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Impact of Leverage on Valuation of Non-Financial Firms in India under Profitability's Moderating Effect: Evidence in Scenarios Applying Quantile Regression

Jagjeevan Kanoujiya [1], Pooja Jain [2], Souvik Banerjee [3], Rameesha Kalra [4], Shailesh Rastogi [1] and Venkata Mrudula Bhimavarapu [5,*]

[1] Symbiosis Institute of Business Management, Symbiosis International (Deemed University), Pune 412115, India; jagjeevan24288@yahoo.co.in (J.K.); krishnasgdas@gmail.com (S.R.)
[2] Amity Business School, Amity University, Gwalior 474020, India; pjain1203@gmail.com
[3] Management Development Institute Murshidabad, Murshidabad 742235, India; souvik.2005@gmail.com
[4] School of Business and Management, CHRIST (Deemed to be University), Bangalore 560029, India; rameesha.kalra@gmail.com
[5] Symbiosis School of Banking and Finance, Symbiosis International (Deemed University), Pune 412115, India
* Correspondence: mrudulabhimavarapu@gmail.com

Abstract: The firm's valuation (FV) is the key element for all stakeholders, particularly the investors, for their investment decisions. The main impetus of this research is to estimate the effects of the debt ratio (DR, i.e., leverage) on the FV (i.e., assets and market capitalisation) of the non-financial firms listed in India. The quantile panel data regression (QPDR) on the secondary data of 76 non-financial BSE-100 listed firms in India is employed. This study also checks the effect of the net profit margin (NPM) as profitability on the association between DR and FV. The QPDR estimates result in multiple quantiles and provide evidence in scenarios. The findings reveal a positive relationship of DR to assets only in higher quantiles, i.e., 90%ile), and a negative association of DR is found with a market capitalisation in all quantiles. Under the interaction effect, profitability (NPM) does not affect the association of DR with assets but negatively affects the association of debt ratio with market capitalisation in the middle (50%) quantile. The findings indicate that leverage (DR) affects a firm's value. The study's outcomes are helpful to all stakeholders, particularly investors, to realise the leverage (DR) as a critical indicator of FV before making any investment decisions. Managers should also consider lower debt ratios for better firm value. The present analysis is original and holds novelty in the form of the moderating role of the net profit margin, i.e., the profitability of the firm between DR and FV in the non-financial firm in India. To the best of our knowledge, no such studies have been performed to look for the association of the debt ratio with a firm's value under the effect of profitability in different quantiles using quantile regression.

Keywords: debt ratio; firm value; net profit margin; sales; profitability

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1. Introduction

In light of the recent global financial crises due to COVID-19, institutions have increasingly relied on financing loans for some of their transient assets. This situation has enabled them to satisfy their financial obligations, maintain a higher rate of return, and avoid going bankrupt. This kind of financial choice does not stop the catastrophe from happening; it merely delays it. This study investigates how the debt structures of non-financial firms listed on the BSE-100 affect their financial performance (as valuation). The debt structure is a crucial metric for assessing performance by the utilisation of resources to maximise earnings for its shareholders and raise the institutions' market value.

Even if there is a lack of funding, it is difficult for non-financial institutions to provide the required funding, and the management of these institutions in developing nations,

notably in the non-financial firm in India, is getting increasingly complex. A company's financial choice is significant because it affects current and future cash flows, profitability, and liquidity. Financial management's main objective is to make decisions to increase the organisation's competitive position while maximising owners' wealth (Abuamsha and Shumali 2022).

The capital structure (CS) influences not just the organisation's profitability but also its leverage ratios. The operating leverage often grows as fixed costs rise. As a result, firms must constantly cut fixed expenditures to avoid additional losses, particularly during times of crisis. The company's CS refers to the ratio of equity and debt resources utilised for funding the firm. Few ideas advocate that the directors' CS choice is crucial because the performance correlates with it. Financial leverage is the ratio of total debt to total capital employed. Hence, besides having a big impact on the organisation's profitability, financial problems caused by CS also substantially affect the macroeconomic results. Profit maximisation and the hazards involved must also be weighed in financial management. The company needs a financing structure that guarantees better profitability and market value. CS and DR impact the company's profitability.

Various studies find the connectivity of leverage with a firm's performance in terms of valuation. Research such as that of Ruland and Zhou (2005), Abor (2005), Tayyaba (2013), and Robb and Robinson (2014) has shown a favourable effect on performance. Cheng and Tzeng (2011), Negash (2001), Phillips and Sipahioglu (2004), and Rahman et al. (2020), however, argue that leverage deteriorates the firm's performance. Lin and Chang (2011) indicate no significant connection between leverage and FV. This situation raises the issue of having fresh evidence of the leverage effect on valuation.

In Indian context, it is evident that Indian corporate has seen several corporate reforms, including the implementation of many rules and regulations like various company acts. The recent one is Company Act 2013 to enhance corporate performance in India. As discussed earlier, leverage is an essential component in a company's capital structure. Valuation is also a key element for an investor's decision to invest in a firm. However, its impact on a firm's valuation is inconclusive. Mainly, the research on such a topic is concentrated in developed economies. Emerging economies like India (one of the fastest-growing economies) need fresh evidence, as several regulatory reforms have been witnessed in this fast-growing economy. Therefore, it is high time to estimate the leverage effect on FV of non-financial firms in India and to provide novel evidence.

In order to answer the primary question addressed in this paper, we use panel data analysis (PDA) to validate the given hypotheses. The rationale for utilising a PDA is that it features cross section and time. Panel data analysis has a wide range of applicability in finance and economics. The quantile panel data regression (QPDR) model (Graham et al. 2015) is employed for regression analysis. This approach is also advantageous because it can better deal with the endogeneity problem. As a result, endogeneity in such models is not a significant difficulty in generating consistent results and proving our objectives. We intend to find the connection between DR and FV (assets value and market capitalisation taken as a proxy of firm value). In this study, NPM is used as a proxy for firm profitability. As a result, the initial analysis omits the relationship between DR, FV, and the moderation impact of business profitability. First, the direct effect of DR on FV may be harmful. If the indirect relationship between DR and FV prevails, analysing profitability as a moderator for the firm value could elaborate on the varied repercussions of the effect of DR on FV. Second, by including sales, "Profit Before Interest And Tax" (PBIT), and "return on assets" (ROA) as control variables, we would be able to make a compelling case for finding the sole impact of DR on valuation and impact in interacting with profitability.

Thus, this paper makes a new contribution to the literature. This study represents a remarkable effort to find the moderating role of the net profit margin, i.e., profitability of the firm between DR and FV in the non-financial firm in India. To the best of our knowledge, no prior study has examined the impact of profitability's moderating role on the linkage between DR and FV.

The advantage of our empirical approach, the panel data analysis using quantile regression, is that it enables us to investigate the contingent roles of leverage on valuation in different scenarios (quantiles). This situation provides deeper insights into the connection between the two to have better decision-making inputs. In this paper, we argue that the sales, profit before interest and tax, and return on assets play a crucial contingent role in a firm's valuation. The justification for using sales, PBIT, and ROA as control variables come from the literature-supported evidence of an empirical association between DR and FV (Abidin et al. 2021; Ullah et al. 2020; Nariswari and Nugraha 2020). Overall, our article suggests an adverse correlation between DR and FV. The current findings give clear implication to focus on portfolio diversification and diversified capital structure.

The remainder of the paper is organised as follows. The following section provides a full literature review, while Section 3 provides data and the research methodology. Section 4 offers the empirical results, briefly discussing the reason for adopting a thorough empirical analysis. Section 5 analyses the empirical findings, while Section 6 provides a summary and implications. The final portion finishes with suggestions for future study extensions.

2. Literature Review

2.1. Debt Structure and Financial Performance

While examining how an organisation's debt structure affects its financial performance (FP), Modigliani and Miller (1958) concluded that FP was unaffected. They asserted in a subsequent study, however, that due to high taxes and deductible interest rates, these organisations prefer to finance with debt rather than equity (Modigliani and Miller 1963), which is consistent with the trade-off theory, which holds that debt gives an organisation a tax advantage (Akeem et al. 2014). As a result, the corporation should take on more debt to improve performance, which will lower taxes and boost ROA (Saif-Alyousfi et al. 2020). This viewpoint is also supported by Nirajini and Priya (2013). Homapour et al. (2022) studied British firms, and they found that leverage improves the market performance of stocks and reduces market risk (financial). Since this study aims to empirically test the DR and FV nexus with a moderation influence on profitability, our examination of the literature will focus on this study area.

Leverage or debt ratio and FP have been the subject of several prior empirical investigations. The results of these investigations are blended. On one side, specific researchers such as Ruland and Zhou (2005), Abor (2005), Tayyaba (2013), and Robb and Robinson (2014) discovered the connection between FP and leverage. According to Robb and Robinson (2014), using debt boosts FP resulting in greater returns than the average interest costs associated with a firm's leverage. These findings can be justified in light of earlier, significant studies like those of Modigliani and Miller (1958) and Ruland and Zhou (2005), which asserted that profitable companies advertise quality by raising their leverage. This situation leads to the positive connectivity of profitability to leverage. The research of Saleem et al. (2013) and Tripathy and Shaik (2020) on a South Asian Oil and gas firm investigated how leverage impacts profitability. The study concluded that financial and operating leverage considerably impact the profitability ratios. Rahman et al. (2020) aimed to investigate how the DR affects a sample of Pakistani enterprises' financial results. Some showed that leverage has a detrimental effect on FP, including Cheng and Tzeng (2011), Negash (2001), and Phillips and Sipahioglu (2004), while others indicated no link between leverage and business success. According to Cheng and Tzeng (2011), the level of leverage results in agency issues that indicate a weak connection between leverage and FP. Lin and Chang (2011) found two threshold effects between leverage and FP, using debt as a threshold for Taiwanese enterprises. A rise in leverage is followed by an improvement in FP as determined by Tobin's Q if the DR is low. There is no proof of a connection between leverage and FP when it is high. As in past studies, the debt ratio is used as a threshold, which evaluates the connectivity of leverage to ROE, the Vietnamese firms' metric of firm success.

Many studies examined the connection between leverage and ROE, their measure of business performance, and the relationship between company size and FP in India and other developing countries. Pandey and Ponni (2017) analysed how CS affects the performance of listed Indian companies, focusing on the pharmaceutical industry. A similar study conducted in Nigeria (Onaolapo and Kajola 2010; Chen et al. 2019) supported the agency costs theory's claim by showing how a high debt ratio significantly negatively impacts FP indicators like ROA and ROE.

Goel et al. (2022) used debt financing as a substitute for CS and profit efficiency as a substitute for business success in order to analyse the impact of CS on industrial performance in India. These findings, consistent with past research, demonstrate little correlation between performance and debt financing. By simulating the CS with debt and the FP with ROA and return on capital employed (ROCE), it is possible to examine the CS and FP of Sri Lanka's listed companies (Pratheepkanth 2011; Yinusa et al. 2021). The results show that there is a bad correlation between leverage and FP. Hence, increasing debt has a negative impact on the FP of the organisation.

No research has yet been conducted on the possible influence of profitability (NPM) on the impact of DR on firm value. We propose to bridge this gap in the literature by employing a more open-ended empirical definition that permits a wide range of potential relationships between the debt ratio and firm value.

2.2. Profitability, Leverage and Firm Value

High profitability suggests positive business prospects, and investors will take these signals favourably, increasing the firm's worth. This situation makes sense because a firm's ability to produce higher profits suggests that the company is performing well, which encourages investors to be optimistic and drives up the company's stock price. The company's value rises along with market stock prices. According to Terpstra and Verbeeten's (2014) research, profitability ratios—measured by ROI or ROA—significantly impact the company's value.

A company's total assets, which comprise its resources, are used to calculate ROA, a profitability metric. This ratio shows how well management uses the total assets to produce profits. The ROA informs the business of the profits from the capital invested (assets). The ROA varies from company to company and throughout industries; therefore, using it as a comparative indicator should be done cautiously, taking into account the company's performance history and comparing it to that of rivals and similar businesses in the same industry (Habib et al. 2016).

A combination of debt and equity is used to finance the firm's assets and fund the business's operations. The ROA gauges how successfully an organisation converts invested capital into net income during operations. High ROA indicates better resource utilisation, translating into higher FP (Gibson 2012).

When assessing a company's ability to produce shareholder value, investors look at metrics including ROA, debt-to-asset ratio (DAR), current ratio (CR), firm size, and dividend payout ratio (DPR). While establishing an FV, profitability is an important consideration. The profitability metric is the ROA. An indicator of the contribution that assets contribute to net income is the ROA ratio (Ullah et al. 2020). ROA impacts FV, according to (Phuong et al. 2020). A significant profit indicates promising corporate futures, encouraging investors to enhance stock demand and raising firm value.

Operating leverage is influenced by the number of fixed costs; hence, a higher percentage of fixed costs denotes significant operational leverage. As a result, operating income will fluctuate with every change in sales. Also, the organisation may be exposed to risk due to the substantial operating leverage. Regardless of the business's sales, fixed expenses must be paid, including manufacturing overhead, equipment depreciation, and maintenance costs (Gitman and Zutter 2015).

Investors must take into account a company's size when estimating its worth. Thakur and Workman (2016) claim that a company's sales, capital, and total assets can be used to

estimate the business size. Compared to firms with small total assets, those with large total assets are mature and can create good prospects in a time of relative stability and can turn a profit.

Mutmainah (2015) asserts that a company's size can be estimated using its sales, total assets, or capital. Firms with higher total assets have matured and are seen as having good prospects in an era of stability and the capacity to generate profits. When a corporation has a large overall asset base, the management has numerous preferences for how the assets should be used (Davydov 2016). From the management perspective, the value of the business will increase due to how easily it can be managed (Rajgopal and Venkatachalam 2011). Nurainy et al. (2013) also support this perspective, which discovered that firm size significantly affects firm value.

According to Darsono et al. (2011), total assets turnover (TAT) is an activity ratio that signals how much of an FV is employed to complete or provide sales (Bahraini et al. 2021). The more effectively all of the FV is employed to produce net sales, the higher the total assets turnover, which leads to better revenue and profit. Profit growth is a metric used to assess an FP; as a result, the higher the profit, the more successful the organisation. Thus, profit growth will be more significant if the total asset turnover is high. The results of in dicate that TAT favours company profit growth.

Profitability gauges the money from a transaction or investment (Liao et al. 2020). It also demonstrates the management's capability to boost company profits or as a barometer for effectiveness. High profitability indicates the business's promising future for investors Profitability has a significant effect on the security and liquidity of the financial system. Investors should therefore take the company's financial liquidity into account when assessing a company's profitability. Investors increasingly consider financial security and profitability levels when making long-term investments.

The extant literature discussed above exhibits that the connectivity of DR and the firm's value is inconclusive. The relationship of leverage and valuation under the moderating role of dividend policy (Fajaria and Isnalita 2018) and corporate governance (Javeed et al. 2017) was investigated and found to be significant. However, the moderating effect of profitability has not yet been examined for the DR and firm's value connection. In addition, it is also observed from the extant literature that studies exploring DR and valuation relationships are highly inclined towards developed economies. In the Indian context, such studies are rarely found. Hence, this study fills the research gap with its novel approach to deliver fresh evidence on the association of DR and the firm's value of firms in India. This study considers specific profitability measures like Sales, PBIT, and ROA as control variables to observe the sole effect of leverage on valuation (Abidin et al. 2021; Ullah et al. 2020; Nariswari and Nugraha 2020). The above discussion expresses how these factors can influence leverage and firm value. Therefore, variables such as sales, PBIT, and ROA should be kept controlled to handle omitted variables biasedness. As these profitability factors are controlled, we chose a more robust profitability measure, i.e., NIM, to moderate the DR and valuation.

2.3. Theoretical Underpinnings for the Impact of Debt Ratio and Firm Value

According to Modigliani and Miller (1958), their modern capital structure theory posits that the firm's value is not affected by financial structure. However, in their advanced theory, Modigliani and Miller (1963) assert that leverage improves a firm's value due to the tax shield advantage. Modigliani and Miller (1963) argue that when leverage cannot build a tax shield advantage, it adversely affects a firm's value by increasing the leverage cost. Similarly, the trade-off theory says that leverage is detrimental to a firm's value because it creates financial instability in firms (Homapour et al. 2022; Cheng and Tzeng 2011).

Nobel Prize winners Modigliani and Miller's (1958) work, which was previously described, was the first quantitative analysis of the impact of a company's capital structure on its financial indicators (Brusov et al. 2022). The conventional strategy, founded on an investigation of empirical data, was in use prior to their work. The Modigliani–Miller

theory became a particular instance of the modern Brusov–Filatova–Orekhova (BFO) theory (Brusov et al. 2022; Brusov et al. 2023; Brusov and Filatova 2023), which was created in 2008. Many qualitatively novel effects missing from the Modigliani–Miller theory have been found in the BFO hypothesis. BFO theory (Brusov et al. 2018; Brusov and Filatova 2023) demolished some of the most fundamental financial management ideas. They considered the company's perpetuity (finite lifespan) as crucial. Therefore, no standard view is observed among researchers. It is also argued that BFO theory under inflation increases the firm's cost of capital and FV. Therefore, leverage decreases the firm's value (Brusov et al. 2022).

The percentage of a company's total debt to its assets is known as the debt ratio, according to Siahaan et al. (2016). As the debt ratio increases, the source of funding through debt reduces. On the other hand, the amount of debt used to finance a project increases with the debt ratio. Financial leverage and company performance in Tanzanian savings and credit cooperative societies were examined using the literature (Towo 2022; Luu 2021), and both were discovered to be significantly and negatively linked. The same findings were also demonstrated by Nigerian product companies, which reported their performance by the added cash value of listed industrial good firms and revealed a negative link with long-term DR while displaying a positive correlation with short-term DR (Ofulue et al. 2022; Akhtar et al. 2016). Regarding the CS effect on family business performance in corporate governance, family-owned businesses with limited resources see a fall in investment opportunities, while more opportunities emerge due to debt. Itan and Chelencia (2022) and Selim et al. (2022) found that savings- and credit-cooperative societies' leverage and FP in Tanzania's financial leverage impacted the success of credit-cooperative societies. A study of Nigerian oil corporations found negative connectivity of leverage and FP as assessed by ROE, and it was proposed that debt financing be increased to secure shareholders' positions in firms (Huynh et al. 2022; Abubakar 2015; Ehikioya 2009; La Rocca 2010; Kalantonis et al. 2021). In a study on British firms, Homapour et al. (2022) advocated that leverage improves a firm's market value and reduces risk. With the above discussion, this study hypothesises the following in its alternate form:

H1. *Debt ratio negatively affects firm value.*

2.4. Theoretical Underpinnings for the Effect of Profitability (NPM) on Debt Ratio and Firm Value Connection

The net profit margin is the portion of revenue made up of net income or profit. A company's or industry's net profit margin is determined by the proportion of net earnings to revenues. Net profit margins are often reported as a percentage. Divide net income by sales to obtain this ratio (Gibson 2012; Rahman et al. 2020). The net profit of margin is a proportion of profitability that contrasts net income to sales. Exposing operational expenses over a given period helps evaluate how efficient a company is (Dakua 2019). The better the net profit margin, the more likely a company is to produce a sufficient profit from sales to allow it to reduce its operating costs successfully. The results of Royda (2019) show that NPM has no discernible effect on a company's growth in earnings. The research results by (Puspasari et al. 2017) show that the NPM effect is positive and significant for firm profit growth. It was observed in several studies, such as (Phuong et al. 2020; Ullah et al. 2020), that profitability improves firm value. However, the mediating role of profitability has not been examined for the DR and FV nexus. Hence, the following alternate hypothesis is made:

H2. *Profitability (NPM) moderates the relationship between Debt ratio and firm value.*

3. Data and Methodology

3.1. Data

This study used the secondary data of 76 BSE-100 listed non-financial firms in India. The sample period of study is ten years (2011–2020). The data initially included 100 firms. However, it was reduced to 76 firms after the data filtration. The financial firms were excluded due to their different approach to reporting having different features. The study found 76 firms with authenticated data for a balanced panel for consistent results. In addition, the chosen period must be investigated after the reform period and recent regulatory measures regarding India's corporate activities, for instance, the recent amendment in the Companies Act 2013 and Insolvency and Bankruptcy Code 2018.

Additionally, the sample period size has enough observations to deliver more substantial and reliable evidence. The data source is the Bloomberg database, from which data retrieval was performed. The industry-wise distribution of firms is shown in Table A1 in Appendix A. The variables for which data were procured are mentioned and described in Table 1.

Table 1. Variables.

Variable	Measurement	References
Explanatory Variables (EV)		
Debt Ratio (DR)	It represents the share of debt to total assets. A higher debt ratio shows that the firm is highly leveraged. It is calculated as DR = total debt/(debt + equity)	Husna and Satria (2019); Irman and Purwati (2020)
Dependent Variables (DV)		
Asset (lasset)	It is the total value of a company's assets. The Asset value is taken as one of the proxies for firm value. lasset shows logarithmic value is taken.	Husna and Satria (2019); Irman and Purwati (2020)
Market Capital (lmcap)	Market capitalisation (Mcap) is taken as another proxy of firm value. It is calculated as mcap = (Total outstanding shares) × market value of a share. lmcap shows logarithmic value is taken.	Al-Ahdal et al. (2020); Garcia et al. (2019)
Tobin's Q (TQ)	It is the ratio of firm's value and firm's assets replacement cost (ARC). TQ = FV/ARC	Vo (2017)
Market-to-Book Ratio (MTB)	It is the ratio of market value (MV) and book value (BV) of a firm's equity share. MTB = MV/BV	Vo (2017)
Enterprise value (ENTV)	It is calculated by the sum of market cap and net debt. ENTV = Mcap/Net Debt	Hao et al. (2022); Ronald and Semuel (2022)
Return on Equity (ROE)	It also indicates the profitability of banks, and it is positively related to profitability. It is calculated as ROA = net income/total equity	Hao et al. (2022); Ronald and Semuel (2022)
Moderating Variables (MV)		
Net Profit Margin (NPM)	It is used as the proxy for profitability. The higher NPM is an indication for higher profitability.	Nariswari and Nugraha (2020); Panjaitan (2018)
Control Variables (CV)		
Sales (lsales)	It shows the total value of sales in a firm. lsales indicates logarithmic value is taken for analysis.	Ohiomah et al. (2020); Blal et al. (2018)
PBIT (lpbit)	It is profit earned by a company before interest and tax. lpbit indicates that the logarithmic value is taken for analysis.	Nariswari and Nugraha (2020)
Return on assets (ROA)	It also indicates the profitability of banks, and it is positively related to profitability. It is calculated as ROA = net income/total assets	Husna and Satria (2019)

Note: The Variables' data is sourced from Bloomberg database.

3.2. Methodology

The data used for this study include both cross-sectional units (76 firms) and a time dimension of ten years (2011–2020). Therefore, we performed the panel data analysis (PDA)

to verify the assumed hypotheses in this paper. The rationale behind using PDA is its benefits of featuring both cross section and time. Hence, it delivers comparatively more information to justify the findings (Hsiao 2007; Baltagi 2008). PDA is less susceptible to endogeneity complexities. Hence, PDA results are comparatively less biased than typical time series or cross-sectional studies (Kanoujiya et al. 2022; Wooldridge 2015). Furthermore, the quantile panel data regression (QPDR) model (Graham et al. 2015) is used for regression analysis because the dependent variables are found to be non-normal. As the dependent variable is non-normal, the extent of the effect might vary in different quantiles (Kanoujiya et al. 2022; Hettmansperger and McKean 2011; Asmare and Begashaw 2018). Thus, the QPDR model becomes a good fit for finding results in scenarios (Kanoujiya et al. 2022; Hettmansperger and McKean 2011; Asmare and Begashaw 2018). The QPDR model is also advantageous, as it can better deal with the endogeneity problem. Hence, endogeneity in such models is not a big issue in delivering consistent results (Kanoujiya et al. 2022; Wooldridge 2015). The model specification is mentioned below:

$$DV_{it}(\tau) = \theta_1 DR_{it} + \theta_2 lsales_{it} + \theta_3 lpbit_{it} + \theta_4 ROA_{it} \quad (1)$$

$$DV_{it}(\tau) = \theta_1 DR_{it} + \theta_2 NPM_{it} + \theta_3 i\_DR\_NPM_{it} + \theta_4 lsales_{it} + \theta_5 lpbit_{it} + \theta_6 ROA_{it} \quad (2)$$

Base models (Model 1 and 2) are based on Equations (1) and (2), corresponding to the interaction models (Model 3 and 4), where the dependent variable (DV) is the firm's value and has two proxies, i.e., lasset and lmcap. Two additional proxies of DV are also taken, namely, TQ and MTB. Both are incorporated to check the results' robustness. The main explanatory variable is the debt ratio (DR). This study also investigates the interaction effect of DR under the moderation of profitability. Hence, the interaction term calculated as (i_DR_NPM [=dDRXdNPM]) is also introduced, including DR as the main explanatory variable and NPM (profitability) as the moderator. Suffix 'd' shows that demean values are taken. In addition, three control variables are also included in the models (i.e., lsales, lpbit, ROA) to obtain a good fit model to determine the sole relationship between the variables of interest. 'it' shows that PDA model specification is taken where 'I'm is cross-sectional units (firms) and 't' is time (year). 'θi' is the coefficient estimate.

3.3. Quantile Regression

Most of the prior studies employ parametric methods to examine how leverage and FV are related. There is evidence in the literature that the effect size may vary with quantiles when the outcome variable is non-normal. The FV-having proxies lasset and lmcap are the dependent variables of interest in this study and are non-normal. A discussion on non-normality checks is provided in Section 4.2.

As mentioned in Section 4.2, lasset and lmcap are not normally distributed. Therefore, we use a quantile regression model to examine the relationship between leverage and FV. In addition, research that supports non-parametric methods is the inspiration for implementing quantile regression since it yields better results in empirical examinations of scenarios (see Asmare and Begashaw 2018; Hettmansperger and McKean 2011). Additionally, quantile regressions and other non-parametric methods do not make any assumptions about the model's error component distribution.

We use Graham et al. (2015) estimator, known as quantile regression for panel data (QRPD), which is based on Ledhem and Mekidiche's (2022) work. As the best non-parametric strategy, we combine QRPD with Markov chain Monte Carlo optimisation (MCMC) to address the difficulties with conventional calculation mistakes. Additionally, according to Dong et al. (2015), one of the effective non-parametric techniques for robust estimation for quantile regression is MCMC. Quantile regression is also more resistant to data outliers and less susceptible to them. Lastly, by assessing the effect at various quantiles of FV, the non-parametric method of QRPD with MCMC optimisation allows for more exploration of leverage. Thus, QRPD is a consistent and justifiable approach for this study.

Additionally, when the data are non-normally distributed, then the classical regression approach does not provide clearer insight for the association of the two variables. Hence, looking at their relationship in different quantiles gives clearer insights to have a better decision-making approach.

3.4. Variables

The dependent variable in this study is the firm's value. The firm's value is proxied by lasset and lmcap. The lasset is the total value of a firm's asset in INR (Husna and Satria 2019; Irman and Purwati 2020). The logarithmic value is taken to handle extreme value vulnerability. The lmcap is the market value of the firm's total outstanding shares (Al-Ahdal et al. 2020; Garcia et al. 2019) (see Table 1 for description). This study also includes two more proxies of FV. These are "Tobin's Q" (TQ) and the "market-to-book ratio" (MTB). They are incorporated to ensure the results' robustness. TQ is the ratio of FV and assets replacement cost (Zhao and Murrell 2016; Vo 2017). MTB is the ratio of the market value and book value of a firm's equity share (Zhao and Murrell 2016; Vo 2017).

The primary explanatory variable is the debt ratio, which describes the firm's leverage status (Husna and Satria 2019; Irman and Purwati 2020). Table 1 has a note on it. Profitability is the moderating variable to find the effect of DR on the firm's value. NPM is taken as the proxy of profitability (Nariswari and Nugraha 2020; Panjaitan 2018). Three variables (lsales (Ohiomah et al. 2020; Blal et al. 2018), lpbit (Adelopo et al. 2018; Nariswari and Nugraha 2020), and ROA (Adelopo et al. 2018; Husna and Satria 2019)) which seem to affect the firm's value are kept controlled to obtain a good-fit model to determine the effect of DR on a firm's value, reasonably. Table 1 demonstrates detailed notes on the variables incorporated in the study.

4. Results

4.1. Summary Statistics

Table 2 gives the summary of descriptive statistics. The firm's asset value has an average value of INR 50,502.44 million. However, it is quite downward from Min. Therefore, on average, the firm's value in India is low. Similarly, the firm's market capital has an average value of INR 71,009.26 million, which is also closer to Min, indicating a low market capital (on average) of firms in India. However, it should be noted that the standard deviation is relatively high. This result shows that firms vary in terms of firm's value.

Table 2. Summary statistics.

Variable	Obs.	Mean	Std. Dev.	Min	Max
DVs					
Asset (lasset)	760	50,502.44	10,0946.97	276.45	1,165,910
Mcap (lmcap)	760	71,009.26	101,625.92	52.22	1,017,464.4
EVs					
DR	760	0.177	0.195	0.00	0.896
MVs					
NPM	760	0.404	3.200	−0.729	78.51
CVs					
Sales	760	38,695.23	77,530.75	61	615,782.6
Pbit	760	4923.03	7999.67	−39,637.4	57,244
ROA	760	11.58	9.49	−20.44	77.61

Note: Min, Max, Obs., and Std. Dev. are minimum value, maximum value, number of observations, and standard deviation, respectively. DVs are dependent variables. EVs, MVs, and CVs are the explanatory, moderating, and control variables, respectively.

Additionally, it is also found that these 76 sample firms share 71.67% of the market capitalisation of all BSE 100 firms. The DR (debt ratio) exhibits its average value of 0.177, closer to Min. Hence, on average, the leverage in the sample firms is low. Additionally, the

sample firms vary less regarding leverage, as their SD is relatively low. The mean value of NPM is 0.404, which is positive but notably down compared to Min. Hence, the firms are found to be in profit (on average), which is fairly low. The SD of NPM is low; hence, the firms are not much differentiated regarding profitability (NPM). The average sales in sample firms are INR 38,695.23 million (closer to Min). Hence, a signal for low sales (on average) in the sample firms is found.

Similarly, the PBIT has an average value of 4923.03 (in million INR). It is optimistic, but it is closer to Min. Hence, on average, a low PBIT is found. However, sales and PBIT have high SD, indicating the varying nature of firms in terms of sales and PBIT. The ROA of sample firms with an average value of 11.58 shows a low ROA due to having proximity towards Min. Its SD is slightly low; hence, firms are not much varying when considering ROA.

4.2. Normality of Dependent Variable

Table 3 demonstrates the normality status of the data used for dependent variable proxies. The Shapiro–Wilk test tests the normality with the null of non-normal data. The significant outcomes for both proxies confirm that the dependent variable proxies are not standard in distribution. Hence, the application of QPDR is reasonably justifiable. Additionally, the QPDR estimates the regression results in different quantities; hence, it helps analyse the outcomes' robustness.

Table 3. Shapiro–Wilk W test.

Variable	Obs	W	*p*-Value	H0: Data Normally Distributed	Outcome
lasset	760	0.992	0.000	Rejection of H0	Non-normal Data
lmcap	760	0.976	0.000	Rejection of H0	Non-normal Data
ENTV	760	0.974	0.000	Rejection of H0	Non-normal Data
ROA	760	0.884	0.000	Rejection of H0	Non-normal Data
ROE	760	0.445	0.000	Rejection of H0	Non-normal Data
TQ	760	0.246	0.000	Rejection of H0	Non-normal Data
MTB	760	0.454	0.000	Rejection of H0	Non-normal Data

Note: The Shapiro–Wilk W test to check normality of data of dependent variable. It has the null of normal distribution. ENTV, ROA, ROE, TQ, and MTB are other proxies taken for valuation to check results' robustness as described in Appendix A.

4.3. Multicollinearity

The correlation matrix shown in Table 4 has a pairwise correlation coefficient. It can be observed that there are many significant correlations between pairs. However, no significant correlation has a value greater than 0.80. This situation indicates that multicollinearity is not available in the models. Moreover, the VIF values (in Table 5) of all variables used in the study are not more than '3'. This result also ensures that multicollinearity is not available in models.

Table 4. Correlation matrix.

	lasset	lmcap	DR	NPM	lsales	lpbit	ROA
lasset	1						
lmcap	0.638 *	1					
DR	0.265 *	−0.051	1				
NPM	0.037	0.059	−0.047	1			
lsales	0.608 *	0.407 *	0.306 *	−0.043	1		
lpbit	0.681 *	0.764 *	0.070	0.087 *	0.612 *	1	
ROA	−0.230 *	0.169 *	−0.462 *	0.373 *	−0.185 *	0.091 *	1

Note: * signals *p*-value significance at 0.05.

Table 5. Variance inflation factor (VIF).

Variable (DV:lasset)	DR	NPM	lsales	lpbit	ROA	DR NPM
VIF	1.542	1.230	1.649	1.496	1.544	1.246
Variable (DV:lasset)	**DR**	**NPM**	**lsales**	**lpbit**	**ROA**	**DR NPM**
VIF	1.543	1.230	1.650	1.497	1.544	1.246

Note: VIF < 3 shows no multicollinearity.

4.4. Regression Results

Tables 6 and 7 demonstrate the regression results of QPDR analysis. Table 6 shows the results of base models (Models 1 and 2). In Model 1, it is evident that 'DR' is insignificant in the first two quantiles (i.e., at 10%ile and 50%ile). However, it is both significant (at 5% significance) and optimistic, with a value of 1.309 in the 90%ile. It indicates that DR positively affects lasset (firm's value) at the 90%ile (higher quantile). The control variables lsales and lpbit are both significant and positive at the 10%ile % and 50%ile %. The control variable ROA is found negative at all quantiles. However, the lsales is insignificant in the 90%ile quantile. In Model 2, DR is found significant and negative in all three quantiles (10%ile, 50%ile, and 90%ile). Hence, it implies that DR is detrimental for the firm's market capitalisation (lmcap). The control variable 'lsales' is found significant and negative in the 10%ile and 50%ile. However, it is insignificant in the 90%ile. 'lpbit' is significant and positive in all quantiles. However, ROA is insignificant for lmcap in all quantiles.

Table 6. Results of quantile regressions (with base variable).

		lasset			lmcap		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−0.093	0.261	0.721	−2.103 *	0.348	0.000
	lsales	0.133 *	0.047	0.005	−0.124 ***	0.072	0.088
	lpbit	0.799 *	0.069	0.000	0.975 *	0.076	0.000
	ROA	−0.413 *	0.027	0.000	−0.029	0.062	0.637
Quantile (50)	DR	0.094	0.102	0.358	−1.151 *	0.148	0.000
	lsales	0.058 *	0.021	0.006	−0.069 *	0.018	0.000
	lpbit	0.941 *	0.021	0.000	0.768 *	0.022	0.000
	ROA	−0.646 *	0.018	0.000	0.011	0.025	0.648
Quantile (90)	DR	1.309 **	2.144	0.032	−0.737 **	0.262	0.005
	lsales	−0.031	−0.214	0.830	0.003	0.031	0.918
	lpbit	0.719 *	4.770	0.000	0.643 *	0.034	0.000
	ROA	−0.415 **	−2.854	0.004	0.045	0.039	0.244

Note: *, **, and *** are for *p*-value is significant at 1%, 5%, and 10%.

While considering the interaction effect in Model 3 (Table 7), DR has an insignificant coefficient in all quantiles in the case of lasset. The moderating variable NPM in the 10%ile and 50%ile is insignificant for lasset but significant and positive in the 90%ile. The interaction term (i_DR_NPM) is insignificant in all quantiles. It means that NPM (profitability) does not affect the association of DR with lasset. The control variable 'lsales' is found significant only in the 50%ile at 5% significance. Other control variables, 'lpbit' and 'ROA', are significant in all quantiles. However, lpbit is positive and ROA is negative. In Model 4, DR has a negative and significant coefficient (−1.610 and −1.044, respectively) in the 10%ile and 50%ile. However, DR is insignificant for lmcap at the 90%ile. It means DR is detrimental to a firm's value in terms of market capitalisation. The interaction term (i_DR_NPM) is negative and significant at the 50%ile. It implies that NPM (profitability) as moderator affects the relationship between DR and lmcap (market capital). Moreover, the negative coefficient indicates that while profitability is high, DR decreases the firm's

market capitalisation. 'lsales' and 'lpbit' are significant at the 10%ile and 50%ile. However, ROA is insignificant in all quantiles. Moreover, looking at all the models, 'lmcap' has exhibited more consistent outcomes in different quantiles. Hence, it can be a more reliable choice of the valuation measure of a bank. Furthermore, it is also evident that exploring the association of the two variables in different quantiles gives a clear indication that firms with higher valuation may exhibit different connectivity with leverage compared to lower-valuation firms.

Table 7. Results of quantile Regressions (with Interaction Variable).

		lasset			lmcap		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−0.002	0.370	0.994	−1.610 *	0.466	0.000
	NPM	0.053	0.087	0.541	−0.082	0.118	0.486
	i_DR_NPM	−0.428	1.390	0.758	−0.894	1.077	0.407
	lsales	0.112	0.088	0.202	−0.350 **	0.114	0.002
	lpbit	0.832 *	0.077	0.000	1.187 *	0.108	0.000
	ROA	−0.417 *	0.043	0.000	−0.019	0.057	0.727
Quantile (50)	DR	−0.026	0.181	0.882	−1.044 *	0.159	0.000
	NPM	0.063	0.115	0.582	−0.011	0.019	0.531
	i_DR_NPM	0.126	0.629	0.841	−0.269 **	0.133	0.044
	lsales	0.089 **	0.045	0.050	−0.122 **	0.042	0.004
	lpbit	0.902 *	0.043	0.000	0.820 *	0.042	0.000
	ROA	−0.670 *	0.019	0.000	0.016	0.035	0.635
Quantile (90)	DR	0.800	1.026	0.436	−0.977	2.684	0.715
	NPM	0.429 **	0.205	0.036	−0.011	3.438	0.997
	i_DR_NPM	−1.613	2.837	0.962	0.444	9.500	0.962
	lsales	0.186	0.322	0.562	0.018	0.614	0.976
	lpbit	0.578 **	0.284	0.042	0.630	0.621	0.310
	ROA	−0.698 *	0.116	0.000	0.056	0.132	0.671

Note: *, **, and *** are for *p*-value is significant at 1%, 5%, and 10%.

4.5. Robustness Test of Results

This study performs the robustness test to ascertain the robustness of the results. The quantile regression is performed, which estimates the impact of DR on the firm's value at different quantiles. Hence, it gives results in various scenarios. In addition, a multi-model approach is adopted, incorporating two proxies of the dependent variable and estimating the association of DR with the firm's value in the simple base establishment and under the moderating effect of profitability (Kanoujiya et al. 2022; Rastogi and Kanoujiya 2022). The study finds the effect of DR on a firm's value in many cases. Additional analysis is performed using five more proxies (i.e., TQ (Tobn's Q), MTB ("market-to-book ratio"), "enterprise value", ROA, and ROE) of a firm's value to further ensure the results' robustness. A complete discussion on this analysis is elaborated in Appendix B (discussed under Appendix B and results are presented in Tables A2–A5). Here again, very similar results are obtained. Hence, it confirms the results' robustness as found in the main models (Kanoujiya et al. 2022; Rastogi and Kanoujiya 2022).

5. Findings and Discussion

5.1. Hypothesis Discussion

This study formulated two main hypotheses. The first hypothesis is that the debt ratio negatively affects the firm value. Significant evidence is obtained in support of this hypothesis. We also found a negative association of debt ratio with a firm value under the effect of profitability (npm) at the 50%ile. Hence, the support for the second hypothesis, profitability, moderates the association of DR and FV. The current findings support the trade-off theory (Cheng and Tzeng 2011), which asserts the negative relationship of leverage and firm value. However, the findings do not support modern capital structure theory

(Modigliani and Miller 1958). It is to be noted that a positive impact of leverage on assets is found only at a higher quantile (90%ile). It also supports Modigliani and Miller (1963) for their advanced theory, indicating that leverage does not carry tax shield benefits; instead, it incurs cost in the leverage of Indian firms. The current findings also support modern capital structure theory, i.e., BFO theory, as discussed in the literature.

5.2. Comparison of Previous Findings

Current results differ from the previous studies that the debt ratio positively affects a firm's value (Modigliani and Miller 1958; Siahaan et al. 2016; Huynh et al. 2022; Abubakar 2015; Ehikioya 2009; La Rocca 2010; Kalantonis et al. 2021). However, the results are in support of the research by Towo (2022), Luu (2021), and Cheng and Tzeng (2011). They conclude that leverage is detrimental to a firm's value. Some studies found mixed effects because the relationship between the debt ratio and firm value varies with changes in the debt structure (Al-Ahdal et al. 2020; She and Guo 2018). It can be concluded from the results shown that the interest tax shield grows as the debt ratio rises, but the costs associated with leverage rise as well, counteracting the beneficial impacts of the debt ratio on the firm value.

5.3. Contribution and Implications

The current study presents the association of leverage with a firm's valuation. It is found that leverage negatively impacts the valuation solely (all quantiles) and under the interaction of profitability (in the middle quantile). The current study augments the literature on leverage and valuation in several ways. First, it provides fresh evidence on the association of leverage and the valuation of non-financial firms in India. Second, it employs a more consistent approach (quantile regression) to reveal this relationship in different scenarios. Hence, the findings provide more profound insights into the impact of leverage on valuation. Third, it also looks for their association under the interaction of profitability. To the authors' belief, such research rarely exists in the literature. Hence, the current evidence makes a significant contribution to the literature.

The findings bring several noticeable implications for all the stakeholders to see the leverage in connection with valuation critically. It is not always the case that it benefits the firm's value. Hence, the finance manager needs to take care of the firm's debt structure while looking for its involvement in the capital structure. They should be alerted to the inclusion of debt and critically evaluate that it does not cause much cost to the firm. The important implication for investors is that firms with a higher share of debt might not be suitable for the firm's valuation. Therefore, leverage should be seen critically for any investment decisions. Additionally, the findings give noticeable implication to focus on portfolio diversification.

6. Conclusions

Leverage is one of the essential elements in a firm's capital structure. This paper aimed to determine the impact of debt ratio on the firm value of 76 non-financial firms listed in BSE-100 in India. Applying QPDR, it was found that a firm's leverage ratio adversely affects its valuation in India. The profitability (NIM) negatively affects the impact of DR on FV. It means leverage is detrimental to a firm's value while the firm has higher profitability. Therefore, it is inferred that leverage does not bring benefits to add value to a firm's valuation. It can be concluded from the results that the interest tax shield grows as the debt ratio rises, but the costs associated with leverage rise as well, counteracting the beneficial impacts of DR on FV. It is generally assumed that DR adds value to the firm traditional capital structure theory of Modigliani and Miller (1963). However, it is not always accurate as exhibited by the empirical results. It might be due to the incurred cost of leverage. Hence, the advanced BFO theory is found supportive. The current study substantially contributes to the existing literature through its novel evidence and approach. The current findings bring noticeable implications to all concerned stakeholders, including

managers and investors, to look at leverage critically and carefully before involving it in capital structure. It should be noted by the managers that the inclusion of leverage should not have a higher cost which hinders the firm's valuation. Policymakers need to understand the limits of leverage inclusion in capital structuring so that it should benefit firms rather harm it.

This study cannot be separated from its limitations. First, the study talks only about non-financial firms listed in India. The financial firms are excluded due to their different approaches to reporting information and work culture. Therefore, the current study can be extended in a separate study of financial firms. In addition, the study's scope is limited to the Indian economy. The results cannot be taken in general. However, the findings give enough impetus to other emerging economies of a similar kind, such as China and Russia. This study can be conducted further on financial firms. The sample can be broadened to have cross-country evidence. Other parameters for a firm's valuation can be incorporated in future studies on capital management. The moderation of competition and inflation for the association of DR and the firm's value should also be examined in future studies.

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Appendix A

Table A1. Industry-wise distribution of sample firms.

Sl. No.	Sector	Firms Count
1	Automobile	12
2	Technology	5
3	Textiles	1
4	Cons Durable	3
5	Construction	7
6	Energy	10
7	Engineering	2
8	FMCG	9
9	Healthcare	10
10	Metals	4
11	Services	6
12	Chemicals	5
13	Communication	2
	Total	76

Notes: The sample's industry classification corresponds to the data from India's Bombay Stock Exchange (BSE). The sample is diverse in that it includes firms from 13 different industries.

Appendix B Additional Robustness Check

It was discussed earlier that the results' robustness is an essential approach to ensure the reliability of obtained empirical evidence. It is observed from the literature that quantile regression itself is an approach which ensures the results' robustness, as it estimates results in different quantiles. However, this study follows a multimodel approach using different proxies of the main dependent variable (firm's value). The two most important proxies of a firm's value (i.e., lasset and local) are taken for the study's main analysis. In addition, in this section, we take two more proxies to further ensure the results' robustness. The five other proxies of firm's valuation are "Tobin's Q" (TQ), "market-to-book ratio" MTB,

"enterprise value" (ENTV), ROA ("return on assets"), and ROE ("return on equity"). The applicability of these variables for the models is checked as being non-normal (see Table 3).

TQ is one of the firm's valuation indicators. It is computed by dividing the firm's market value by the firm's asset replacement cost (Zhao and Murrell 2016; Vo 2017). Similarly, MTB is another valuation indicator computed as dividing the market value of a firm's equity by the book value of the same equity (Zhao and Murrell 2016; Vo 2017). ENTV is calculated by the sum of the market cap and net debt (Hao et al. 2022; Ronald and Semuel 2022). ROA and ROE are other valuation proxies indicating return on assets and return on equity, respectively (Hao et al. 2022; Ronald and Semuel 2022).

Tables A2 and A3 present the regression outcomes of base models and interaction models, respectively, using TQ and MTB as the dependent variables. In Table A1, DR significantly impacts both TQ and MTB in the quantiles. However, DR relates to TQ negatively in all cases. DR connects to MTB negatively in the lower quantile (10%ile) and positively in the higher quantiles (50%ile and 90%ile). In Table A2, the explanatory variable of interest is the interaction term (i_DR_NPM). It is found to be significant and positive with TQ only in the lower quantile (10%ile) at 5% significance. In rest of the cases, interaction term is insignificant. Comparing the results with the outcomes of main analysis, very similar results are obtained, indicating that DR negatively affects a firm's value. However, in the higher quantile, it has positive connectivity to the firm's value in some cases. Thus, it further confirms the results' robustness.

In Tables A4 and A5, the regression outcomes of the base models and the interaction models having ENTV ('enterprise value'), ROA, and ROE are demonstrated. DR in almost all cases (quantiles) is found to be significant for ENTV, ROA, and ROE. Here, again, in Table A4, the DR is negatively connected to ENTV in all quantiles. DR is negatively connected to ROA in the lower quantile (10%ile); however, it is found to be positively associated with ROA in the higher quantiles ((50%ile and 90%ile). In the case of ROE (as the dependent variable), DR is found to be positively related to it. In Table A5 for interaction models, the interaction trem 'i_DR_NPM' is found to be insignificant in all quantiles for ENTV. In case of ROA, 'i_DR_NPM' is also insignificant in all quantiles. The interaction term 'i_DR_NPM' is found to be significant and positive in the lower quantile (10%ile) in the case of ROE only. The interaction term 'i_DR_NPM' is insignificant in all other models in Table A5. Here, again, very similar outcomes are obtained using other proxies of firm's valuation (i.e., ENTV, ROA, and ROE).

Table A2. Results of quantile regressions (with base variable).

		TQ			MTB		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−1.084 *	0.278	0.000	−0.487 ***	0.258	0.059
	lsales	0.004	0.039	0.909	−0.179 *	0.050	0.000
	lpbit	−0.068	0.056	0.227	0.027	0.052	0.598
	ROA	0.543 *	0.172	0.001	1.098 *	0.160	0.000
Quantile (50)	DR	−0.729 *	0.212	0.000	1.867 *	0.310	0.000
	lsales	−0.154 *	0.028	0.000	−0.006	0.064	0.914
	lpbit	−0.248 *	0.043	0.000	−0.915 *	0.105	0.000
	ROA	2.148 *	0.150	0.000	3.357 *	0.209	0.000
Quantile (90)	DR	−2.264 **	0.950	0.017	1.113 *	0.379	0.005
	lsales	−0.076	0.144	0.595	0.388	0.306	0.205
	lpbit	−0.445 **	0.207	0.031	−1.879 *	0.385	0.000
	ROA	4.468 *	0.494	0.000	8.456 *	0.972	0.000

Note: *, **, and *** are for *p*-value is significant at 1%, 5%, and 10%.

Table A3. Results of quantile regressions (with interaction variable).

		TQ			MTB		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−1.010 *	0.291	0.000	−0.123	0.739	0.867
	NPM	−0.524	0.728	0.472	0.007	0.295	0.978
	i_DR_NPM	1.196 **	0.566	0.034	−0.892	1.821	0.624
	lsales	−0.177	0.223	0.427	−0.299 ***	0.172	0.082
	lpbit	0.106	0.240	0.658	0.134	0.166	0.420
	ROA	0.923 *	0.136	0.000	1.103 *	0.189	0.000
Quantile (50)	DR	−0.552	0.349	0.114	2.376 *	0.735	0.001
	NPM	−0.212	0.364	0.561	−0.200	0.700	0.774
	i_DR_NPM	−0.117	0.786	0.881	−1.013	1.388	0.465
	lsales	−0.226 *	0.059	0.000	−0.246	0.218	0.259
	lpbit	−0.183 *	0.060	0.002	−0.698 *	0.223	0.001
	ROA	2.202 *	0.144	0.000	3.502 *	0.269	0.000
Quantile (90)	DR	−2.562 **	1.199	0.033	0.381	3.072	0.901
	NPM	−0.442	1.388	0.750	−0.652	2.251	0.772
	i_DR_NPM	1.120	3.087	0.716	2.841	6.055	0.638
	lsales	−0.143	0.267	0.592	0.266	0.778	0.732
	lpbit	−0.400	0.281	0.155	−1.742 **	0.792	0.028
	ROA	4.465 *	0.454	0.000	8.467 *	0.873	0.000

Note: *, **, and *** are for *p*-value being significant at 1%, 5%, and 10%.

Table A4. Results of quantile regressions (with base variable).

		ENTV			ROA			ROE		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−0.639 **	0.303	0.035	−0.937 *	0.135	0.000	3.498 **	1.399	0.012
	lsales	0.002	0.048	0.958	−0.223 *	0.026	0.000	1.724 *	0.292	0.000
	lpbit	0.867 *	0.052	0.000	0.260 *	0.024	0.000	−1.738 *	0.289	0.000
	opmar	1.085 *	0.413	0.008	−0.998 *	0.224	0.000	3.180 *	0.371	0.000
Quantile (50)	DR	−0.379 *	0.139	0.006	1.713 *	0.098	0.000	12.610 *	0.942	0.000
	lsales	−0.019	0.015	0.193	−0.321 *	0.027	0.000	1.136 *	0.208	0.000
	lpbit	0.715 *	0.020	0.000	0.311 *	0.028	0.000	−1.466 *	0.224	0.000
	opmar	0.708 *	0.147	0.000	−0.497 *	0.156	0.001	7.017 *	0.425	0.000
Quantile (90)	DR	0.787 *	0.214	0.000	1.474 *	0.402	0.000	20.766 *	3.343	0.000
	lsales	0.070 *	0.020	0.000	−0.784 *	0.092	0.000	1.206 **	0.608	0.047
	lpbit	0.570 *	0.030	0.000	0.792 *	0.097	0.000	−2.448 *	0.752	0.001
	opmar	0.727 *	0.199	0.000	−2.051 **	0.843	0.015	4.323 *	1.388	0.000

Note: *, **, and *** are for *p*-value being significant at 1%, 5%, and 10%.

Table A5. Results of quantile regressions (with interaction variable).

		ENTV			ROA			ROE		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	**p**	**Coef.**	**Std. Err.**	***p***
Quantile (10)	DR	−0.190	0.448	0.670	−0.741 ***	0.398	0.063	−3.681 *	1.267	0.003
	NPM	−0.033	0.132	0.803	0.074	0.090	0.409	−0.966 **	0.419	0.021
	i_DR_NPM	−0.823	1.204	0.494	−0.655	1.565	0.675	7.833 *	1.861	0.000
	lsales	−0.209	0.147	0.156	−0.192 *	0.072	0.008	1.421	0.254	0.000
	lpbit	1.055 *	0.145	0.000	0.226 *	0.070	0.001	−1.414	0.264	0.000
	opmar	0.722	0.846	0.393	−0.574	0.594	0.334	13.842	0.240	0.000

Table A5. *Cont.*

		ENTV			ROA			ROE		
		Coef.	**Std. Err.**	***p***	**Coef.**	**Std. Err.**	**p**	**Coef.**	**Std. Err.**	***p***
Quantile (50)	DR	0.538 ***	0.303	0.076	1.228 *	0.242	0.000	11.100 *	1.674	0.000
	NPM	0.001	0.009	0.878	0.059	0.117	0.609	−0.485	1.023	0.635
	i_DR_NPM	−0.590	0.688	0.391	−1.499	0.923	0.105	8.752	5.431	0.107
	lsales	−0.018	0.055	0.734	−0.297 *	0.072	0.000	1.551	0.412	0.000
	lpbit	0.708 *	0.053	0.000	0.267 *	0.072	0.000	−1.845	0.392	0.000
	opmar	1.093 *	0.322	0.000	0.287	0.473	0.543	17.540	0.400	0.000
Quantile (90)	DR	0.758 **	0.363	0.036	1.712 *	0.596	0.004	17.006 *	4.271	0.000
	NPM	1.016 *	0.215	0.000	0.065	0.722	0.927	−1.135	4.262	0.790
	i_DR_NPM	−0.721	0.526	0.170	−1.091	2.257	0.628	11.056	11.939	0.354
	lsales	0.192 ***	0.111	0.084	−0.550 ***	0.321	0.087	1.761	1.218	0.148
	lpbit	0.445 *	0.106	0.000	0.528	0.321	0.101	−2.816	1.273	0.027
	opmar	1.908 *	0.323	0.000	−0.329	1.360	0.808	24.420	1.202	0.000

Note: *, **, and *** are for *p*-value being significant at 1%, 5%, and 10%.

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