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Determinants of Capital Structure: An Empirical Study of Selected Nifty 50 Companies in India

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Abstract The paper evaluates the determinants of capital structure of India's Nifty 50 Non-Financial publicly listed companies and the effects of macroeconomic determinants after controlling for firm-specific determinants of leverage. The regression analysis was performed using pooled ordinary least squares method on the debt to equity ratio and debt ratio with respect to five firm-specific variables and four macroeconomic variables from a sample of 195 firm-year observations of 39 non-financial Nifty 50 firms over FY 2020-21 to FY 2024-25 (186 observations after dropping near-zero-equity observations). The leverage varies to a large extent with industry, the five-year averages of debt ratio varied between 7.7% for IT Services to 39.8% for infrastructure, industrials, and telecom industries. The firm characteristics account for up to one-third of the cross-sectional variation in leverage (adjusted $R^2 = 0.34$ in both models): profitability is the most influential negative determinant while tangibility, firm size, and liquidity are positively correlated whereas growth is insignificant. The macroeconomic determinants fail to explain any cross-sectional variation in leverage (adjusted $R^2 < 0$) despite an inverse correlation between average leverage and repo rate during five years. It can be seen that there is a presence of a pecking order and trade-off theory in addition to fundamental based financing strategy rather than macroeconomic based financing strategy. The research reveals that just one occurrence of zero equity could obscure the entire relationship. The explanatory power of the determinants is used to derive recommendations for corporate managers, investors and lenders, and policymakers.

1. Introduction

Financing the firm through either debt or equity can without a doubt be considered one of the most important decisions because it affects financial risk, cost of capital, and claims on cash flows from operations. In accordance with the Modigliani-Miller theory, the decision is irrelevant in an ideal world. Taking into consideration the issues related to taxes, bankruptcy cost, asymmetric information, and conflict of interest, a number of different theories appear and, in the last decades, empirical analysis could not give any definite conclusion about the matter (Myers, 1984; Frank & Goyal, 2009).

The reason for the importance of India in the context of the above research problem is that although the finance structure of the corporate sector in India remains dominated by the banking route, some of the larger corporates have the opportunity of financing through the corporate bond market route, stock market route, and internal funds. For India, the conventional study is that of Handoo and Sharma (2014) based on a sample of 870 listed companies for the period 2001-2010. However, the situation in the corporate sector in India has undergone dramatic changes since then. FY 2020-21 has seen negative growth at 5.8% and repo rate of 4%. The next year has seen a quick turnaround, higher than the tolerance band of the central bank in 2022-23 and repo rate increased to 6.5%.

This research attempts to study the capital structure of non-financial companies listed in the Nifty 50 Index for the fiscal year 2020-21 to 2024-25. Four research questions have been set up for this study.

(RQ1): What is the capital structure of the companies and what is its variation across industries and periods?

(RQ2): How does the company-specific factor affect the leverage of the company?

(RQ3): How do the macroeconomic/market factors affect the leverage of the company, controlling for company specific factors?

(RQ4): How much of the variation in leverage do the selected determinants explain, and what does this imply for the financing decisions of managers, investors and policymakers?

The contributions of the study are fourfold. First, it provides current results related to the large-cap sector of India, which has not been investigated yet by the previous studies using the large sample and the period of the pandemic shock to recovery and full tightening cycle. Second, it uses all models with the same sample, employing two measures of leverage

– debt-to-equity ratio (DER) and debt ratio (DR), in order to check whether the results will remain the same irrespective of the definition of leverage used. Third, it compares the fundamental characteristics of firms and the macroeconomic conditions in terms of their influence and relative importance, which has not been done much in India. Finally, it shows how the macroeconomic conditions can be correlated with the aggregate drift of leverage without having any correlation at the level of firms, and how one single observation of zero equity can obscure all firm-level correlations.

The paper is organized as follows. The literature review and hypothesis development are described in Section 2. Section 3 explains the data and methodology. Results are discussed in Section 4. Section 5 assesses the explanatory power of the determinants and sets out recommendations (Objective 4). Section 6 concludes with implications, limitations and directions for further research.

2. Literature review and hypotheses

2.1 Theoretical foundations

The static trade-off theory suggests that organizations strive to achieve a degree of leverage at which the marginal gains from the tax shield of debt equals to marginal costs of financial distress (Kraus & Litzenberger, 1973). Firms that are large and diversified, have a stable stream of cash flows and whose assets are collateralized are likely to face low distress costs and therefore they are expected to have high levels of debt. The Pecking Order theory is based on the concept of information asymmetry where the securities issued by informed managers are undervalued by external investors; firms initially finance their investments internally, then through debt and lastly equity (Myers, 1984; Myers & Majluf, 1984). Profitable and liquid firms will borrow less and retain any debt. Debt under agency theory constrains the managers of cash-rich firms since it commits the cash flows of the firm to the creditors (Jensen & Meckling, 1976; Jensen, 1986). But, according to structural approaches, the firm should have a positively bounded process of its earnings and, therefore, should have lower debt than recommended by classical theory and it can be called debt conservatism (Nishihara & Shibata, 2025), in addition, companies in investment grade use financial flexibility buffer and not the specific level of leverage (Manaev, 2026). One more important issue is the existence of non-debt financed firms (Strebulaev & Yang, 2013).

2.2 Firm-level determinants: evidence from the reviewed studies

The cross-country methodology represents the beginning of the investigation into the problem under analysis. Firstly, Titman and Wessels (1988) and Rajan and Zingales (1995) find that for US firms and G-7 firms leverage is positively related to firm size and tangibility and negatively related to profitability and market-to-book ratio, secondly, Booth et al. (2001) show that the same group of variables significantly influences the leverage in ten developing countries despite the differences in the weights of the variables because of institutions, and finally, Frank and Goyal (2009) show that the only group of the variables that could be used to predict the leverage level is median industry leverage, tangibility, profitability, firm size, market-to-book ratio and expected inflation. However, according to Graham and Leary (2011), these variables fail to explain most of leverage variability.

Profitability. The profitability and its substitutes are inversely correlated with leverage ratio. According to Serghiescu & Văidean (2014), among 20 firms conducting construction activities, listed at Bucharest Stock Exchange within 2009-2011, the profitability margin is one of the most important (inverse) predictors of capital structure along with inverse influence of liquidity. Czerwonka & Jaworski (2021) use the pooled, fixed, and random effects models for 250 small and medium-sized enterprises from six Central and Eastern European countries in the period of 2014-2017 and confirm the predictions of the pecking order theory. Serrasqueiro and Nunes (2008) find in Portugal that the profitability coefficient is negative under pooled OLS, fixed effects, random effects and dynamic GMM – the choice of estimator affects only the precision of the estimate. Abdalla (2025) find the same for 99 family-owned GCC firms over 2015–2023 using fixed effects and IV-2SLS, while Duguleană et al. (2024) reveal a negative, two-way relationship between ROA and leverage for 437 Romanian e-commerce firms using Granger causality and GMM.

Size and Tangibility. Size and tangibility should, according to the trade-off theory, demonstrate positive effects on the debt choice. For instance, according to the research carried out by Antoniou (2002), the effects of size are positive in France, Germany, and the UK from 1969 to 2000 due to the two-step system GMM; similarly, Bilgin and Dinc (2019) find positive effects of size and tangibility on debt decisions of 261 companies from the Turkish stock market; and Abdalla (2025) show that in the GCC countries both size and tangibility have positive effects. In the research of Rehan (2023), total assets and tangibility are identified as the most persistent variables for 551 firms from Malaysia from 2005

to 2016 due to multiple regression, ARDL and difference GMM. However, there are studies that identify negative effects of size and tangibility: Handoo and Sharma (2014) find negative effects of size on debt choices in many Indian firms, and Serghiescu and Vaidean (2014) find negative tangibility effect.

Liquidity and growth. There seems to be a contradiction in the effect of liquidity – highly liquid companies borrow less (pecking order), yet simultaneously, these companies have less risks when becoming creditors. A statistically significant negative correlation has been discovered (Serghiescu & Vaidean, 2014; Bilgin & Dinc, 2019), though, this correlation does not prove to be significant in Handoo and Sharma (2014) as well as in the fixed effects regression of GCC companies (Abdalla, 2025). The problem of growth is difficult to predict since growth causes high demand for financing while creating non-collateralized value. The growth rate had a positive effect on leverage in India (Handoo & Sharma, 2014), yet a negative effect in the GCC (Abdalla, 2025), whereas an insignificant effect in Portugal (Serrasqueiro & Nunes, 2008). Antoniou (2002) found that there exists a negative relationship between the market-to-book ratio and leverage. Anuar and Chin (2016) provide a five-factor model of the debt-to-equity ratio according to classical theory without empirical confirmation.

2.3 Macroeconomic conditions, cycles and shocks

The second research stream analyzes the effect of the environment and not the firm on leverage. The relationship between interest rates, stock prices, and leverage is an inverse one in three European countries over the time period of 15-30 years according to Antoniou (2002). Llobet Dalmases (2023) establish that in the U.S. (1963-2018) there are cyclical patterns of leverage which are partly synchronized with NBER recessions, thus, leverage exhibits both a permanent and a cyclical component. Voutsinas & Werner (2025) conduct a "horse race" analysis on 60,037 observations in Japan and conclude that in boom periods the pecking order prevails while in credit crunch periods the trade-off hypothesis holds. Grau-Vera (2025) state that the speed of adjustment toward the target leverage ratio for 110 Spanish companies (2007-2020) is about 30% annually and the rise in the aggregate risk aversion negatively affects the speed. External factors matter also, specifically, applying the staggered difference-in-differences approach to the sample of 27,889 firm-years from China, Cui & Zhang (2025) show that the creation of specialized bankruptcy courts narrows down the gap between target and current leverage ratios owing to the loosening of financial constraints, particularly for firms with high liquidity and capital intensity, Sheng & Shao (2026) find that shocks to the supplier climate increase the speed of adjustment through the organizational learning process, Bakkar (2026) shows that climate-exposed European banks have higher capital ratios and faster adjustment, and Gohdes (2025) finds that the project finance simulations of an Australian wind farm display a rapid increase in sustainable gearing with the proportion of revenue from power purchase agreements, which is consistent with the trade-off theory of debt.As per Duguleana (2024), the pandemic of COVID-19 has brought a change in the relationship between performance and leverage. Therefore, it is essential to examine the effect of macroeconomic determinants on a long-term basis or because of an institutional shock. There is no empirical evidence on the Indian market in this context.

2.4 Emerging determinants and the Indian gap

Further studies have contributed to the literature and provided additional determinants. As per Malik (2026), ESG disclosures lower the debt/equity ratio via lowering the cost of debt and thereby the usage of debt, especially in the pandemic era, using pooled OLS regression, system GMM estimation, and mediation analysis for NSE500 firms (2015-2022). Wu et al. (2025) claim in their study of 37,867 firm years in China that digital R&D lowers the gap from the target leverage via relaxing financing constraints and improving disclosure quality. Bilgin and Dinc (2019) view factoring as an off-balance sheet alternative to borrowing. On the other hand, Mensah (2025) reverse the cause and effect direction and argue that the debt/equity ratio negatively influences the product responsibility and corporate reputation of 163 firms listed in London Stock Exchange (2002-2023), with governance quality acting as a moderator. The below mentioned Table 1 is a summary of the 22 papers reviewed above. For the Indian scenario wherein the major works are by Bhaduri (2002) and Handoo & Sharma (2014), and for the studies that are pre-COVID-19 and contemporary monetary period, there are three gaps which stand out: (i) lack of literature on large cap stocks in COVID-19 tightening period, (ii) use of cross-sectional/mean data with single estimator, and (iii) macro financials ignored or used as control variables.

Table 1 Summary of the 22 studies reviewed

No.	Study	Context and sample	Method	Key finding relevant to this study
1	Handoo & Sharma (2014)	India; 870 NSE firms; 2001–10	OLS on 10-yr averages	Profitability −, size −, tangibility +, growth +; R^2 0.26–0.41
2	Malik et al. (2026)	India; NSE500 non-financials; 2015–22	Pooled OLS, system GMM, mediation	ESG disclosure lowers D/E via cost of debt; size +, ROA −
3	Serghiescu & Văidean (2014)	Romania; 20 construction firms; 2009–11	Pooled OLS vs FE	Profitability strongest (−); liquidity −; pecking order
4	Serrasqueiro & Nunes (2008)	Portugal; 39 listed firms; 1998–2004	OLS, FE, RE, GMM, LSDVC	Profitability − and size + under every estimator
5	Rehan et al. (2023)	Malaysia; 551 firms, 9 sectors; 2005–16	MRA, ARDL, static panel, GMM	Tangibility most persistent; dynamic trade-off
6	Abdalla et al. (2025)	GCC; 99 family firms; 2015–23	FE, IV-2SLS	ROA −, growth −; size +, tangibility +; interest rate −
7	Bilgin & Dinç (2019)	Turkey; 261 listed firms; 2012–17	Two-part fractional regression	Size, tangibility +; profitability −; inflation −
8	Duguleană et al. (2024)	Romania; 437 e-commerce firms; 2005–20	Granger, FE, GMM	Two-way negative ROA–leverage link; high persistence
9	Antoniou et al. (2002)	France, Germany, UK; 1969–2000	Two-step system GMM	Size +; term structure and share prices −
10	Grau-Vera et al. (2025)	Spain; 110 listed firms; 2007–20	Partial adjustment, system GMM	Risk aversion slows adjustment speed
11	Voutsinas & Werner (2025)	Japan; 60,037 obs.; 1980–2007	Horse-race panel tests	Theory fit depends on monetary regime
12	Llobet-Dalmases et al. (2023)	USA; Compustat; 1963–2018	Cycle dating, cash-flow OLS	Financing cycles weakly tied to recessions
13	Cui & Zhang (2025)	China; 27,889 obs.; 2010–22	Staggered DiD	Bankruptcy courts speed adjustment
14	Sheng & Shao (2026)	China; A-share firms; 2007–22	FE, IV-2SLS	Supplier climate shocks speed adjustment
15	Wu et al. (2025)	China; 37,867 obs.; 2008–23	FE, 2SLS, GMM, mediation	Digital R&D reduces leverage deviation
16	Bakkar (2026)	Europe; 4,606 banks; 2006–21	System GMM, DiD	Climate-exposed banks hold more capital
17	Mensah et al. (2025)	UK; 163 LSE firms; 2002–23	CCEMG, FE, GMM	Higher D/E harms responsibility and reputation
18	Gohdes (2025)	Australia; wind-farm project model	Financial simulation	Revenue volatility caps gearing (trade-off)
19	Nishihara & Shibata (2025)	Theoretical	Real-options structural model	Earnings floor can lower optimal leverage

No.	Study	Context and sample	Method	Key finding relevant to this study
20	Manaev (2026)	Theoretical; investment-grade firms	Closed-form model	Optimal flexibility buffer limits leverage
21	Anuar & Chin (2016)	Malaysia; micro-franchises	Conceptual model	Proposes five-determinant D/E framework
22	Czerwonka & Jaworski (2021)	CEE; SMEs, 6 countries; 2014–17	Pooled OLS, FE, RE	Firm factors dominate; pecking order

Note: + / − denote positive / negative significant relations with leverage; FE = fixed effects, RE = random effects, GMM = generalised method of moments, DiD = difference-in-differences.

2.5 Hypotheses

The signs of the theoretical variables (Table 2) can be derived based on the theory discussed above. Diversified firms will be large firms with minimal problems (H1, positive). Profitable firms will have more internal sources of finance (H2, negative). Tangible assets help in borrowing (H3, positive). Liquid firms will need less external finance (H4, negative). The growth variable will be theoretically ambiguous (H5). The signs of the macroeconomic variables in the model can also be derived. An increase in the repo rate will lead to an increase in the cost of borrowing (H8, negative), while the healthy equity market will encourage the firm to go for equity rather than debt (H9, negative). The signs of GDP and inflation will be theoretically ambiguous (H6 and H7, respectively).

3. Research methodology

3.1 Objectives

The main objectives of the study in relation to analysis shall include the following: (i) to analyze the characteristics of the capital structure of the selected Nifty 50 companies during the period under consideration; (ii) to evaluate the impact of the factors like size of the company, profitability, tangibility of the assets, liquidity, and growth opportunities on the level of leverage; (iii) to evaluate the impact of macroeconomic and financial market factors on the level of leverage; and (iv) to evaluate the power of explanation of the selected determinants.

3.2 Data and sample

The dataset used for regression analysis is that of Nifty 50 firms. The 11 banks and NBFCs have not been included in the regression due to the fact that leverage ratios of banks/NBFCs are structurally different from those of other non-financial firms due to the fact that banks are subject to deposit and capital adequacy ratio requirements. Thus, banks and NBFCs have been separately analyzed in descriptive statistics. As such, the number of observations included in the regression is 39 non-financial firms for the period of five years starting from 2020-21 to 2024-25. The dataset used is of secondary nature. Firm-level data have been collected from consolidated balance sheet of firms from annual report of firm available at Screener.in and StockAnalysis.com. Macroeconomic and market data have been collected from MOSPI (GDP), RBI (CPI Inflation, Repo Rate), FIMMDA/CCIL (Spread of AAA rated corporate bond over 10 year G-Secs) and NSE (Return of Nifty 50 in Financial Year).

The equity-denominator ratios can not be considered as valid when equity approaches zero. This is also applicable to InterGlobe Aviation as because of coronavirus, equity of this company fell in such a way that debt-to-equity ratio of this company is more than 25 for the fiscal year 2023-2024 and therefore, it is about 12 standard deviations away from the mean of the ratio in the sample. The observations for which equity tends to approach zero or even becomes negative are ruled out as leverage models are based on the same sample size of 186 observations per year per firm.

Table 2 Variables, measurement and hypothesised signs

Variable	Measurement	Hypothesis and theoretical basis	Expected sign
DER	Total borrowings / shareholders' equity (times)	Dependent variable	—
DR	Total borrowings / total assets (%)	Dependent variable	—
SIZE	Natural logarithm of total assets	H1: trade-off, diversification, lower distress risk	+
PROF	Return on assets (%)	H2: pecking order, internal funds preferred	–
TANG	Tangible assets / total assets (%)	H3: trade-off, collateral supports borrowing	+
LIQ	Current ratio (times)	H4: pecking order, liquid firms avoid external funds	–
GROWTH	Annual sales growth (%)	H5: financing need versus distress-risk arguments	+/–
GDP	Real GDP growth (%)	H6: business-cycle channel	+/–
CPI	CPI inflation (%)	H7: inflation channel	+/–
REPO	RBI repo rate (%)	H8: cost-of-debt channel	–
NIFTY	Nifty 50 financial-year return (%)	H9: equity market-timing channel	–
SPREAD	AAA corporate bond over 10-year G-sec spread (bps)	Cost-of-debt channel; dropped (collinear with REPO)	–

Note: Firm-level variables are computed from consolidated accounts. Each year's macroeconomic value is assigned to every firm-year observation of that year.

3.3 Empirical model

The pooled OLS regression equation that would be used to estimate the firm level model is as follows:

$$Leverage_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 PROF_{it} + \beta_3 TANG_{it} + \beta_4 LIQ_{it} + \beta_5 GROWTH_{it} + \varepsilon_{it}$$

In which Leverage would be DER or DR of firm *i* in period *t*. However, in the case of macroeconomic model, GDP, CPI, REPO and NIFTY would be substituted with firm level regressors. For pooled OLS estimation, there are three major reasons why this would be chosen method for estimation. The first reason is that because of having just five annual observations, firm fixed effect would incorporate most of the variance of the slowly changing variables such as size and tangibility. The second reason is that dynamic panel models like Arellano-Bond require extremely large panel data (see Serrasqueiro & Nunes, 2008). The third reason is that the same specification estimated on two leverage ratios would act as an internal consistency test.

Multicollinearity test will be carried out using Pearson correlation and Variance Inflation Factors (VIF), while outliers test will be carried out using Standardized Residuals. Since each of the macroeconomic variables have only five unique values – that is one for each year, the macroeconomic analysis is supplemented by the analysis of year average co-movement between average leverage and repo rate/credit spread using Pearson and Spearman correlation.

4. Results and discussion

4.1 Capital structure profile of Nifty 50 firms

It is clear that leverage is a sector-dependent variable, as can be seen from Table 3 and Figure 1 below. In a five-year time frame, the debt ratio varies between 7.7 per cent in IT services and 12.4 per cent in pharmaceuticals and healthcare,

17.6 per cent in autos, around 30 per cent in metals, cement, materials and energy and utilities, and 39.8 per cent in infrastructure, industrials and telecom. This implies that the asset-intensive sectors are four to five times more leveraged than IT services. The averages of around 22 per cent in all firms do not cover any of these sectors.

Table 3 Sector-wise leverage, FY 2020-21 to FY 2024-25

Sector	DER FY 2020-21	DER FY 2024-25	Avg. DR (%)	Direction of DER
IT services	0.116	0.116	7.7	Stable
Pharma & healthcare	0.293	0.293	12.4	Stable
FMCG & consumer	0.297	0.353	13.6	Increasing
Automobiles	0.909	0.516	17.6	Decreasing
Metals, cement & materials	1.073	1.013	29.5	Decreasing
Energy & utilities	0.976	0.771	30.1	Decreasing
Infra, industrials & telecom	1.332	2.169	39.8	Increasing
NBFCs (reported separately)	1.750	1.634	25.1	Decreasing

Note: DER = debt-to-equity ratio, DR = debt ratio. Average DR is the five-year sector average. NBFCs are shown for completeness and excluded from the regressions.

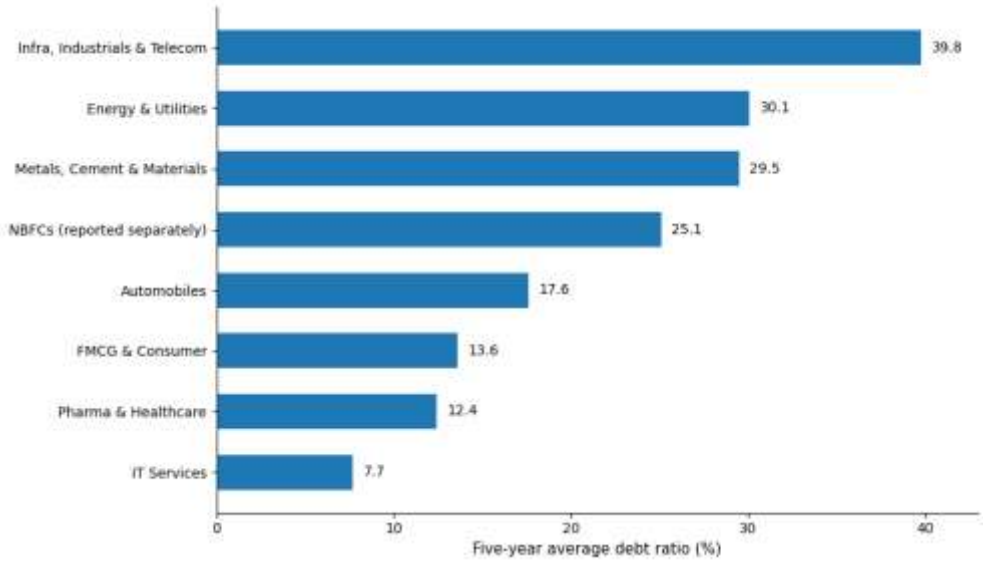


Fig. 1. Five-year average debt ratio by sector (non-financial sectors in dark, NBFCs shown for reference only).

In addition to this, there are three more features of the profile that have relevance to the subsequent discussion. The first is that the two measures of leverage are not necessarily consistent with each other. In particular, in case of infrastructure, industrials and telecom, the DER has increased from 1.332 to 2.169, while DR has decreased from 39.93 to 36.66 per cent. It is so because in this case, the equity grows faster than the debt and assets. For the six sectors where end-point debt ratios can be observed, the DRs decrease in all sectors: automobiles (18.62 to 16.94 per cent), energy & utilities (31.64 to 28.94), infrastructure (39.93 to 36.66), IT services (7.78 to 7.42), metals, cement & materials (34.40 to 31.12) and pharmaceuticals (14.93 to 14.28). Hence, one measure of leverage cannot fully capture the movement of the sector. Second, there is significant heterogeneity in each of the sectors. In one case, the DER of Eternal has increased from 0.752 to 1.787, while that of Hindalco has decreased from 1.672 to 1.359. Finally, the distribution is strongly positively skewed. For the 186-observation regression sample, the average DR is 20.1 per cent, while the median is 12 per cent.

4.2 Firm-level determinants of leverage

The Table 4 describes Descriptive Statistics and Correlations. Non-financial Nifty 50 companies have low debt ratios, where the mean Debt Ratio is 20.11% and Debt-Equity ratio is 0.631. The standard deviation of the Debt Ratio is 17.99%, which is almost equal to the mean value and thus sufficient variation is present in the cross-section of the model. The correlation is in agreement with the theory except for the growth. The variable with the highest correlation is profitability, which is correlated with the Debt Ratio at $r = -0.459$ level. This is followed by Size (+0.386) and Tangibility (+0.354). The Liquidity and Growth have negative correlation and no correlation respectively with the Leverage. All the pairs of variables have absolute values of the correlations less than 0.30. VIFs vary between 1.04 and 1.16. The two leverage variables are strongly correlated with each other at 0.907 level.

Table 4 Descriptive statistics and correlations with leverage (n = 186)

Variable	Mean	Std. deviation	Correlation with DR	Correlation with DER
DER (times)	0.631	0.741	—	—
DR (%)	20.11	17.99	—	—
SIZE (ln total assets)	11.40	1.27	+0.386***	+0.433***
PROF (ROA, %)	13.49	9.07	−0.459***	−0.450***
TANG (%)	37.63	19.53	+0.354***	+0.253***
LIQ (current ratio)	2.06	1.93	−0.247***	−0.273***
GROWTH (%)	15.87	20.18	+0.060	+0.051

Note: *** $p < .001$. The correlation between DR and DER is 0.907 ($p < .001$).

Table 5 offers data on the regression analysis results. In general, both regressions are statistically significant ($F(5, 180) = 20.19$ and 20.11, $p < .001$) and explain roughly the same amount of variance (adj $R^2 = 0.342$ and 0.341 for DR and DER, respectively) that can be compared to 0.26-0.41 obtained by Handoo and Sharma (2014) based on a much larger Indian sample. The maximum value of the standardized residual is approximately 3.3 for both variables.

Table 5 OLS regression results: firm-level determinants (n = 186)

Predictor	DR: B	t	p	Std. β	DER: B	t	p	Std. β
Constant	−21.683	−1.837	.068	—	−1.201	−2.458	.015	—
SIZE	+3.904	4.286	<.001	+.276	+0.190	5.028	<.001	+.324
PROF	−0.647	−5.112	<.001	−.327	−0.028	−5.310	<.001	−.340
TANG	+0.183	3.119	.002	+.199	+0.003	1.246	.214	+.080
LIQ	−1.012	−1.727	.086	−.109	−0.057	−2.352	.020	−.149
GROWTH	+0.077	1.414	.159	+.086	+0.003	1.392	.166	+.085
R^2 / Adj. R^2	.359 / .342				.358 / .341			
F (5, 180)	20.19		<.001		20.11		<.001	

Note: B = unstandardised coefficient, Std. β = standardised coefficient. Pooled OLS estimated in SPSS on the common sample.

Profitability is still the key driver. Profitability is the variable having the highest value of standardized coefficient amongst all other factors (−.327 for DR, −.340 for DER). An increase in ROA by 1% causes a decline in the value of

debt ratio by 0.65%. From the above discussion, it becomes evident that profit making firms in Nifty 50 use internal sources of finance; therefore, pecking order theory holds true.

Both coefficients are positive and statistically significant ($p < .001$); the increase in one unit of the logarithm of total assets brings about an increase in the debt ratio by 3.9 percentage points. In such a way, this finding supports the trade-off theory as bigger and more diversified companies have low distress costs and a good relationship with the banks and bond market. Tangibility coefficient is also statistically significant ($B = 0.183$, $p = .002$) and, hence, verifies the collateral theory; however, the coefficient of DER is positive, but statistically insignificant. This is not surprising as tangibility is relative to the total assets, like DR, rather than equity, like in the case of DER. The liquidity reduces the leverage statistically significantly ($p = .020$) in the DER model and statistically insignificantly at the level of 10 percent ($p = .086$) in the DR model. Highly liquid companies do not need any loans, and, hence, this result supports the pecking order theory. Growth is statistically insignificant ($p \approx .16$).There are two possible explanations for this finding. First, the firms in the sample have had sales grow by an average of 16 percent and earn high profits. Second, sales growth per year is an inefficient measure of growth prospects since market-to-book ratios are efficient measures of growth prospects.

In addition, the sample may provide some indication regarding the methodology, especially concerning the application of the close to zero value of the equity in the DE regression analysis, where one of the values was 12 times the distance from the average, $R^2 = 0.06$, and none of the coefficients were statistically significant. It is the removal of this value that prevented us from obtaining the correlations in Table 5.

4.3 Macroeconomic and financial-market factors

Variations in macroeconomic variables have been illustrated in Table 6. Though the GDP growth rate rose from −5.8% to 9.7%, there was a rise in the repo rate from 4.00% to 6.50%. Moreover, the AAA credit spread was also observed to increase from 26 to 98 basis points. Furthermore, Nifty 50 returns varied in a range of −0.6% to 70.9%. However, there were variations in mean DR within a narrow range of 20.3% to 22.7%.

Table 6 Macroeconomic and financial-market conditions and average leverage by year

Fiscal year	GDP growth (%)	CPI (%)	Repo (%)	Bond spread (bps)	Nifty return (%)	Mean DR (%)	Median DR (%)
2020-21	−5.8	6.2	4.00	35	70.9	22.67	12.89
2021-22	9.7	5.5	4.00	26	18.9	21.54	13.48
2022-23	7.6	6.7	6.50	68	−0.6	21.30	12.10
2023-24	9.2	5.4	6.50	77	28.6	20.31	12.47
2024-25	6.5	4.6	6.25	98	5.3	21.05	18.04

Sources: MOSPI (GDP, revised estimates); RBI (CPI, repo rate); FIMMDA/CCIL (AAA corporate bond spread over 10-year G-sec); NSE (Nifty 50 financial-year return); authors' calculations (DR).

None of the macroeconomic factors has any relationship with either of the two leverage ratios ($|r|$ for all $=< 0.05$, $n = 190$). But the relationship between these variables is highly correlated (REPO and SPREAD, $r = 0.896$, REPO and NIFTY, $r = −0.643$, CPI and SPREAD, $r = −0.463$). As the bond spread is almost a linear function of the repo rate because of having only five different yearly observations, it has been excluded from the regression equation through SPSS (tolerance = .000). Thus, credit-spread hypothesis cannot be tested alone, while there are four macroeconomic variables.

Table 7 OLS regression of leverage on macroeconomic factors (n = 190)

Predictor	DR: B (t)	DR: p	DER: B (t)	DER: p
Constant	24.088 (1.368)	.173	0.635 (0.874)	.383
GDP growth	−0.336 (−0.345)	.730	−0.005 (−0.126)	.900
CPI inflation	+0.121 (0.064)	.949	+0.035 (0.450)	.653
Repo rate	−0.381 (−0.253)	.800	−0.028 (−0.451)	.653
Nifty 50 return	+0.001 (0.014)	.989	−0.000 (−0.131)	.896
R^2 / Adj. R^2	.002 / −.020		.003 / −.019	
F (4, 185)	0.077	.989	0.133	.970

Note: The bond spread was excluded by SPSS because of collinearity with the repo rate (tolerance = .000).

No predictive ability is demonstrated by the macroeconomic model. None of the coefficients have any significance and the F-statistics do not approach the significance point, adjusted R^2 is even slightly negative, whereas in the case of firm fundamentals 34 percent of variance is accounted for. The lack of results is not the fault of the test itself because of the following three reasons.

First, it can result from the nature of the data used. Leverage is far more variable across firms than the one through time. The standard deviation of DR is 18 percentage points whereas the difference in means of five years is only 2.4 percentage points (22.67 to 20.31 per cent). Inasmuch as the variables stay unchanged through years for all firms, they are not supposed to account for cross-sectional variations. Moreover, cross-sectional variations are the main source of variations in leverage ratios. Second, the null effect is relatively conservative. Taking into account that 190 firm-year observations are used for five observations of each macroeconomic variable, standard errors are bound to be underestimated. As a consequence, the significance of the results is even more pronounced. It is valid for both the leverage proxies either DR or DER and in spite of the correction for outliers applied in the latter case. Third, the effect is economically reasonable. The Nifty 50 firms are those whose financial statements are most appealing in India – diversification of sources of funds, availability of committed lines of credit and even large cash balances.

But macroeconomic factors do play a role in the context of leverage. Indeed, as Fig. 2 demonstrates, DR is positively associated with the repo rate (Pearson r = −0.78, Spearman ρ = −0.78), as well as with the bond spread (Pearson r = −0.67, Spearman ρ = −0.80). There are only five observations in this case, therefore, the significance levels are quite high (the correlation between DR and repo rate using Pearson coefficient is around $p \approx .12$ according to the data from Table 6). But the signs of these correlations correspond to the cost-of-debt mechanism (Antoniou, 2002) and to the mechanism of passive de-leveraging with earnings retention exceeding borrowings because of high profitability, i.e. the data fit the pecking order model. In terms of numerical values, the median level of DR was stable at 12-13 per cent during four years and rose up to 18 per cent in FY 2024-25, while the mean level was around 21 per cent, which means that firms re-leveraged in the middle part of the sample period.

Essentially, the findings confirm the theory that monetary policy affects aggregate leverage drift and not cross-section leverage spread. In addition, the findings align with regime dependence shown by Voutsinas and Werner (2025), which suggests that Indian firms operate under the unconstrained pecking order regime with a repo rate of 6.5%.

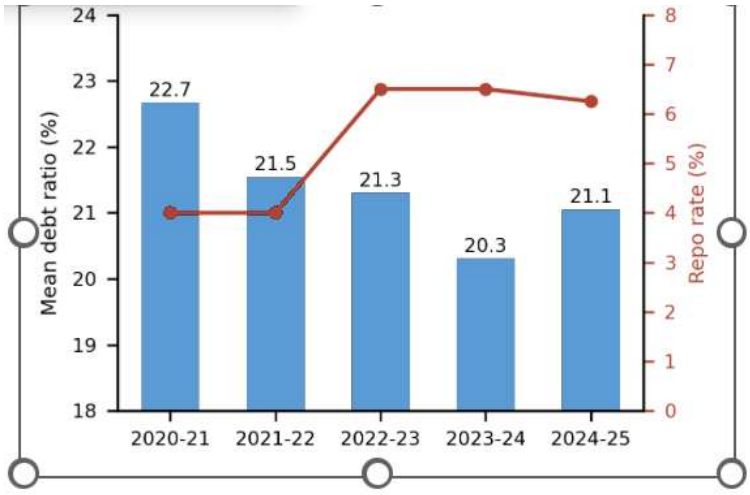


Fig. 2. Mean debt ratio of non-financial Nifty 50 firms (bars) and the RBI repo rate (line), FY 2020-21 to FY 2024-25.

4.4 Synthesis and comparison with earlier Indian evidence

Table 8 gives a recap of the hypothesis testing. Hypotheses of profitability and size have been accepted in both the equations, whereas tangibility and liquidity have been accepted in case of DR and DER, respectively. Growth, GDP growth, inflation, and stock-market return hypotheses have not been accepted. The hypothesis of credit spread could not be tested. Repurchase rate has turned out to be insignificant at the firm level even though there is strong negative relationship between repurchase rate and leverage at aggregate level.

Table 8 Summary of hypothesis testing (5% level)

Hypothesis	Expected sign	Result	Decision
H1: SIZE	+	Positive, $p < .001$ in both models	Supported
H2: PROF	–	Negative, $p < .001$ in both models	Supported
H3: TANG	+	Positive, $p = .002$ (DR), not significant (DER)	Supported for DR
H4: LIQ	–	Negative, $p = .020$ (DER), $p = .086$ (DR)	Supported for DER; marginal for DR
H5: GROWTH	+/–	Not significant in either model	Not supported
H6: GDP growth	+/–	Not significant in either model	Not supported
H7: CPI inflation	+/–	Not significant in either model	Not supported
H8: REPO	–	Not significant at firm level, strong negative aggregate co-movement ($r = -0.78$, $n = 5$)	Not supported at firm level
H9: NIFTY	–	Not significant in either model	Not supported
Bond spread	–	Excluded, collinear with REPO ($r = .896$)	Not testable

Note: Decisions refer to the 5% significance level unless stated otherwise.

Comparison to Handoo & Sharma (2014) can be done as their total debt ratio is comparable to our DR (Table 9). The similarity is in profitability and tangibility whereas differences are in size, growth, and liquidity. As Handoo & Sharma observe a negative impact of firm size for 870 firms (both small and large) and in our case, the size variable has a positive impact on the largest publicly held firms. It looks reasonable in view of our hypothesis which states that debt capacity

is rewarded only for the largest firms through leverage despite some differences between datasets in time span, aggregation, and estimation. The growth was the critical factor in the leverage for the previous dataset in 2001-2010 whereas in our dataset the post-pandemic sample it is not statistically significant for the largest firms due to the fact that the growth of these firms is financed through earnings.

Table 9 Comparison with Handoo and Sharma (2014), standardised coefficients

Determinant	**Handoo & Sharma (2014): total debt ratio, 870 firms, 2001–2010**	**This study: DR, 39 firms, 2020-21 to 2024-25**	**Agreement**
Profitability		−.327	Same sign, similar magnitude
Tangibility	+.360	+.199	Same sign, smaller effect
Size	−.187	+.276	Sign reversed
Liquidity	+.052 (n.s.)	−.109 (p = .086)	Differs
Growth	+.104	+.086 (n.s.)	Significance lost
R^2	.408	.359	Comparable

Note: * significant at 5%; n.s. = not significant. Handoo and Sharma (2014) use ten-year firm averages and ten explanatory variables, this study uses a five-year pooled panel and five.

5. Recommendations (Objective 4)

5.1 Explanatory power of the selected determinants

Fourthly, the extent of explanatory power of the chosen determinants has to be evaluated before drawing any conclusions since the quality of evidence will define the scope of the recommendations that can be drawn from the study. Table 10 shows the comparison of the two groups of determinants. The firm-level model explains about one-third of the variations in leverage (adj. $R^2 = 0.342$ for DR and 0.341 for DER; $F(5, 180) = 20.19$ and 20.11, $p < .001$). The figure is within the 0.26 – 0.41 interval established for India by Handoo and Sharma (2014). However, as for the macroeconomic model, it does not demonstrate any explanatory power in the context of firm level analysis (adj. $R^2 = −0.020$ and $−0.019$; $F(4, 185) = 0.077$ and 0.133, not significant). With regard to the impact on leverage, profitability has the greatest effect on leverage (-.327 for DR, -.340 for DER), followed by size (+.276, +.324), tangibility (+.199 for DR) and liquidity (−.149 for DER), while growth has no significance (Table 5).The biggest part of the variance of the leverage ratio is unexplained and depends on the industry's technology, problems with ownership, aims of ratings, and the history of the company. Therefore, all the dependencies described below can be considered trends which have to be considered, but cannot be regarded blindly. All recommendations are based on facts (refer to Table 11).

Table 10 Explanatory power of the determinant sets

Model	**Adj. R^2 (DR)**	**Adj. R^2 (DER)**	**F-statistic (DR / DER)**	**Significance**
Firm-level determinants: SIZE, PROF, TANG, LIQ, GROWTH (n = 186)	.342	.341	20.19 / 20.11	$p < .001$
Macroeconomic factors: GDP, CPI, REPO, NIFTY (n = 190)	−.020	−.019	0.077 / 0.133	Not significant (p = .989 / .970)

Note: Firm-level model from Table 5; macroeconomic model from Table 7. Ranking of firm-level determinants by standardised coefficient (DR): PROF > SIZE > TANG > LIQ > GROWTH (n.s.).

5.2 Recommendations for corporate financial managers

R1 – Leverage should be compared to the industry, not to the market. The average leverage ratio varies from 7.7% for IT Services to 39.8% for infrastructure, industrials, and telecom (see Table 3). Thus, 20% leverage is high for an IT firm but low for a utility. Leverage goals, covenants, and board deliberations should be made in regard to the leverages of the company relative to its industry, not the average leverages across all industries, which equal about 22%.

R2 – Retained earnings should be considered the most preferable financing option, but underleveraged companies should be controlled. Profitability becomes the best criterion in both models ($p<.001$; see Table 5). It is because profitable Nifty 50 firms finance themselves using internal funds and rarely borrow, following the pecking order theory. It is a sound decision, but very profitable and liquid firms with much lower leverage ratios than the average of the industry incur expenses related to free cash flow problem (Jensen, 1986). In such companies, the board has to consider the possibility of borrowing to implement value-creating projects and pay more dividends.

R3 – Explicitly use debt capacity on account of size and collateral. There exists a positive relationship between size (both models $p < .001$) and tangibility ($p = .002$ for DR) and leverage (see Table 5) in accordance with the trade-off theory. Consequently, larger and tangible asset intensive firms in energy, utilities, metals, and cement must plan their borrowing on the basis of their debt capacity and synchronize their debt raising with their investments.

R4 – Do not make use of macroeconomic forecasts in determining capital structure. GDP growth rate, inflation rate, repo rate, and Nifty returns taken together do not determine any inter-firm variation in the leverage ratio (see Table 7). Even in a period characterized by economic slowdown owing to a pandemic and monetary policy contraction of 250 bps, macroeconomic determinants do not affect leverage. Leverage must be determined by profitability, assets, and liquidity.

R5 – Manage the leverage and liquidity hand-in-hand. Liquidity is negatively related to leverage ($p = .020$ for DER model and $p = .086$ for DR model; see Table 5) because liquid firms require little external funding.

R6 – Disclosure of the Debt Ratio along with the Debt-Equity Ratio. Both of these financial ratios may show different trends – for instance, in infrastructure, industrial, and telecom sectors the increase in DER from 1.332 to 2.169 was followed by the decrease in the DR from 39.93% to 36.66% (4.1) – and the equity ratios do not make sense without equity, which is demonstrated by the InterGlobe Aviation case (3.2).

5.3 Recommendations for investors, analysts and lenders

R7 – Assessing leverage in connection with sector bands. Leveraging is very industry-specific, has high variability within the industries and is skewed towards higher values (average leverage ratio of 20.1% versus 12% median, Section 4.1). The leveraging of a firm thus should be compared to the band of the sector; any deviations signal either peculiarities of the business model (leasing, captive finance, regulatory assets) or increased stress, both warranting analysis.

R8 – Interpreting an increase in borrowings of a profitable firm as being informative. As profitable firms tend to have lower levels of debt (Table 5), an increase in borrowings by a profitable firm signals either the initiation of a major investment project or satisfying some needs that need to be examined.

R9 – Focusing on firm-specific rather than macroeconomic factors. Firm-specific factors explain around 34% of the variation in leverage ratios, while macroeconomic factors explain no variation (Table 10). Credit analysis of large-cap borrowers thus should focus more on fundamentals.

5.4 Recommendations for policymakers and regulators

R10 - Poor monetary policy transmission through the leverage channel among large capitalization firms. It has not been found any influence of 250 bps increase in repo rate on cross-firm leverage (Table 7), only mean leverage reduced due to interest rates growth ($r = -0.78$, $n = 5$, Fig. 2). The leverage channel for monetary policy transmission should be considered by RBI among smaller and credit-dependant firms.

R11 - Developing of corporate bond market. Spread between AAA corporate bond yield and 10-year government bond has increased from 26 to 98 bps over the period (Table 6), and at the same time leverage has been high in large firms

(Table 5). Better development of liquid AAA/AA corporate bond market will give an opportunity to big firms to obtain financing cheaper and become less bank-dependant.

R12 - Asset leverage reporting if equity is weakened. SEBI and stock exchanges could make it mandatory to disclose the debt-to-assets ratio along with the debt-to-equity ratio when equity becomes less than some value related to borrowings (Section 3.2).

Table 11 Traceability of recommendations to findings

Recommendation	Audience	Primary evidence
R1 Sector-benchmarked leverage targets	Managers	Sector DR bands 7.7–39.8% (Table 3)
R2 Internal finance first; review idle capacity	Managers	PROF strongest negative determinant, $p < .001$ (Table 5)
R3 Deliberate use of debt capacity	Managers	SIZE and TANG positive (Table 5)
R4 No macro timing of capital structure	Managers	Macro model adj. $R^2 < 0$, not significant (Table 7)
R5 Joint liquidity–leverage policy	Managers	LIQ negative, $p = .020$ in DER model (Table 5)
R6 Dual leverage reporting	Managers	DER–DR divergence, near-zero equity case (Sections 3.2, 4.1)
R7 Sector-relative screening	Investors, lenders	Sector dispersion and skewness (Table 3, Section 4.1)
R8 Profitable-firm borrowing as a signal	Investors	Negative PROF–leverage relation (Table 5)
R9 Fundamentals over macro overlays	Lenders	Firm model adj. $R^2 \approx 0.34$ vs macro ≈ 0 (Table 10)
R10 Weak large-cap leverage channel	RBI, policymakers	No firm-level macro effect; aggregate $r = -0.78$ (Table 7, Fig. 2)
R11 Bond-market deepening	Regulators	Spread 26→98 bps, SIZE positive (Tables 5, 6)
R12 Asset-based ratio disclosure	SEBI, exchanges	Near-zero equity distorts DER (Section 3.2)

Note: Recommendations apply to non-financial Nifty 50 firms over FY 2020-21 to FY 2024-25.

6. Conclusion

The paper studies the capital structure of non-financial Nifty 50 companies for the period FY 2020-21 to FY 2024-25 which spans the period post a contraction induced by the pandemic, followed by the recovery period and then a period of monetary tightening. Three results can be summarized from this research. First, leverage has been found to be extremely sector-specific where the leverage ratio ranged from 7.7% to 39.8% among sectors. In the sample, firm-level variables determine around one-third of the leverage with the profitability of a firm having a negative effect on leverage, the size and tangibility of a firm having a positive effect on leverage and the liquidity of a firm having a negative effect. Second, there is no association between macroeconomic variables and leverage. Finally, even though the leverage is negatively related with the repo rate and credit spread on average, there is no firm-level reaction to any macroeconomic variables in the leverage decision of the firm.

6.1 Implications

The sector and not against the economy wide average leverage ratio, taking into account the retained earnings as the initial source of funds and the discipline of using debt as a source of financing and avoiding capital structure decisions based on forecasts about the economic conditions. The results for banks and analysts imply normalizing the leverage to the average leverage of the sector and viewing borrowings increase of a firm which makes profits a signal worth investigating, and also paying more attention to the firm's fundamentals than to the macroeconomic backdrop when judging large capitalization firms' borrowings. For regulators, the absence of reaction of the cross sectional leverage to the monetary conditions implies that the channel of transmission through the leverage will be a slow one for the largest firms and the credit constrained small firms have to be taken into account.

6.2 Limitations and future research

However, there are some limitations which need to be kept in mind while making sense of the results obtained from the study. Firstly, the sample period used in the study is very short (5 years), and the sample size used is quite small (39 firms), hence, the macroeconomic variables used in the analysis would have only five distinct values and separate effect of bond spread cannot be estimated. Secondly, Pooled OLS method does not take care of unobserved firm and year effects and does not cluster the standard errors, hence, the results need to be considered indicative rather than conclusive. Thirdly, growth of the firm is taken to be a function of sales growth and not market value growth; the leverage ratio used in the study is book value leverage on the basis of consolidated statements. Governance and ESG factors which turn out to be significant for Indian firms in recent empirical analysis (Malik et al., 2026) are not incorporated in the model.

References

Abdalla, Y. A., Ahmed, I. E., & Jafeel, A. Y. (2025). Family businesses in the GCC: What drives their capital structure? *Borsa Istanbul Review*, *25*(6), 1128–1136. https://doi.org/10.1016/j.bir.2025.06.012

Antoniou, A., Guney, Y., & Paudyal, K. N. (2002). *Determinants of Corporate Capital Structure: Evidence from European Countries*. SSRN. https://doi.org/10.2139/ssrn.302833

Anuar, H., & Chin, O. (2016). The Development of Debt to Equity Ratio in Capital Structure Model: A Case of Micro Franchising. *Procedia Economics and Finance*, *35*, 274–280. https://doi.org/10.1016/S2212-5671(16)00034-4

Bakkar, Y. (2026). Climate risk and bank capital structure. *Journal of Financial Stability*, *84*, 101540. https://doi.org/10.1016/j.jfs.2026.101540

Bhaduri, S. N. (2002). Determinants of capital structure choice: a study of the Indian corporate sector. *Applied Financial Economics*, *12*(9), 655–665.

Bilgin, R., & Dinc, Y. (2019). Factoring as a determinant of capital structure for large firms: Theoretical and empirical analysis. *Borsa Istanbul Review*, *19*(3), 273–281. https://doi.org/10.1016/j.bir.2019.05.001

Booth, L., Aivazian, V., Demirgüç-Kunt, A., & Maksimovic, V. (2001). Capital structures in developing countries. *The Journal of Finance*, *56*(1), 87–130.

Cui, Y., & Zhang, Y. (2025). Financial stability strategies: Bankruptcy courts and corporate capital structure adjustment. *International Review of Economics & Finance*, *99*, 104026. https://doi.org/10.1016/j.iref.2025.104026

Czerwonka, L., & Jaworski, J. (2021). Capital structure determinants of small and medium-sized enterprises: evidence from Central and Eastern Europe. *Journal of Small Business and Enterprise Development*, *28*(2), 277–297. https://doi.org/10.1108/JSBED-09-2020-0326

Duguleană, C., Duguleană, L., & Deszke, K.-D. (2024). Financial performance and capital structure – an econometric approach for Romanian e-commerce companies during the COVID-19 pandemic. *Economic Analysis and Policy*, *83*, 786–812. https://doi.org/10.1016/j.eap.2024.05.024

Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management*, *38*(1), 1–37.

Gohdes, N. (2025). On spot revenues, capital structure and trade off theory: Analysing investment risk for contracted renewables. *Energy Economics*, *148*, 108703. https://doi.org/10.1016/j.eneco.2025.108703

Graham, J. R., & Leary, M. T. (2011). A review of empirical capital structure research and directions for the future. *Annual Review of Financial Economics*, *3*(1), 309–345.

Grau-Vera, D., Rubio, G., & Sogorb-Mira, F. (2025). Time-varying risk aversion and capital Structure: An overlooked effect. *International Review of Economics & Finance*, *102*, 104266. https://doi.org/10.1016/j.iref.2025.104266

Handoo, A., & Sharma, K. (2014). A study on determinants of capital structure in India. *IIMB Management Review*, *26*(3), 170–182. https://doi.org/10.1016/j.iimb.2014.07.009

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, *76*(2), 323–329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, *28*(4), 911–922.

Llobet-Dalmases, J., Plana-Erta, D., & Uribe, J. M. (2023). Cyclical capital structure decisions. *The North American Journal of Economics and Finance*, *66*, 101917. https://doi.org/10.1016/j.najef.2023.101917

Malik, N., Kashiramka, S., & Sharma, P. (2026). ESG disclosures and capital structure: An analysis of debt and equity dynamics in India. *International Review of Economics & Finance*, *105*, 104890. https://doi.org/10.1016/j.iref.2026.104890

Manaev, V. (2026). How much financial flexibility is optimal? A closed-form capital structure model for investment-grade firms. *International Review of Economics & Finance*, *109*, 105448. https://doi.org/10.1016/j.iref.2026.105448

Mensah, L., Arhinful, R., Obeng, H. A., & Gyamfi, B. A. (2025). The impact of capital structure on product responsibility and corporate reputation: Evidence from non-financial institutions listed on the London stock exchange. *European Research on Management and Business Economics*, *31*(3), 100287. https://doi.org/10.1016/j.iedeen.2025.100287

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, *39*(3), 574–592.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221.

Nishihara, M., & Shibata, T. (2025). Optimal capital structure with earnings above a floor. *European Journal of Operational Research*, *326*(3), 656–673. https://doi.org/10.1016/j.ejor.2025.04.023

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance*, *50*(5), 1421–1460.

Rehan, R., Abdul Hadi, A. R., Hussain, H. I., & Adnan Hye, Q. M. (2023). Capital structure determinants across sectors: Comparison of observed evidences from the use of time series and panel data estimators. *Heliyon*, *9*(9), e19618. https://doi.org/10.1016/j.heliyon.2023.e19618

Serghiescu, L., & Văidean, V.-L. (2014). Determinant Factors of the Capital Structure of a Firm- an Empirical Analysis. *Procedia Economics and Finance*, *15*, 1447–1457. https://doi.org/10.1016/S2212-5671(14)00610-8

Serrasqueiro, Z., & Nunes, P. M. (2008). *Determinants of Capital Structure: Comparison of Empirical Evidence from the Use of Different Estimators*. *International Journal of Applied Economics*, *5*, 14–29. https://www.cefage.uevora.pt/en/research/publications/articles/articles-other-peer-review-journals/446

Sheng, X., & Shao, J. (2026). Learning from climate risk: Supplier shocks and the adjustment toward firms' optimal capital structure. *International Review of Economics & Finance*, *110*, 105604. https://doi.org/10.1016/j.iref.2026.105604

Strebulaev, I. A., & Yang, B. (2013). The mystery of zero-leverage firms. *Journal of Financial Economics*, *109*(1), 1–23.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, *43*(1), 1–19.

Voutsinas, K., & Werner, R. A. (2025). Trade-off theory vs. the pecking order hypothesis: Japanese evidence on capital structure under financial constraints. *Structural Change and Economic Dynamics*, *74*, 944–962. https://doi.org/10.1016/j.strueco.2025.06.004

Wu, J., Yang, K., & Song, F. (2025). Reconfiguring capital structures through digital R&D: Mechanisms and empirical insights. *International Review of Economics & Finance*, *104*, 104610. https://doi.org/10.1016/j.iref.2025.104610