Changing Dynamics of Leverage Determinants : A Comprehensive Study of Firms Listed in India

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Abstract

Purpose : This study offered a unique perspective on leverage determinants, examining both the direct influences of firm-level and the direct and indirect influences of industry-level determinants.

Methodology : By analyzing annual data of all BSE-listed non-financial 3,620 firms from 1992 to 2023 (31 years), resulting in 35,510 firm-year observations, and using the hierarchical linear model (a statistical method that allows for the analysis of data with a nested structure), we were able to assess multi-level influences of leverage determinants. The study's comprehensiveness regarding firm-year observations and variables effectively addressed the problem of model misspecification and identified the most significant leverage determinants.

Findings : Our results revealed significant firm and industry-level leverage determinants, providing evidence that industry factors strongly and indirectly influenced capital structure decision-making, potentially altering the influence of firm-level factors on leverage.

Practical Implications : We demonstrated that the relationship between capital structure and its determinants is hierarchical and not straightforward. These findings have important implications for financial decision-making in Indian firms.

Originality : This study questioned the dominant perspective in the existing literature that internal firm factors are primary determinants of capital structure.

Keywords : **capital structure, leverage, determinants, hierarchical linear model, India**

JEL Classification Codes : G3, G30, G32

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Capital structure refers to the approach in which an organization finances its assets through a mix of equity, preference shares, and long-term debt. The financing decisions are complicated due to the conflicting expectations of owners and lenders, also termed as "Capital Structure Puzzle" by Myers (1984). Capital structure decisions are vital and depend upon numerous factors. Several research studies have identified various

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capital structure determinants in different nations and sectors. However, most empirical studies have analyzed leverage determinants sporadically (Chakraborty, 2010; Chakraborty, 2013; Huang & Song, 2006; Pacheco & Tavares, 2017). Extant literature either implicitly ignores the relevance of industry-level factors in their model specification or explicitly ignores industry-fixed effects by using dummy variables, except in a few studies (Kayo & Kimura, 2011; Mukherjee & Mahakud, 2012; Nejad & Wasiuzzaman, 2013). One possible reason for this could be data limitations in the construction of industry-specific variables, especially in the case of developing countries.

Another central area for improvement in capital structure research studies across the globe is that most of these studies are based on secondary data. Therefore, the factors that go into capital structure decision-making are assumed to be manifested in firm-level characteristics. Thus, conclusions are drawn in general, such as firms with high tangibility or profitability may or may not have higher debt (Batra & Munjal, 2018; Kumar & Bindu, 2018). This assumption is because the top-level management makes the financing decisions in consultation with the board. Hence, primary data collection is not accessible for many firms. Therefore, the analysis based on secondary data helps in concluding corporate financing behavior. Given this, the present study attempts to analyze the maximum possible determinants for the maximum possible firms. To provide profound and valuable insights, this study is based on the population rather than generalizing results based on a sample. Our thorough research process, which includes the analysis of a large dataset, instills confidence in the robustness of our conclusions.

The present study, which employs the hierarchical linear modeling (HLM) technique, a robust statistical tool, to analyze the direct and indirect influences of firm and industry-level factors, underscores the significant role of industry factors in moderating the relationship between leverage and firm-level factors. The results demonstrate that a range of factors, including liquidity, distance from bankruptcy, foreign ownership, tangibility, profitability, firm's size, non-debt tax shield, free cash flows (FCFs), firm growth type, industry median leverage, industry median profitability, industry median tangibility, and industry munificence significantly affect leverage at a 5% significance level. Following the pecking order theory, most firm-level variables exhibit a negative relationship with firm leverage. However, given industry factors, this relationship can change to either becoming less negative or positive. By explicitly incorporating several industry variables, the study offers compelling evidence that industry leverage has a substantial indirect impact on capital structure decisions.

Literature Review

Different authors have used different proxies for leverage ratios. Welch (2011) propagated that the way capital structure is measured plays an important role and also pointed out that the book value measures of leverage are not indisputable for capital structure analysis and research. Taking current liabilities in the numerator will overstate the amount of leverage (Rajan & Zingales, 1995), so it is better to take either total or long-term debt in the numerator. Regarding the denominator of the leverage proxy, Rajan and Zingales (1995) argued that using debt and equity is preferable to total assets, as some assets may be allocated to specific liabilities, potentially reducing the leverage ratio.

Table 1. ***Summary of Leverage Determinants and their Definition and Relationship with Leverage Identified by Previous Studies***

Firm-level Capital Structure Determinants				
S. No.	**Variable**	**Definition**	**Few Studies with a Positive Relationship**	**Few Studies with a Negative Relationship**
1.	Liquidity of Current Assets	Current assets/ Current liabilities (Tan, 2021)	Sibilkov (2009)	de Jong et al. (2008); Myers & Rajan (1998)

2.	Firm's Age	The number of years since establishment	Yahaya & Tijjani (2024)	Talberg et al. (2008)
3.	Distance from Bankruptcy	Altman *Z* Score/Earnings volatility/Std dev of EBIT/Total Assets	Baker & Martin (2011)	Kayo & Kimura (2011)
4.	Government Ownership	Dummy variable indicating presence/absence	De Wenter & Malatesta (2001)	Borisova et al. (2015)
5.	Foreign Ownership		Huang et al. (2011)	Gupta et al. (2024)
6.	Group Affiliation		Jung et al. (2009)	Chakraborty (2013)
7.	Tangibility	Tangible assets/ Total assets	Chen et al. (2021); Cahyono & Chawla (2021)	Huang & Song (2006)
8.	Profitability	Net Income/Total Assets Cash Flow/Sales	Frank & Goyal (2003); Modigliani & Miller (1963)	Chakraborty (2010); Rajan & Zingales (1995); Singh & Bansal (2022)
9.	Firm's Size	Natural log of sales or total assets	Kandil et al. (2018); Rajan & Zingales (1995)	Bhat et al. (2023)
10.	Non-Debt Tax Shield	(Depreciation + Amortization)/Total Assets	Chakraborty (2010)	Gokmenoglu & Kaakeh (2020); Huang & Song (2006)
11	Growth Opportunities	The market value of assets/book value of assets	Chen (2004); Eldhose & Kumar (2019); Rajan & Zingales (1995)	Kayo & Kimura (2011)
12.	Market Structure	Tobin's *Q* (Rathinasamy et al., 2000)	Rathinasamy et al. (2000)	Chevalier (1995)
		Industry-level Capital Structure Determinants		
		Definition	**Studies with a Positive Relationship**	**Studies with a Negative Relationship**
1.	Industry Classification	Firms in a given industry have similar leverage ratios (Harris & Raviv, 1991). Industry effects help explain variations in capital structure across industries (Abor, 2007) due to differences in fund requirements (Harris & Raviv, 1991); Myers (1984).		
2.	Industry Concentration	Herfindahl-Hirschman Index (HHI)	MacKay & Phillips (2005)	Kayo & Kimura (2011); Nejad & Wasiuzzaman (2015) reported no impact.
3.	Industry Median Leverage	Median leverage of all firms in the industry	Frank & Goyal (2007); Hanousek & Shamshur (2011)	
4.	Dynamism	Degree of the unpredictability of any given industry (Dess & Beard, 1984)		Kayo & Kimura (2011); Simerly & Li (2000)
5.	Munificence	The capacity of the environment to sustain continued growth (Dess & Beard, 1984)	Findings of Kayo & Kimura (2011): Significant in emerging countries; insignificant in developed countries	

Many studies have analyzed capital structure determinants and proposed various factors that affect leverage decisions. These factors may be divided into firm, industry, and economy. Table 1 summarizes various leverage determinants, definitions, and relationships with leverage identified by previous studies.

Research Gaps, Objectives, and Formulation of Hypotheses

The detailed literature review identifies various capital structure determinants in different settings. A deeper analysis brings out three critical research gaps. First, most of these are sectoral and/or based on a handful of determinants, suggesting they need to be more comprehensive to draw meaningful conclusions. Second, studies on the indirect influences of industry and economic determinants on financing decisions are minimal in developing countries like India. This could be because of the difficulty in creating the industry-specific variables because of data limitations in the case of developing countries. Hence, the capital structure studies concerning developing countries either implicitly ignore the relevance of industry factors in their model specification or explicitly ignore industry fixed effects by using dummy variables. Third, limited studies that have explicitly employed and studied the role of industry factors show that they affect financing decisions but do not demonstrate exactly how their indirect influences affect firm financing decisions.

Hence, to overcome the first research gap, we undertake a comprehensive study on determinants of capital structure, which considers all major industries of India and incorporates as many determinants as possible that past research studies have identified. This is because of two reasons. It helps avoid sampling bias and shows how the impact of a given independent variable changes in the presence of other variables. Hence, a model that integrates all probable explanatory variables would better portray a realistic situation rather than a model with only a few regressors. To fulfill the second research gap, we collect all possible data, construct industry factors for developing countries like India, and explicitly analyze their role in financing decisions. To overcome the third research gap, in the present study, we show how the presence or absence of a given industry factor may maximize, minimize, or even reverse the impact of a given firm-level variable on financing decisions. We show this for all industry factors under study.

This study aims to (a) assess whether leverage decisions of firms in emerging markets like India are influenced by internal (firm-level) or external (industry) factors and (b) explore how industry factors modify the impact of firm factors on financing decisions. These objectives lead to the following research questions:

- Which firm-level leverage determinants are significant and directly explain variation in the capital structure?
- Which industry-level capital structure determinants directly and/or indirectly affect financing decisions?
- Does the direction of firm-level factors' impact on capital structure remain the same in the presence of industry-level determinants?

The first research question pertains to identifying significant firm-level capital structure determinants and the direction of their direct impact on capital structure. A large number of capital structure determinants have been identified in previous studies, and this study incorporates a large number of firm-level factors. Hence, we build a common hypothesis for all those firm-level factors. Therefore, our first hypothesis concerning firm-level variables is:

- **Ha1 :** Several firm-level variables have a significant and direct influence on leverage.

The second research question concerns the recognition of noteworthy industry-level leverage determinants and the direction of their direct and indirect effect on financing decisions. Due to multiple industry factors in the present study, we again develop a common hypothesis for all industry-level determinants. Hence, we build our second hypothesis as follows:

- **Ha2 :** A few industry-level variables have either a significant direct and/or indirect impact on financing decisions.

The third research question pertains to the role of industry determinants in modifying the direction of the direct impact that firm factors have on leverage. Industry factors are higher-order factors and may have stronger influences on firm factors. In rare situations, when the firm represents the industry itself, the impact of industry factors may become less critical. Hence, depending upon the given firm's characteristics and industry variables, one may witness a change in the direction of impact on leverage. The present study is based on a large number of firm and industry-level factors, so we again build a common hypothesis as follows:

↳ **Ha3 :** Industry-level factors can modify the direction of direct impact that firm factors have on capital structure decisions.

Data, Sample Firms, and Research Method

Data

The present study is based on firm and industry annual data from 1992 to 2023 collected from the Prowess database. Due to data requirements, sales data were collected from 1987 onwards. Thus, we examine firms' leverage levels for 31 years.

Sample Firms

We use financial data of all non-financial BSE-listed firms from 1992 to 2023. In 2023, there were 3,620 non-financial and non-utility BSE-listed firms. However, consistent data from 2,314 firms, leading to 35,510 firm-year observations, was available for analysis. These firms were divided into 17 industries based on CMIE Prowess's industry classification. The lowest contributing industries are the consumer durables, hospitality, and transport industries, while the highest are the construction, trading, and textile industries.

Method

Selection of Variables

Data were collected for almost all capital structure determinants identified in past literature; however, the model could only include those variables for which continuous data was available for the sample period.

Definition of Variables

Market leverage is preferred in empirical research as it represents intrinsic value and is goal-oriented and forward-looking (Morellec & Zhdanov, 2008). Hence, we employ market leverage to estimate capital structure (De & Banerjee, 2017; Singh et al., 2024). Table 2 lists the variables employed along with other details.

Table 2. ***Details of Variables Used in the Present Study***

S. No.	Variable Name	Definition	Reference	Code Used
1	Market Leverage	Total Debt/(Total Debt + Market Value of Equity)	Kieschnick & Moussawi (2018)	*MKT_LEV1*
2	Industry Median Leverage	Median leverage of all firms in a given industry	Frank & Goyal (2009); Hanousek & Shamshur (2011)	*I_LEV*

3	Industry Tangibility	The median tangibility of all firms in a given industry	Braun & Larrain (2005)	*I_TANG*
4	Industry Profitability	Median profitability of all firms in a given industry	Ahsan et al. (2016)	*I_PROF*
5	Industry Liquidity	Median liquidity of all firms in a given industry	Boah & Ujah (2024)	*I_LIQ*
6	Industry Market Concentration	HH index	Kayo & Kimura (2011)	*I_MC*
7	Industry Munificence	Regress time against sales of industry over the last five years and then divide regression slope coefficient by average sales	Boyd (1995)	*MUNIF*
8	Industry Dynamism	Standard error of munificence regression slope coefficient/ average sales	Kayo & Kimura (2011)	*DYNAM*
9	Firm's Short-term Asset Liquidity	Current ratio	Al-Najjar & Taylor (2008)	*F_ASSET_LIQ*
10	Firm Age	2023–Year of incorporation	Pfaffermayr et al. (2013)	*F_AGE*
11	Distance from Bankruptcy	Altman *Z* score	Kayo & Kimura (2011)	*F_ZSCORE*
12	Government Ownership	1 in presence, 0 in absence	Fraser et al. (2006)	*F_GOVT*
13	Foreign Ownership	1 in presence, 0 in absence	Li et al. (2009)	*F_FO*
14	Group Affiliation	1 in presence, 0 in absence	Chakraborty (2013)	*F_GA*
15	Firm Tangibility	Net Fixed Assets/Total Assets	Chakraborty (2010)	*F_TANG*
16	Firm Profitability	Profit After Tax/Total Assets	Igbinosa (2015)	*F_PROF*
17	Firm's Size	Natural Log of Total Assets	Salim & Yadav (2012)	*F_SIZE*
18	Firm Non-Debt Tax Shield	(Depreciation + Amortization)/ Total Assets	Chakraborty (2010)	*F_NDTS*
19	Market Structure	Tobin's *Q*	Pandey (2004)	*F_MS*
20	Firm Free Cash Flow	(Net operating cash flow – Capex)	Doorasamy (2016)	*F_FCF*
21	Firm High Growth Type	One if a firm is a high growth type, otherwise 0	Wu & Yeung (2012)	*F_HGT*
22	Firm Low Growth Type	1 if a firm is low growth type, otherwise 0	Wu & Yeung (2012)	*F_LGT*

Research Method

Kayo and Kimura (2011) examined the three-tier leverage determinants using HLM based on the maximum likelihood estimation (MLE) procedure. Multi-level regression recognizes the impact of an individual's behavior in the presence of group membership and also the impact of differences across groups on the dependent variable. The three-level framework of capital structure determinants involves nesting these determinants at three hierarchical levels: firm-level, industry-level, and economy-level. As the present study analyzes all firms listed in India (only one country), country-level factors would change over time and remain the same for all firms and industries. Thus, time represents the first level, firm represents the second level, and industry represents the third level factors in our HLM model. The characteristics of the lower levels are assumed to be influenced by the characteristics of the higher levels. Time dummy variables have represented the time-period variables. This study analyzes the direct effects of time, firm, and industry factors and the indirect impact of industry-level variables.

By applying mixed-effect modeling to the capital structure determinants, we assume that observations belonging to a given firm are correlated across time. This leads to solid correlations within the cluster. Firms in a given industry are assumed to follow a similar financing pattern. However, this financing pattern varies across sectors.

Steps in Hierarchical Linear Modeling

HLM begins with the empty model, wherein the intercept term is the only determinant of the regressand, and the intercept varies due to group membership. This model shows the relevance of multilevel regression and further states the intraclass correlations (ICC1 and ICC2). The ICC1 shows the percentage of explained variance due to group membership (Bliese, 2022), while the ICC2 measures the reliability of the group mean. The second step is to develop a random intercept model in which variables of each level are sequentially added from the lower level onwards. The third step is to examine the random intercept and random slope variance. All three models were developed and analyzed. However, due to the paucity of space, only the final equation and output of the model with the random intercept and random slope have been presented here.

Econometric Model – Random Intercept and Random Slope Model

To analyze the influence of firm variables in the presence of industry-level factors on corporate leverages, we assume that along with the intercept, the slope of firm variables is also random and is impacted by industry-level factors. This process makes the random intercept and slope model a complex hierarchical one. However, it helps to analyze how the interaction between firm and industry factors affects corporate leverage. This happens because industry factors influence firm factors, affecting firm leverage levels. However, not all firm-level variables that determine capital structure are directly affected by industry-level variables employed in the present study. So, interactions that logically hold have been tested, and only the ones found to be significant have been reported. For instance, industry dynamism is hypothesized to influence asset liquidity significantly. This instability may have a positive impact on a firm's liquidity. Thus, we assess the influence of industry dynamism on liquidity and its overall impact on firm leverage. We hypothesize that although industry dynamism (DYNAM) and firm liquidity (F_ASSET_LIQ) individually negatively affect leverage when dynamism is high, liquid firms prefer more leverage due to high debt service capacity. In another case, median industry profitability and firm liquidity individually have a significant negative impact on leverage. When median industry profitability is high, it is likely that firms too enjoy more profitability and liquidity. So, we hypothesize that when median industry profitability is high, it, in turn, increases the liquidity, and the impact of firms' liquidity (belonging to high median industry profitability) on firm leverage remains significantly negative. While running the HLM model, the computer software STATA identifies the significant industry variable and firm variable combinations in the background and shows the net impact of their interactions on financial leverage.

$$LEV_{ijk} = \delta_{000} + \sum_{i=1 \text{ to } 26} (\sigma_{ioo} * Year_{i00}) + \gamma_{10k} (F_ASSET_LIQ_{ijk}) + \beta_{2jk} (F_AGE_{ijk}) + \gamma_{30k} (F_ZSCORE_{ijk}) + \beta_{4jk} (F_GOVT_{ijk}) + \beta_{5jk} (F_FO_{ijk}) + \beta_{6jk} (F_GA_{ijk}) + \gamma_{70k} (F_TANG_{jk}) + \gamma_{80k} (F_PROF_{ijk}) + \beta_{9jk} (F_SIZE_{ijk}) + \beta_{10jk} (F_NDTS_{ijk}) + \gamma_{110k} (F_MS_{ijk}) + \gamma_{120k} (F_FCF_{ijk}) + \beta_{13jk} (F_HGT_{ijk}) + \beta_{14jk} (FLGT_{ijk}) + \gamma_{01k} (I_LEV_{00k}) + \gamma_{02k} (I_TANG_{00k}) + \gamma_{03k} (I_PROF_{00k}) + \gamma_{04k} (I_LIQ_{00k}) + \gamma_{05k} (I_MC_{00k}) + \gamma_{06k} (MUNIF_{00k}) + \gamma_{07k} (DYNAM_{00k}) + \gamma_{11k} (I_LIQ_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{12k} (I_LEV_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{13k} (MUNIF_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{14k} (DYNAM_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{15k} (I_PROF_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{16k} (I_TANG_{00k} * F_ASSET_LIQ_{ijk}) + \gamma_{31k} (I_LEV_{00k} * F_ZSCORE_{ijk}) + \gamma_{32k} (I_LIQ_{00k} * F_ZSCORE_{ijk}) + \gamma_{33k} (I_MC_{00k} * F_ZSCORE_{ijk}) + \gamma_{71k} (I_LEV_{00k} * F_TANG_{ijk}) + \gamma_{81k} (I_TANG_{00k} * F_PROF_{ijk}) + \gamma_{82k} (I_PROF_{00k} * F_PROF_{ijk}) + \gamma_{83k} (MUNIF_{00k} * F_PROF_{ijk}) + \gamma_{84k} (I_LIQ_{00k} * F_PROF_{ijk}) + \gamma_{111k} (I_TANG_{00k} * F_MS_{ijk}) + \gamma_{112k} (I_PROF_{00k} * F_MS_{ijk}) + \gamma_{113k} (MUNIF_{00k} * F_MS_{ijk}) + \gamma_{121k} (I_PROF_{00k} * F_FCF_{ijk}) + u_{00k}$$

$$+ e_{ijk} + r_{0jk} + r_{1jk}(F_ASSET_LIQ_{ijk}) + r_{3jk}(F_ZSCORE_{ijk}) + r_{7jk}\ (F_TANG_{ijk}) + r_{8jk}\ (F_PROF_{ijk}) + r_{11jk}(F_MS_{ijk}) + r_{12jk}\ (F_FCF_{ijk}) \quad (1)$$

Thus, Equation (1) represents the combined mixed-effects model, which includes hierarchical variables at the time, firm, and industry levels.

Data Analysis, Results, and Hypotheses Testing

Data Analysis

The study is based on 35,510 firm-year observations, which compel one to assume linearity and normality in the data set. Further, all 21 variables employed in the study have variance inflation factors (VIFs) less than 3, indicating the absence of multicollinearity. However, heteroskedasticity and autocorrelation-corrected standard errors were used to address the problem of heteroskedasticity and serial correlation.

Results

The first step in the HLM model is to estimate the null model and intraclass correlations, ICC1 and ICC2. ICC1 is 0.649, which indicates that 64.9% of the variance in leverage can be explained through group membership. The ICC2 is 0.965, indicating that industry groups significantly differ in average leverage.

To assess the indirect influences of industry variables, we develop a random slope model known as Equation (1). Besides incorporating time dummies, firm, and industry variables, this model also considers the interaction effects. The model fit measures indicate that interactions are essential in explaining variance in capital structure. Table 3 exhibits the results of the random slope model. It is evident that the inclusion of interactions does not drastically affect the direction and significance level of the direct influence of firm and industry factors on leverage decisions; instead, they demonstrate supplementary significant relationships. As mentioned previously, we chose to report only statistically significant interactions.

Table 3. ***Random Slope Model***

	Value	Std. Error	*p*-value
(Intercept)	0.576276	0.0404396	0**
Year Fixed Effects		Yes	
F_ASSET_LIQ	–0.0011183	0.00021904	0**
F_AGE	–0.000747	0.0004669	0.1094
F_ZSCORE	–0.015209	0.0026504	0**
F_GOVT	–0.039258	0.0551868	0.4769
F_FO	–0.1053586	0.0400618	0.0086**
F_GA	–0.014237	0.0153727	0.3545
F_TANG	–0.141234	0.0204724	0**
F_PROF	–0.100461	0.0205482	0**
F_SIZE	–0.026358	0.0042006	0**
F_NDTS	0.3645561	0.1291934	0.0048**
F_MS	0.0008827	0.00142302	0.5351

F_FCF	0.0000003	0.00000043	0.045*
F_HGT	–0.0884637	0.00517237	0**
FLGT	0.087606	0.0042772	0**
I_LEV	0.000438	0.0000515	0**
I_TANG	0.622538	0.1053092	0**
I_PROF	–1.2223109	0.10772585	0**
I_LIQ	–0.022767	0.01102619	0.1789
I_MC	0.189858	0.1206244	0.1155
MUNIF	–0.0585163	0.0193216	0.0025**
DYNAM	–0.1053921	0.06385396	0.1188
Interaction Variables			
I_LEV X F_ASSET_LIQ	0.000038	0.00000096	0.0001**
I_LEV X F_ZSCORE	–0.000077	0.0000082	0**
I_LEV X F_TANG	–0.000147	0.0000614	0.0169*
I_TANG X F_ASSET_LIQ	–0.001697	0.000842	0.0439*
I_TANG X F_PROF	0.226648	0.0768708	0.0032**
I_TANG X F_MS	0.0357465	0.0052343	0**
I_PROF X F_ASSET_LIQ	–0.019992	0.006784	0.0032**
I_PROF X F_PROF	3.857535	0.504418	0**
I_PROF X F_MS	0.269714	0.035779	0**
I_PROF X F_FCF	0.000017	0.000009	0.0648
MUNIF X F_ASSET_LIQ	–0.0025294	0.00128766	0.0495*
MUNIF X F_PROF	0.9533897	0.13078546	0**
MUNIF X F_MS	0.0290391	0.0081593	0.0004**
I_MC X F_ZSCORE	0.432353	0.296818	0.082
I_LIQ X F_ASSET_LIQ	–0.0010996	0.00051323	0.0322*
I_LIQ X F_ZSCORE	0.0540865	0.00773136	0**
I_LIQ X F_PROF	–0.2079686	0.05981372	0.0005**
DYNAM X F_ASSET_LIQ	0.058	0.031	0.045*
AIC		–17026.72	
BIC		–15844.96	
LOG-LIKELIHOOD		8653.36	

Note. ** means significant at 1%, and * means significant at 5%.

Discussion

Direct Influences

We highlight the direct influence of each firm and industry variable on leverage. The first one is liquidity. Following the pecking order theory and several research studies (Sheikh & Wang, 2012), we found a negative impact of liquidity on leverage. The greater the liquid assets on a company's balance sheet, the greater the chances that shareholders will use the assets to their advantage, which could be at the cost of debtholders (Prowse, 1990).

Also, liquid firms accumulate finances to finance future opportunities. The second is the distance from bankruptcy. The results show a negative impact in accordance with the pecking order theory. This is because firms with high *Z* scores are expected to be more profitable, reducing the need for debt. However, at the same time, such firms have stable earnings and accumulated debt-taking capacity.

The third one is foreign ownership. The results show the negative influence of foreign ownership on leverage, signifying that foreign institutional equity investors in India do not require debt to discipline and control managerial self-interest and utilize their financing channels to meet fund requirements (Do et al., 2020; Gupta et al., 2024). The fourth is asset tangibility. The results show a negative impact of tangibility on the capital structure (Bas et al., 2009). BSE-listed companies prefer not to finance their tangible assets through long-term debt. This could be due to various possible reasons. One, firms that can obtain long-term debt against collateral assets may have equal or greater competence to issue equity shares and raise funds. Second, a firm's leverage is only relative to its net fixed assets. Third, the specific nature of a fixed asset may reduce its collateral value. Fourth, the importance of financial discipline (debt brings) is reduced for firms with high tangibility, suggesting a negative relationship between debt and tangibility (Titman & Wessels, 1988). Fifth, firms with high tangibility face lesser information asymmetries, lowering the cost of equity and making equity preferable to debt (Frank & Goyal, 2008). Sixth, the results pertain to India, where the equity market is much more developed than the debt markets (Demirguc-Kunt & Maksimovic, 1994).

The fifth one is profitability. The results exhibit a negative impact of profitability on capital structure. This could be because profitable firms have low debt requirements due to their large sizes /or more significant reserves and low information asymmetries. The sixth one is the firm's size. The results show a negative influence of a firm's size on debt (as suggested by the pecking order theory) as large firms face lesser information asymmetries (Rajan & Zingales, 1995). However, firm size could positively affect leverage because large firms are usually diversified (Ferri & Jones, 1979), which reduces their probability of going bankrupt (confirming the trade-off theory).

The seventh one is NDTS. The results demonstrate that NDTS positively affects leverage, indicating that NDTS and tax shields are not perfect substitutes and that a firm requires both NDTS and interest payments to reduce the tax burden. This is in line with the findings of a few studies (Delcoure, 2007) and contradictory to others (Deesomsak et al., 2004). However, firms with sufficient net fixed assets will charge sufficient depreciation, reducing the need for a non-debt tax shield. However, NDTS also comprises amortization, investment tax credits, and depreciation. Therefore, the relationship between NDTS and leverage cannot be inferred from the relationship between tangibility and leverage. The eighth one is FCF. The present study's results demonstrate that FCF positively affects leverage. This suggests that most of our sample firms use leverage to eradicate the problem of FCFs, bring financial discipline, and avoid the problem of overinvestment. Hence, a firm's financing mix helps overcome agency problems. Therefore, despite having FCFs and internally generated funds, our sample firms prefer debt as a mode of financing.

The ninth one is the firm's growth type. We split the firms into three groups, high, mixed, and low growth types, based on tangibility and type of information asymmetry. High-growth firms have lower tangibility and growth-related information asymmetry, and vice-versa (Wu & Yeung, 2012). As evident in Table 3, high-growth firms share a negative relationship with leverage, in confirmation with the pecking order theory (Myers, 1984). High-growth firms usually have high bankruptcy risk, and as per trade-off theory, such firms do not prefer loans (Harris & Raviv, 1991; Myers, 1984). Also, in line with agency theory, debt and firm growth share a negative relationship. One possible reason could be that high-growth firms do not keep idle cash balances and prefer investing, so they do not require debt for their disciplinary role (Jensen, 1986). Second, high-growth firms do not prefer debt as their revenues may not be regular/predictable, reducing their debt service capacity. Third, the risky investments of high-growth firms may result in an enhanced interest rate on loans (Udomsirikul et al., 2011). Thus, high-growth firms in India prefer equity issues over debt for multiple reasons. It is worth observing that a

few firm-level capital structure determinants, such as firm age, government ownership, group affiliation, and market structure, were found to have an insignificant direct impact on financial leverage.

The first industry-level determinant is industry leverage, which is also one of the vital determinants as per empirical research (Frank & Goyal, 2008). The results show a positive impact of industry leverage on firm leverage (Frank & Goyal, 2009; Welch, 2004). The reason could be that firms in a given industry are exposed to similar risks, comparable asset components, and even analogous government rulings. These factors predispose firms to follow capital structure practices their peer firms adopt. In specific industries, the median industry leverage is also considered a benchmark or target capital structure by the top management (Graham & Harvey, 2001). The second is the industry tangibility; the output shows that it positively affects the debt levels. Tangibility must positively impact leverage, as not all firms in the high median tangible industry are old and capital-rich. Thus, others will either buy using borrowed funds or take them on lease. The greater the median industry tangibility, the greater the debt requirements for new entrants or old firms that are incapable of issuing equity or have retained earnings.

The third one is median industry profitability. The results show the negative impact of firm and industry profitability on leverage. Extending firm-level capital structure theories to the industry level exhibits that the relationship between industry median profitability and leverage aligns with the pecking order theory. The fourth one is industry munificence. Firms operating in munificent industries usually witness lower competition and higher profitability. The results show a negative impact of munificence on leverage (Kayo & Kimura, 2011), which aligns with the pecking order hypothesis. It must be observed that factors such as industry liquidity, industry concentration, and dynamism are found to have an insignificant direct influence on capital structure.

Indirect Influences

First, the results show significant interactions of industry median leverage with firm liquidity, distance from bankruptcy, and tangibility. The direct impact of liquidity and Altman *Z* score on debt is negative; however, the interaction results exhibit that when industry median leverage is high, liquid firms and financially healthy firms prefer debt to meet the industry standards. The direct effect of tangibility on debt is negative; however, because of high median industry leverage, debt preference has become less negative.

Further, the results show significant interactions of industry median tangibility with firm liquidity, profitability, and market structure. The results show a significant negative impact of liquidity on the capital structure because of the high agency cost. The interaction effects show that the impact remains significantly negative because liquidity does not necessarily signify profitability. So, liquid firms may take tangible assets on lease instead of purchasing them using debt. Further, the direct influence of profitability on debt is negative; however, when a firm is profitable and belongs to an industry that requires more tangible assets, it will prefer debt in the form of secured loans as they are cheaper and provide the advantage of tax deductibility. Further, when firms with high market valuations belong to an industry with high tangibility, they prefer debt in the form of secured loans as they are cheaper and provide the advantage of tax deductibility. Also, debt helps raise EPS and does not dilute the control of equity shareholders.

The results further exhibit significant interactions of industry median profitability with firm liquidity, profitability, market structure, and FCFs. The output exhibits a significant negative influence of liquidity and industry median profitability on debt levels. The results further show that when a liquid firm belongs to an industry with high median profitability, the demand for debt reduces further. One possible reason is the greater liquidity increases the agency's cost of debt; such firms accumulate liquidity to finance their future opportunities. This confirms the pecking order theory and a few research studies (Sheikh & Wang, 2012). When firms are highly liquid, the need for both short-term and long-term debt reduces (Sheikh & Wang, 2012). Thus, with increased

industry median profitability and firm liquidity, the probability that shareholders will use the assets to their advantage increases (Prowse, 1990). Further, firm profitability has a direct negative impact on leverage. However, in high industry median profitability, firm profitability is also found to affect leverage positively. As we advance, the market structure does not have a direct impact on leverage. However, it positively affects leverage in industries with high mean profitability. This could be because when a firm belongs to a profitable industry and its market valuation of the firm is high, it further enhances the expectation of equity shareholders. Management prefers to issue debt due to its low cost and interest tax deductibility, which, in turn, helps raise EPS. Additionally, firms with FCF prefer loans to avoid the misutilization of cash. When a firm belongs to a profitable industry, it becomes even more essential to manage FCF better, and therefore, as evident in the results, preference for debt has increased.

The results further show significant interactions between industry munificence with firm liquidity, profitability, and market structure. Highly liquid firms in munificent industries have augmented capabilities to accumulate liquidity for financing future opportunities. Additionally, the negative impact of profitability on debt changes to positive in a munificent environment. This could be because debt does not pose a burden when a firm works in a munificent environment; instead, it helps raise the EPS. Furthermore, the insignificant impact of market structure on debt changes to positive when firms belong to munificent industries. This could be because a firm in a munificent environment meets the shareholder's expectations by availing advantages of debt issues such as low cost, tax deductibility, retention of control, and trading on equity.

The study now analyzes the indirect influence of industry market concentration. The results show significant interactions of industry concentration with the Altman *Z*-score, which has a significant direct negative influence on debt. However, in the presence of industry concentration, its effect becomes positive and significant at 10%. This could be because when firms become market leaders, they utilize their debt capacity by taking cheaper loans and maximizing the wealth of their stakeholders. Hence, financially healthy firms and market leaders meet their funding needs by raising debt. These findings have practical implications for firms, highlighting the potential for market leaders to use debt strategically to maximize wealth.

The study now explores the indirect influence of industry median liquidity. The results exhibit significant interactions of median industry liquidity with three firm-level factors: liquidity, distance from bankruptcy, and profitability. Concerning firm liquidity, the output demonstrates that liquid firms belonging to the industry with high median liquidity will not prefer debt to finance their fund requirements. This is because when firms are highly liquid, the need for short, as well as long-term leverage reduces (Sheikh & Wang, 2012) as greater liquidity increases the agency cost of debt. This is even more applicable in the case of liquid firms belonging to industries with high median liquidity. Concerning distance from bankruptcy, the study shows that financially healthy firms belonging to the industry with high median liquidity will prefer debt to finance their fund requirements. This is because, besides being financially healthy, it is equally important to match the inflow and outflow of cash. In the context of firm profitability, the results show negative influence as both liquid and profitable firms witness lower information asymmetries, greater reserves, and more significant agency costs.

The study finds the indirect positive influence of industry dynamism on firm liquidity and leverage. One possible reason why liquid firms in dynamic industries prefer more debt is that they have sufficient liquid assets.

Hypothesis Testing

The above discussion demonstrates several significant firm-level capital structure determinants such as firm liquidity, distance from bankruptcy, foreign ownership, firm tangibility, firm profitability, firm size, non-debt tax shield, FCF, and firm growth type. These variables directly affect leverage. Hence, we accept Ha1. The results also show that various significant industry-level leverage determinants, such as median industry leverage, industry tangibility, industry profitability, and munificence, play a critical part in framing leverage decisions. We also

demonstrate the indirect influence of factors like industry liquidity, dynamism, and market concentration on the capital structure of firms listed in India. Hence, Ha2 finds support. The discussion above clearly supports Ha3 by showing that the negative influence of liquidity on leverage turns positive in the presence of industry dynamism or when median industry leverage is high, similarly, how the effects of *Z*-score on leverage become positive when industry market concentration and median industry liquidity are high.

Conclusion and Implications

Capital structure decisions are long-term decisions for every organization and should be taken after considering internal factors (firm) and external factors (industry and economy). In this study, we analyze the direct impact of internal factors and direct and indirect influences of external factors (industry) in shaping corporate leverages. We identified a few firm and industry-level factors that have a significant direct impact on leverage, i.e., firm liquidity, distance from bankruptcy, foreign ownership, tangibility, profitability, size, non-debt tax shield, FCF, firm growth type, industry median leverage, industry median tangibility, industry median profitability, and industry munificence. We also show that a few industry factors do not directly influence leverage decisions but indirectly influence leverage decisions. Further, we show that the influence of firm-level determinants varies across industries. The results of the present study further demonstrate various instances where the direct impact of any given firm variable gets modified in light of industry-level factors. However, the direction of the company variable's impact on leverage can sometimes be opposite in the presence of industry factors. These research findings have led to achieving the research objectives by providing robust evidence that industry factors substantially indirectly impact capital structure decision-making, which may even modify the impact of firm-level factors on leverage decisions.

The present study helps researchers recognize that internal firm factors' role in determining capital structure is over-emphasized in the extant literature and that the relationship between capital structure and its determinants is not straightforward. Furthermore, the study helps corporations recognize that the same leverage determinants could behave differently when firms belong to different industries. So, the same rule of thumb about the method of financing does not apply to firms in various sectors.

Limitations of the Study and Directions for Future Research

This study has certain limitations. First, it relies solely on secondary data since a company's board makes capital structure decisions collectively. As a result, obtaining direct information from the board of directors of listed firms proved challenging. Second, the study is constrained by the lack of continuous data for several parameters, which necessitated either the exclusion of certain variables or a reduction in firm-year observations.

Future research may cover a few essential aspects. One is conducting a primary survey, which may help include qualitative variables to better understand firms' financing behavior. Second, handpick data for those quantitative variables in the study for which data is complex to extract from databases, such as employee treatment, credit rating, board size, director's remuneration, etc. However, this is possible at the cost of reducing the number of firms.

Authors' Contribution

Prof. (Dr.) Amit Kumar Singh conceptualized the study and designed the quantitative framework for the empirical research. Dr. Preeti Bansal gathered research papers from prestigious journals, filtered them based on relevant keywords, and conducted a comprehensive review. Prof. (Dr.) K. Latha subsequently validated the analytical

methods and oversaw the research process. Dr. Preeti Bansal collected data from the CMIE Prowess database and analyzed it using STATA 14 under the expert guidance of Prof. (Dr.) Amit Kumar Singh and Prof. (Dr.) K. Latha. Dr. Preeti Bansal wrote the manuscript in collaboration with Prof. (Dr.) Amit Kumar Singh and Prof. (Dr.) K. Latha.

Conflict of Interest

The authors declare no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

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