9942	1.050
Tang	0.2598	0.2369	0.1693	0.0005	0.7404	1.318
Inv to asst	0.1149	0.0885	0.1074	0.0003	0.6847	1.382
GDP	0.5827	0.6800	0.3895	−0.5800	0.9100	1.207
Infl	0.5500	0.5000	0.1547	0.3600	0.9400	1.548
HHI	−0.0663	−0.0188	0.1469	0.0001	1.7917	1.062

Source: Author calculation.

Table 3. Correlation analysis.

Variables	ROA	ROE	SDA	LDA	TDA	Siz	Grw	Tang	Inv to asst	GDP	Infl	HHI
ROA	1											
ROE	0.388***	1										
SDA	−0.097**	−0.009*	1									
LDA	−0.446***	−0.223***	0.366***	1								
TDA	−0.451***	−0.317***	0.205***	0.098***	1							
Siz	−0.331***	−0.288***	0.189***	0.317***	0.274***	1						
Grw	0.081*	0.103**	0.054*	0.014	0.041	0.054	1					
Tang	0.148***	0.06	0.366***	0.439***	0.343***	0.133***	0.056	1				
Inv to asst	0.184***	0.172***	0.253***	0.247***	0.110*	0.427****	0.106*	0.112*	1			
GDP	0.001**	0.006*	0.051	0.042	0.038	0.014	0.117***	0.007	0.012*	1		
Infl	−0.074*	−0.098**	−0.054	−0.081**	−0.096**	0.001	0.078*	0.064	0.002	0.295***	1	
HHI	0.051**	0.023	0.123***	0.138***	0.095**	0.138***	0.119***	0.171***	0.038	0.001	0.028	1

Source: Author calculation.
***, **, * signifies the level of significance at 1%, 5%, and 10% level.

To assess the strength of the linear relationship among the predictors of FP, we have conducted a cross-correlation analysis. The result of the correlation matrix is reported in Table 3. The result shows that the ROA and ROE are negatively correlated with SDA, LDA, and TDA ratios, implying that borrowings have a negative link with FP. Further, the firm size and FP are negatively correlated. However, growth, tangibility, and inventory to current assets share a positive relation with the ROA and ROE of the firms. This means that growth in sales, investment in fixed assets, and inventory drives the performance of firms. Besides, the GDP in the economy is positively, and inflation is negatively correlated with the performance of Indian firms. Additionally, the market concentration index (HHI) is positively related to the ROA and ROE of the firms.

Since a high correlation is not found between FP variables (ROA and ROE) and CS variables (SDA, LDA, and TDA), multicollinearity problems among them should be of less concern. The correlation coefficients between selected variables are below the problematic level (<0.50), which allows researchers to include all the selected variables in the regression model (Abdullah & Tursoy, 2021; Das et al., 2022; Ghardallou, 2023; Zeitun & Goaied, 2022). Moreover, the study conducts popularly used Variance Inflation Factor (VIF) analysis to identify multicollinearity problems among the explanatory variables (Craney & Surles, 2002; Nikhil et al., 2023; Singla & Samanta, 2019). The reported results of VIF analysis (refer to Table 2) affirm the absence of a correlation interdependence issue [*since VIF values are* < 5] among the study's variables.

4.2. Unit root test

The summary statistics and correlation matrix results corroborate that our sample firms do not suffer from serious issues such as heterogeneity issues, extreme values, and lack of variation. However, to avoid spurious regression coefficients, it is necessary to examine the stationarity of the variables (Abdullah & Tursoy, 2021; Chakraborty, 2010; Nikhil et al., 2023). There are several unit root tests; amongst Dickey &

Fuller (1981) and Phillips & Perron (1988) are the most commonly used tests. However, such tests lack distinguishing power for panel data (Singla & Samanta, 2019). Thus, we have used the Levin and Lin unit root test (Levin et al., 2002) since it is more powerful than the traditional unit root tests (Maddala & Wu, 1999), and the results are reported in Table 4. Since the p values are less than 5%, we reject the null hypothesis, i.e. data is non-stationary. Hence, the included variables do not have unit roots at level.

4.3. Regression results

The results of the system GMM regression analysis is provided in Table 5. The GMM is applied to two measures of FP, i.e. ROA (Model 1) and ROE (Model 2). In both models, the coefficients of the lagged value of the dependent variable (ROA and ROE) are significant, which justifies the use of the dynamic specification. This finding explains that the present performance of the firm is impacted by its past performance. The Hansen test concludes that the instrumental variables included are valid (since the p-value is >0.05, accept H_0), and the p-value for AR (1) is less than 0.05, which confirms that the data have first-order autocorrelation (Since H_0 is rejected). However, the second-order autocorrelation is absent (since the p-value for AR (2) is >0.05, we accept H_0). Since the results of the statistical tests align with the requirements that the GMM postulates, we can substantiate that the model specification and all instruments are valid.

The main regression result shows a significant negative relationship between leverage (SDA, LDA, and TDA) and FP (ROA, ROE) of the firms. To be precise, 1 unit of TDA reduces the ROA of firms by 0.48 units and ROE by 0.002 units. Likewise, 1 unit increase in SDA will result in the reduction of FP by 0.22 (ROA), and 0.08 (ROE), respectively, and LDA decreases FP by 0.71 (ROA) and 0.17 (ROE), correspondingly. This finding infers that the CS, which is mainly based on leverage, tends to have an adverse effect on the performance of firms, allowing us to accept the study's first hypothesis $(\boldsymbol{H}1)$. Thus, debt financing in India negatively impacts the performance of non-financial firms. Moving on to the control variables, the negative sign for the size variable implies that excess investment in fixed assets negatively drives the performance of firms. The growth in sales and tangibility ratio are found to share a significant positive association with the FP. Further, a positive linkage is observed between inventories to asset ratio and FP measures, demonstrating that the availability of ready inventories enhances sales, thereby improving the firm profitability. In addition, the macroeconomic indicators show that GDP growth is found to enhance the FP, whereas the rise in the inflation rate harms the FP. Besides the market structure variable, HHI is

Table 4. Unit root test results.

Variable	Statistic	Acceptance/rejection of the null hypothesis
ROA	−8.422***	Rejected
ROE	−9.102***	Rejected
SDA	−33.158***	Rejected
LDA	−7.151***	Rejected
TDA	−13.399***	Rejected
Siz	−5.014***	Rejected
Grw	−16.038***	Rejected
Tang	−8.294***	Rejected
Inv to asset	−8.731***	Rejected
GDP	−13.776***	Rejected
Infl	−6.934***	Rejected
HHI	−5.534***	Rejected

H_0 : The data is non-stationary.
***, **, * signifies the level of significance at 1%, 5%, and 10% level.

Table 5. Two-step system GMM regression results.

	Model 1 Dependent: ROA	Model 2 Dependent: ROE
SDA	−0.2219	−0.0861
	(0.0122)	(0.0037)
	***	***
LDA	−0.7189	−0.1778
	(0.0725)	(0.0183)
	***	***
TDA	−0.4823	−0.0023
	(0.0384)	(0.0009)
	***	***
Siz	−0.0004	−0.0029
	(0.0007)	(0.0016)
	***	*
Grw	0.0275	0.0572
	(0.0026)	(0.0067)
	***	***
Tang	0.0071	0.0285
	(0.0035)	(0.0168)
	**	*
Inv to Asst	0.0781	0.4413
	(0.0232)	(0.0503)
	***	***
GDP	0.0008	0.0111
	(0.0004)	(0.0025)
	**	***
Infl	−0.0044	−0.0064
	(0.0024)	(0.0030)
	*	**
HHI	0.0792	0.4019
	(0.0093)	(0.0263)
	***	***
Constant	0.1372	0.0852
	(0.0083)	(0.0241)
	***	***
L.ROA	0.5089	
	(0.0071)	
	***	
L.ROE		0.6289
		(0.0053)
		***
Firm Year Observations	515	513
AR (1)	0.000	0.005
[p-value]		
AR (2)	0.697	0.862
[p-value]		
Hansen J	0.347	0.595
[p-value]		

Source: Author calculation.

Note: Standard errors are parentheses, ***p < 1%, **p < 5%, *p < 10%. The Hansen J test reports the p-value for the validity of instrumental variables (H_0 : The instrumental variables are valid). The AR (1) and AR (2) report the p-values for the absence of first-order serial correlation and second-order serial correlation of the residuals, respectively (H_0 : The residuals have no first-order/second-order autocorrelation).

positively associated with the ROA and ROE of firms, implying that the industry concentration enhances the performance of Indian firms.

The system GMM results are more robust than the traditional models (Ghardallou, 2023; Le & Phan, 2017). However, the observed GMM results cannot be generalized as there is a possibility that the relationship may vary as the firms become more profitable and the borrowing capacity increases. Moreover, profitable firms are relatively efficient and ready to bear additional risks. Thus, examining the nonlinear relationship between FP and explanatory variables is important. Subsequently, we have applied QR regression analysis in line with the existing literature (Das et al., 2022; Ghardallou, 2023; Ku & Yen, 2016; Tripathy & Uzma, 2022). The QR results at different levels are reported in Table 6. The QR shows that the debt indicators (SDA, LDA, and TDA) have a negative impact on the FP indicators (ROA and ROE). The relationship is found to be symmetrical in the GMM analysis. However, QR analysis confirms that the impact of CS on FP differs across the quantiles. The negative impact is more evident around firms with

Table 6. Quantile regression results.

	Dependent: ROA					Dependent: ROE				
Variables	Q(10)	Q(25)	Q(50)	Q(75)	Q(90)	Q(10)	Q(25)	Q(50)	Q(75)	Q(90)
SDA	−0.0174	−0.0405	−0.0463	−0.0589	−0.0645	−0.0014	−0.0574	−0.0785	−0.0874	−0.0997
	(0.0082)	(0.0234)	(0.0258)	(0.0206)	(0.0183)	(0.0007)	(0.0313)	(0.0375)	(0.0379)	(0.0372)
	**	*	*	***	***	*	*	**	**	***
LDA	−0.2804	−0.3726	−0.4172	−0.4360	−0.6759	−0.5997	−0.7166	−0.7206	−0.8488	−1.3413
	(0.1285)	(0.1124)	(0.0635)	(0.0645)	(0.1328)	(0.1649)	(0.1154)	(0.2361)	(0.2180)	(0.4427)
	**	***	***	***	***	***	***	***	***	***
TDA	−0.3668	−0.4503	−0.5246	−0.5391	−0.6568	−0.5723	−0.6594	−0.7198	−0.8121	−1.2607
	(0.0935)	(0.0861)	(0.0503)	(0.0414)	(0.1084)	(0.1151)	(0.0791)	(0.1634)	(0.1095)	(0.3679)
	***	***	***	***	***	***	***	***	***	***
Siz	−0.0078	−0.0079	−0.0083	−0.0118	−0.0126	−0.0105	−0.0137	−0.0152	−0.0264	−0.0481
	(0.0035)	(0.0017)	(0.0028)	(0.0034)	(0.0021)	(0.0042)	(0.0069)	(0.0097)	(0.0045)	(0.0110)
	**	***	***	***	***	**	**		***	***
Grw	0.0267	0.0298	0.0311	0.0338	0.0458	0.0298	0.0449	0.0468	0.0497	0.0937
	(0.0109)	(0.0147)	(0.0096)	(0.0412)	(0.0169)	(0.0175)	(0.0281)	(0.0261)	(0.0238)	(0.0255)
	**	*	***		***	*		*	**	***
Tang	0.0283	0.0333	0.0435	0.0805	0.0876	0.0057	0.0664	0.0860	0.1097	0.1340
	(0.0153)	(0.0147)	(0.0277)	(0.0191)	(0.0353)	(0.0349)	(0.0312)	(0.0379)	(0.0500)	(0.0515)
	*	**		***	**		**	**	**	***
Inv to Asst	0.0535	0.0757	0.0830	0.1018	0.1751	0.1163	0.2285	0.2932	0.3631	0.3698
	(0.0312)	(0.0572)	(0.0272)	(0.0428)	(0.0411)	(0.0892)	(0.0551)	(0.0906)	(0.0808)	(0.1154)
	*		***	**	***		***	***	***	***
GDP	0.0004	0.0033	0.0043	0.0074	0.0098	0.0036	0.0064	0.0071	0.0121	0.0662
	(0.0002)	(0.0017)	(0.0129)	(0.0088)	(0.0039)	(0.0017)	(0.0029) **	(0.0129)	(0.0092)	(0.0306)
	*	*			***	**				**
Infl	−0.0019	−0.0201	−0.0554	−0.0625	−0.1200	−0.0087	−0.0137	−0.0282	−0.1227	−0.3990
	(0.0011)	(0.0288)	(0.0297)	(0.0380)	(0.0442)	(0.0046)	(0.0612)	(0.0599)	(0.0664)	(0.1288)
	*		*		***	*			*	***
HHI	0.0049	0.0052	0.0151	0.0172	0.0465	0.0021	0.0174	0.0277	0.0387	0.3525
	(0.0142)	(0.0028)	(0.0079)	(0.0192)	(0.0149)	(0.0014)	(0.0099)	(0.0269)	(0.0343)	(0.1678)
		*	*		***	**	*			**
Constant	0.0512	0.1413	0.1774	0.2638	0.2917	0.1837	0.1926	0.2325	0.5054	0.7411
	(0.0243)	(0.0457)	(0.0324)	(0.0318)	(0.0504)	(0.1021)	(0.0984)	(0.0709)	(0.0741)	(0.1336)
	**	***	***	***	***	*	*	***	***	***
Quasi-LR statistic	152.58 ***	161.09 ***	222.38 ***	266.96 ***	233.41 ***	120.39 ***	98.24 ***	110.33 ***	141.96 ***	101.74 ***
Observ (N)	521	521	521	521	521	519	519	519	519	519

Source: Author calculation.
Note: Standard errors are parentheses, ***p < 1%, **p < 5%, *p < 10%. The quantiles, Q(10), Q(25), Q(50), Q(75), Q(90) represent the distribution of firms with the 10th, 25th, 50th, 75th, and 90th percentile of firms in terms of profitability.

highly profitable firms (Q90), or the magnitude of the detrimental effect of leverage is higher at the upper quantile compared to the lower quantiles (Q < 90). Thus, overdependence on leverage significantly drives down firms' profitability, specifically among the highly profitable firms. This finding allows us to accept the study's second hypothesis $(\boldsymbol{H}2)$, i.e. the relationship between CS and FP is non-homogeneous among Indian firms listed under the Nifty 100 index.

In the same vein, firm size is negatively related to FP, and the inverse relationship becomes intense among highly profitable firms. Regarding firm growth, it is significantly and positively associated with the performance of firms. Nevertheless, the magnitude of impact increases as the firms move to higher quantiles. Besides, tangibility, inv to asset, GDP, and HHI are found to have positive impact on FP, whereas inflation is found to cause an adverse impact on FP concurrently. However, the impact of the aforementioned variables varies, i.e. the magnitude of the impact changes as the firms move from lower quantile (Q10) to higher quantiles (Q > 10).

4.4. Model diagnostics

Starting with the GMM model, the study checks for autocorrelation and instrumental validity, and the results are provided in Table 5. The p-values of AR (1) and AR (2) demonstrate that the model has the first-order serial correlation (since p-value < 0.05, reject H_0), however, free from second-order autocorrelation (since p-value > 0.05, accept H_0), validating the dynamic model specification (Abdullah & Tursoy, 2021; Le & Phan, 2017). Further, the Hansen J test result encapsulates the model's instrument variables' authenticity or the absence of over-identification restrictions (Das et al., 2022; Ghardallou, 2023). Moving on

Table 7. Wald test results.

	Dependent: ROA				Dependent: ROE			
Variables	H0: Q(10) =Q(90)	H0: Q(25) =Q(90)	H0: Q(50) =Q(90)	H0: Q(75) =Q(90)	H0: Q(10) =Q(90)	H0: Q(25) =Q(90)	H0: Q(50) =Q(90)	H0: Q(75) =Q(90)
Wald test statistic	88.5074	58.8876	84.0075	20.7323	24.2211	28.7376	36.2985	20.7729
p-value	0.0000	0.0000	0.0000	0.0230	0.0026	0.0014	0.0001	0.0227

Source: Author calculation.
Note: The Wald test examines if the quantile results are constant across different points of the conditional distribution of the dependent variable, i.e. firm performance (H_0 : There is slope equality, and coefficients are equal across different quantiles). ***, **, * signifies the level of significance at 1%, 5%, and 10% level.

to QR analysis, Tables 6 and 7 show several post-estimation test results, emphasizing the model's constancy. Initially, the goodness of fit was tested using a Quasi-likelihood ratio (Quasi-LR), which tests for the null hypothesis, i.e. there is no significant improvement in the model fit (Jung, 1996). The reported result (refer to Table 6) provides evidence to reject the stated null hypothesis and signifies that the QR models at different quantiles are valid. Further, the test developed by Wald (1943) is employed to assess if the quantile regression parameter is constant across different quantile levels. The Wald test statistics and its corresponding p-values are reported in Table 7. Since the p-values are less than 5%, we reject the null hypothesis through all regressors, resulting in the rejection of the assumption of homogeneous coefficients across different pairs of quantiles. Thus, the use of the QR approach is justified, and in India, the impact of the leverage of FP is indeed non-homogeneous across different levels of the firm's profitability (different quantiles).

5. Discussions

5.1. The linear relationship between FP and explanatory variables (refer to Table 5)

The Arellano & Bond (1991) test for serial correlation reveals that residuals of our data are not serially correlated at second order [AR (2)]. Thus, the regression coefficients produced by the system GMM estimator can be considered consistent and meet the moment conditions of GMM analysis (Zeitun & Saleh, 2015). Further, the Hansen test results demonstrate that the instrument variables considered in the study are valid and are uncorrelated with the error term. To begin with the regression results, the coefficients of lagged dependent variables (ROA and ROE) are highly significant at a 1% level. This outlines that the firm's performance in the present year serves as information to its stakeholders and thus positively influences the performance of firms in the next year. Hence, the firm's past performance drives the current investment decisions in India, and similar findings have been documented in prior studies (Das et al., 2022; Ghardallou, 2023).

The negative and significant coefficient for CS indicators, i.e. SDA, LDA and TDA, indicates that the debt in the CS of the companies adversely impacts their performance and, thus, supports the study's first hypothesis ($\boldsymbol{H}_1$). The debt in the CS commits the management to pay out the interest and reduces the free cash flows (Frank & Goyal, 2009; Jensen & Meckling, 1976). Although the mitigation of the conflict of interest between owners and managers is constituted as the benefit of debt financing, the excess debt financing plausibly seems to provide unprecedented opportunity for equity holders to invest suboptimally (HARRIS & RAVIV, 1991) Whilst the risk of failure of projects is to be borne by lenders, since equity holders escape such mishaps due to the limited liability fundamentals. As a result, the excess debt would result in a conflict of interest between lenders and owners of the company (Myers, 1977). Therefore, leveraging debt financing among Indian firms will be accompanied by a fall in their performance. Apart from this, the financial sector in emerging markets is characterized by the misallocation of financial resources, where industries are highly reliant on costly bank finance (Allen et al., 2012). Moreover, the capital markets are still embryonic, which compels the firms to rely on bank finances. On the other side, most banks are owned and managed by non-private organizations, which further provides the managers with the opportunity for perk consumption. Consequently, in such economies, debt financing is unlikely to reduce the conflict of interest between management and owners, instead resulting in excessive free cashflows. Additionally, trade-off theory points out an optimal CS, and borrowing beyond the optimal point increases the cost of bankruptcy and other compulsive costs that surpass the tax shield advantage (Kraus & Litzenberger, 1973). Moreover, the leverage is likely to increase the information costs to the company

(Myers & Majluf, 1984). As a result, studies in developing economies have found that debt is negatively related to the FP (Amare, 2021; Chadha & Sharma, 2016; Dawar, 2014; Le & Phan, 2017; Nikhil et al., 2023). Consistent with the prior studies, we found that over-dependence on debt sources negatively influences the performance of Indian firms.

Turning to control variables, in line with the existing studies (Abdullah & Tursoy, 2021; Becker-Blease et al., 2010), the size variable is found to have a negative link with the FP. The over-investment in tangible assets results in underutilization of resources (Nikhil et al., 2023; Shepherd, 1972) and diseconomies of scale (Goddard et al., 2005) and thus negatively impacts the performance of firms. As a result, the negative coefficient is observed for the size variable. The growth appears to be positively linked with both the measures of FP, i.e. the ROA and ROE, which is concurrent with the previous findings (Abdullah & Tursoy, 2021; Ahmed et al., 2023; Danso et al., 2020; Jang & Park, 2011; Le & Phan, 2017). The positive sign implies that the growth in sales appears to be a significant driver of the firm's profitability. This is because the high growth rate helps the firms to achieve a higher market share that generates the advantage of first movers in the market, gradually influencing the firm's profitability (Lee et al., 2000). Moreover, a wide argument existshat a firm's growth, profitability, and value are directly correlated (Varaiya et al., 1987). This explains why we observed a positive coefficient for the growth variable. Apart from this, the study finds that the tangibility ratio and inventory-to-asset ratio enhance the performance of sample firms. It is argued that companies with an optimum investment in fixed assets tend to have lower bankruptcy costs (Akintoye, 2009), further enhancing the firm's future value (Zainudin et al., 2018). Moreover, firms with lower fixed assets are prone to external shocks more often (Panda et al., 2023). Accordingly, several researchers have identified a positive relationship between tangibility and FP (Ghardallou, 2023; Mehari & Aemiro, 2013). Additionally, efficient management of current assets, including inventories, maximizes the return on investment (Bj, 1986). Furthermore, systematic inventory management positively impacts sales and hence, the firm's profitability (Knauer & Wöhrmann, 2013). Consequently, consistent with the previous studies (Das et al., 2022; Nepal & Deb, 2023), we found that the inventory-to-asset ratio is positively associated with the ROA and ROE of Indian firms. The GMM results also manifest the significant influence of general economic indicators, i.e. GDP and inflation, on the performance of Indian firms. While the growth in the GDP rate enhances the FP, the hike in inflation hinders the FP. The higher GDP indicates a booming economy, enhancing the firm's productivity and profitability (Nikhil et al., 2023). Contrastingly, the increase in inflation rate is viewed as harmful to firms since a hike in inflation is likely to result in lower purchasing power, high overhead costs and thus negatively impacts the FP (Soukhakian & Khodakarami, 2019). Thus, we found a positive coefficient for GDP and a negative coefficient for the inflation variable, and our results are congruous with the prior studies (Attia et al., 2023; Egbunike & Okerekeoti, 2018; Issah & Antwi, 2017; Killins, 2020; Pattitoni et al., 2014; Pervan et al., 2019). Finally, a non-negative relationship between market concentration (HHI) and firm performance is observed, indicating the concentration of industry positively affects the performance of Indian non-financial firms. In other words, in markets with higher concentration, firms may enjoy benefits in terms of reduced competition and higher profitability (Fosu, 2013; Pant & Pattanayak, 2010). Certainly, the argument for the direct relationship between the competition variable and FP is evident in many previous studies (Javeed et al., 2020; S. J. Nickell, 1996; Pervan et al., 2019; Yasser & Mamun, 2017).

5.2. The nonlinear relationship between FP and explanatory variables (refer to Table 6)

Despite the apparent popularity of a linear relationship between leverage and FP, the empirical validity of the nonlinear impact of leverage on FP is yet to be demonstrated, specifically in emerging markets like India. Accordingly, the study employs the QR technique to assess the asymmetric relationship between leverage and FP. The QR regression result corroborates that the leverage negatively influences the performance of firms of upper quantiles, or the intensity of the negative impact of borrowings is more pronounced around highly profitable firms. This finding lends support to accept the study's second hypothesis $(\boldsymbol{H}_2)$. The plausible justification is that the firm's capital ratio increases as the firm's returns grow (Berger et al., 2008) because the growth in the revenue increases the stability of the firm (Rashid et al., 2021), and such firms are likely to enjoy the additional debt capacity (Ghardallou, 2023). However, the additional access to debt sources provides the management with unprecedented opportunities to invest in unfruitful avenues and indulge in perk consumption (Kazemian & Sanusi, 2015). Thus, this opportunistic behavior of the managers adversely affects the FP (Chung et al., 2005). Though the agency

theory suggests that debt financing restricts free cashflows and earnings management activities (Frank & Goyal, 2009; Jensen & Meckling, 1976), debt financing beyond the optimal point, which, according to trade-off theory, leads to impairment of FP on account of increment cost of debt over the benefit of tax shield (Kraus & Litzenberger, 1973). Further, the underdevelopment of capital markets compels the firms to rely upon bank loans (Allen et al., 2012); most banks, on the other hand, are publicly owned. As a result, Indian firms do not strive to repay the borrowed loans, resulting in agency problems between owners, management, and lenders (Jensen, 1986; Myers, 1977; Pandey, 2001). Thus, in such instances, the agency theory argument fails (Dawar, 2014), further worsening firms' profitability. As a result, extreme reliance on debt would result in lower ROA and ROE among highly profitable firms. In accordance with our findings, few studies have documented that the magnitude of the negative impact of debt on the performance of firms is evident, especially among upper quantiles (Das et al., 2022; Ghardallou, 2023; Ku & Yen, 2016; Tripathy & Uzma, 2022).

With regard to the control variables, the impact of firm size exhibits a nonlinear pattern. The negative impact of firm size is highly evident among upper quantiles (Q90) compared to lower quantiles ($Q < 90$). This implies that profitable firms heavily invest in capital assets, which results in the underutilization of resources (Shepherd, 1972). When the assets are not used optimally, firms end up facing diseconomies of scale (Goddard et al., 2005), and as a result, it negatively affects the ROA and ROE of firms. Thus, the excess investment in capital assets among profitable firms negatively drives their performance. Besides, a positive impact of growth rate on the FP is more pronounced around the firms with upper quantiles. In the academic fraternity, there is a widespread presumption that a firm's growth and profit are interrelated, where the former fosters the latter (Jang & Park, 2011). Additionally, high-profit firms enjoy economies of scale and higher market share. Consequently, they achieve competitive advantage and higher profitability (Mansikkamäki, 2023). As a result, the favorable impact of growth is more evident around highly profitable firms than other firms. In the same vein, the influence of tangibility ratio and inventory-to-asset ratio on the FP, are found to be asymmetric. Investment in fixed assets and inventory are found to drive the performance of firms, specifically among highly profitable firms, compared to less profitable firms. This implies that profitable firms are highly efficient in managing their fixed assets and inventory, ultimately enhancing the FP, and our results are concurrent with the previous findings (Ku & Yen, 2016; Das et al., 2022). While the GDP and HHI index increases the FP, the inflation withers the FP. Further, their relationships are found to be asymmetrical, where the positive impact of GDP growth rate and higher market concentration is pronounced more around highly profitable firms. At the same time, the negative relationship between inflation and FP indicators becomes intense as the firm's profitability increases, indicating a nonlinear pattern between the two. This could be because, during favorable economic conditions (GDP growth) and during a slump (high inflation), severe impact revolves around highly profitable firms since it causes a significant impact on their sales, productivity, and profitability. Likewise, highly profitable firms reap the benefits of industrial concentration (high HHI) in terms of market share, less competition, and sales compared to less profitable ones. As a result, we have observed a nonlinear pattern between HHI and FP indicators, and our findings are robust with the previous studies (Fosu, 2013; Ghosh, 2008; Thi Viet Nguyen et al., 2021)

6. Conclusions

The connection between financial borrowing and firm performance has posed a longstanding problem and has been debated in the academic fraternity. This hot topic has garnered the attention of several researchers around the world. To provide more insights into this topic, we employed the QR technique to investigate the conditional relationship between financial leverage and corporate performance in the Indian context. Initially, the system GMM technique is employed to check for the linear linkage between CS and FP among Indian firms. Using a balanced panel dataset of 515 firm-year observations of non-financial Nifty 100 public companies for the years 2011 to 2023, the study finds that leverage (SDA, LDA, and TDA) significantly deteriorates the performance of firms (ROA and ROE) in India. As borrowings bear periodic interest payments, the marginal return available to company owners is reduced. Besides, levered firms are prone to bankruptcy risk. As a result, the leverage withers the performance of Indian firms.

The QR results reveal that the leverage-FP relationships significantly vary among firms across different levels of profitability distribution. In particular, the intense negative influence of leverage on the ROA and ROE is evident around the firms with upper quantiles (highly profitable firms) than the lower quantile firms (less profitable firms). The result implies that the highly profitable firms will likely have additional debt capacity, allowing them to borrow more than required. Thus, overinvestment in debt paves the way for bankruptcy and other costs. Moreover, firms end up investing in unfruitful avenues. As a result, highly profitable firms in India could not benefit from debt financing. Consequently, Indian firms must focus on optimal CS and strengthen their governance mechanisms to minimize the opportunistic behavior of managers, specifically among growing and matured firms.

Our findings add new knowledge to the existing body of literature since it is the first study in the Indian context to examine the asymmetric influence of financial leverage on the corporate performance of firms. India is a growing economy, and it needs the large contribution of manufacturing companies. Thus, our robust findings help policymakers decide the optimal CS and serve as a prerequisite for surging the Indian economy. Moreover, the empirical findings of this study guide investors and other stakeholders in making efficient CS decisions. Apart from this, the study recommends that management should lower the debt financing, specifically the highly profitable firms should refrain from overinvestment in debt financing.

Nonetheless, this study has few limitations. First, the study's findings are restricted to the accounting performance of firms. Second, the financial firms are excluded from the study's sample. Finally, the study's findings are limited to only developing and emerging countries since such countries exhibit unique markets, economic characteristics, and challenges. Thus, future studies may contribute to the existing knowledge by addressing the aforementioned study's limitations.

Note

1. Nifty 100 index comprises the top 100 Indian large-cap companies, representing the major sectors of the Indian economy [Read more about the index: https://www.nseindia.com/products-services/indices-nifty100-index].

Acknowledgments

The authors extend sincere gratitude to the anonymous reviewers for their valuable insights and constructive feedback, which greatly contributed to enhancing the quality of this paper. We also appreciate the efforts of the editor for meticulous review and guidance throughout the editorial process.

Disclosure statement

Authors have no potential conflict of interest to disclose.

Funding

This research has received no direct funding.

About the authors

Nikhil M. N. (First Author) is currently pursuing his Ph.D. from the Department of Commerce, Manipal Academy of Education, Karnataka, India. Nikhil's area of research are capital structure, firm performance and Indian accounting standards.

Sandeep S. Shenoy (Corresponding Author) is working as Professor and Head of the Department of Commerce, MAHE, Manipal, Karnataka, India.

Suman Chakraborty is working as Professor and Associate dean at Narsee Monjee Institute of Management Studies, Indore, Madhya Pradesh, India.

Lithin B. M. is a Doctoral Scholar. His area of research is corporate finance and is currently pursuing his Ph.D. from the Manipal Academy of Higher Education, Manipal, India.

ORCID

Nikhil M. N. http://orcid.org/0000-0002-6760-2669
Sandeep S. Shenoy http://orcid.org/0000-0002-9848-9718
Suman Chakraborty http://orcid.org/0000-0002-3999-7181
Lithin B. M. http://orcid.org/0000-0001-9332-7202

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