# CAPITAL STRUCTURE AND PROFITABILITY OF SMALL PHARMACEUTICAL FIRMS: EVIDENCE FROM THE ALTERNATIVE INVESTMENT MARKET

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## Abstract

The relationship between capital structure and profitability remains a critical issue for finance scholars and corporate decision-makers. While prior studies have examined this relationship in the pharmaceutical sector, limited attention has been given to small pharmaceutical firms. This study investigates the impact of capital structure on the profitability of small pharmaceutical companies listed on the Alternative Investment Market (AIM) of the London Stock Exchange (LSE). Using a five-year panel dataset (2018–2022), three regression models (Ordinary Least Squares, Fixed Effects, and Random Effects) were estimated with R statistical software. Profitability was measured by return on assets (ROA) and return on equity (ROE), while capital structure was captured through debt-to-equity ratio, short-term debt, and long-term debt, with firm size included as a control variable. The findings reveal a significant negative relationship between short-term debt and ROA, and between debt-to-equity and ROE, while firm size exhibits a positive relationship with both profitability measures. This study extends existing literature by focusing on small pharmaceutical firms, offering insights into their capital structure decisions and the implications for firm performance.

**Keywords**: debt-to-equity, return-on-equity, return-on-assets, short-term debt, London Stock Exchange

**JEL Classification**: G32, C23, D22

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## 1. Introduction

The pharmaceutical industry, with origins tracing back to Merck in 1668, has long been dominated by major firms such as GlaxoSmithKline, Pfizer, Eli Lilly, Bristol-Myers Squibb, Bayer, and AstraZeneca. While large pharmaceutical companies have traditionally led the industry, a paradigm shift in the late 1970s through the early 2000s saw the rise of small and medium-sized pharmaceutical firms, driven by innovation and technology. Notably, small firms account for the discovery of a significant share of new medicines—81% of drugs launched by large pharmaceutical companies (Jung et al., 2019), with 76% of such discoveries co-owned by larger firms (Kennedy et al., 2023).

Within the United Kingdom, the Alternative Investment Market (AIM) of the London Stock Exchange provides a platform for small and medium-sized growth companies. As of 2022, AIM hosted 816 companies with a combined market capitalization of £93 billion, of which pharmaceutical and biotechnology firms represented 7.5% of listings and 10.1% of market capitalization (£9.4 billion). Of the 61 AIM-listed pharmaceutical firms, most operate within the UK, with a few maintaining global or regional presence. Market capitalisations vary widely, from over £1 billion to under £100 million. However, the majority remain unprofitable, reflecting their concentration in clinical trials and early-stage research and development.

## 2. Research Gap

Capital structure, defined as the mix of debt and equity financing (Yegon et al., 2014), is one of the most critical managerial decisions due to its implications for risk, return, and firm value (Ullah et al., 2020). While equity and debt financing provide essential resources, both entail costs and obligations that influence profitability, with investors responding to financing choices through stock price movements (Myers, 1984). Thus, determining an optimal capital structure is vital for maximising firm value (Tailab, 2014).

Although prior studies (e.g., Mohammadzadeh et al., 2013; Enekwe et al., 2014; Dinh & Pham, 2020; Rehan et al., 2020; Jacob & Ajina, 2020; Tretiakova et al., 2021; Nwafor et al., 2022) have examined the capital structure–profitability nexus in pharmaceutical companies, they predominantly focus on larger firms. Tretiakova et al. (2021) specifically recommended further research considering firm

size. Accordingly, this study addresses the gap by investigating the extent to which capital structure influences the profitability of small pharmaceutical companies.

## 3. Literature review

### 3.1. Theories

The six alternative theories regarding the capital structure choice can be identified as Net income (NI), Net operating income (NOI), Traditional, M&M, pecking order, and Trade-off.

Capital structure and profitability are topics in finance that have been around for a long time and have witnessed a lot of academic effort from different scholars who have propounded theories to explain or provide an ideal solution; however, scholars recognised the complexity of the topic. According to Myers (1984), we know little about capital structure; we do not know how firms choose the debt, equity, or hybrid securities they issue. Patrick et al. (2021) further state that capital structure remains a riddle among researchers in the finance literature.

Prior to Modigliani and Miller's seminal 1958 work, three main approaches shaped the capital structure debate: the Net Income (NI) approach, the Net Operating Income (NOI) approach, and the Traditional approach. The NI approach (Durand, 1952) argued that capital structure influences firm value, as higher leverage lowers the weighted average cost of capital (WACC), thereby increasing profitability. Conversely, the NOI approach posited that capital structure is irrelevant, asserting that financing choices have no effect on firm value or WACC (Lawal, 2014). The Traditional approach proposed a compromise, suggesting that moderate use of debt reduces WACC and enhances firm value, but beyond an optimal point, excessive leverage increases financial risk and reduces value (Ahmadinia et al., 2012). These early theories faced criticism for overlooking agency costs, environmental shifts, and behavioural factors. Nonetheless, they provide a foundation for understanding how leverage and financing decisions may influence profitability.

Modigliani and Miller (1958) revolutionised capital structure theory, proposing that firm value is independent of financing choices (Proposition I) and that the cost of equity rises with leverage to offset the benefits of cheaper debt (Proposition II). In their 1963 revision, they incorporated corporate taxes, showing that interest deductibility provides a tax shield that enhances firm value. However, critics (e.g.,

Stiglitz, 1969; Baxter, 1967) noted the model's unrealistic assumptions, including the neglect of bankruptcy costs and risk heterogeneity.

With respect to *trade-off theory,* Kraus and Litzenberger (1973) extended M&M by incorporating bankruptcy costs, framing the trade-off between the tax benefits of debt and potential financial distress. Myers (1984) emphasised adjustment costs, leading to a "dynamic trade-off theory" (Fischer et al., 1989). While debt offers tax advantages, its value depends on balancing benefits against the costs of financial distress, with empirical evidence yielding mixed results (Fama & French, 1998).

In relation to the pecking order theory, Donaldson (1961) and later Myers and Majluf (1984) argued that firms prioritise internal financing, followed by debt, and, lastly, equity, to minimise costs and avoid control dilution. The theory highlights practical financing preferences but may not apply in highly leveraged firms (Yıldırım & Çelik, 2020).

The six capital structure theories yield mixed predictions. The NI approach suggests a positive relationship between leverage and profitability, while the NOI approach indicates a negative one. The Traditional, M&M, Trade-Off, and Pecking Order theories provide inconclusive outcomes, emphasising conditional or context-specific relationships. Overall, while theoretical insights are valuable, their assumptions—particularly the neglect of debt heterogeneity—limit real-world applicability. This gap underscores the need for empirical investigation to address the research question: "To what extent does capital structure impact profitability?"

### 3.2. Empirical literature review

The relationship between capital structure and profitability remains a central theme in empirical finance research, particularly within industries where research and development (R&D) and regulatory costs are high, such as pharmaceuticals. Theoretically, the debate is shaped by Modigliani and Miller's (1958) irrelevance proposition, the Pecking Order Theory (Myers & Majluf, 1984), and the Trade-off Theory (Kraus & Litzenberger, 1973). However, empirical findings show little consensus, particularly for smaller firms that often face greater financing constraints, information asymmetries, and volatility in earnings. This section reviews empirical studies on capital structure and profitability, focusing on small and pharmaceutical firms, and highlights the gap this study addresses.

***Evidence from Small and Medium Enterprises (SMEs)***

Several studies have investigated the financing choices of SMEs, providing useful insights for understanding smaller pharmaceutical firms. Abeywardhana (2015) examined the capital structure and profitability of UK SMEs, employing regression analysis with return on assets (ROA) and return on capital employed (ROCE) as profitability measures, and short-term debt, long-term debt, and total debt as capital structure proxies. The results indicated a significant negative relationship between all forms of debt and profitability, but a positive relationship between firm size and profitability. The author argued that SMEs in the UK primarily rely on internally generated funds to avoid the risks associated with external debt, a finding consistent with the Pecking Order Theory.

In contrast, Ferati and Ejupi (2012) studied small firms in Macedonia using an ordinary least squares regression approach. They measured profitability with return on equity (ROE) and capital structure using short-term debt, long-term debt, and total debt. The findings showed that short-term debt and equity positively correlated with ROE, while long-term debt had a negative effect. This result is different from Abeywardhana (2015), suggesting that country context, institutional frameworks, and access to credit significantly influence how SMEs finance their operations. Together, these studies indicate that SMEs face unique financing challenges, but their reliance on debt and its effect on profitability varies across regions.

***Evidence from Pharmaceutical Companies Globally***

Research has also explored the relationship between capital structure and profitability within the pharmaceutical industry, where capital intensity and long R&D cycles complicate financing decisions. Mohammadzadeh et al. (2013) studied 26 Iranian pharmaceutical firms between 2001 and 2010. Using correlation and regression analysis, they measured profitability with ROA, ROE, and net profit margin, while short-term, long-term, and total debt were used to represent capital structure. The results revealed a significant negative relationship between all forms of debt and profitability, with firms predominantly financing operations internally, aligning with the Pecking Order Theory.

Similarly, Enekwe et al. (2014) analysed five Nigerian pharmaceutical companies using regression methods, finding that the debt ratio and debt-to-equity ratio negatively affected ROA, while interest coverage had a positive effect. Their findings were consistent

with Mohammadzadeh et al. (2013), reinforcing the negative impact of leverage on pharmaceutical profitability in emerging markets.

Rehan et al. (2020) extended this line of inquiry to Pakistan, studying seven listed pharmaceutical companies from 2007 to 2018 using regression and Pearson correlation methods. Their results showed that debt-to-equity ratios were negatively associated with profitability, measured by ROE, ROCE, net profit margin, and earnings per share. These findings aligned with the evidence from Iran and Nigeria.

Jacob and Ajina (2020) investigated the Indian pharmaceutical sector, analysing five listed firms between 2016 and 2020. Using regression analysis, they found a negative relationship between debt-to-equity ratios and ROE, in line with the Net Operating Income approach, and consistent with Mohammadzadeh et al. (2013), Enekwe et al. (2014), and Rehan et al. (2020).

However, Dinh and Pham (2020) reported divergent findings in Vietnam, where long-term assets, leverage-to-assets ratio, and debt-to-assets ratio positively influenced profitability, while equity-to-assets had a negative relationship. Using least squares regression on data from 30 firms (2015–2019), they attributed their findings to the growth strategies of Vietnamese pharmaceutical firms, which may rely more heavily on external debt for expansion.

Tretiakova et al. (2021) conducted one of the most comprehensive recent studies, analysing 185 pharmaceutical companies in the UK using panel data regression and Wald tests. The findings showed that short-term debt was negatively correlated with ROA, return on investment, and firm value. Long-term debt negatively affected market valuation and price-to-book ratio, while equity positively influenced market value but negatively impacted ROA and price-to-book ratio. Importantly, Tretiakova et al. (2021) recommended further investigation into smaller firms, given their distinct financing needs and vulnerabilities.

Nwafor et al. (2022) explored Nigerian pharmaceutical companies (2011–2020) using correlation and regression analysis. Their findings showed that both debt-to-equity and total debt ratios negatively influenced profitability measured by ROA. This evidence was consistent with the negative impact of debt found in the UK and other emerging markets, further strengthening the case for caution in the use of leverage.

Overall, while studies on SMEs and pharmaceutical companies provide valuable insights, the evidence does not converge to a clear consensus. Most studies (Mohammadzadeh et al., 2013; Enekwe et al., 2014; Rehan et al., 2020; Jacob & Ajina, 2020; Tretiakova et al., 2021; Nwafor et al., 2022) report a negative relationship between debt ratios and profitability, consistent with the Pecking Order Theory. However, exceptions (e.g., Dinh & Pham, 2020) suggest that context, economic environment, and firm strategy can alter this relationship. Firm size often shows a positive effect on profitability, reflecting economies of scale and greater market power.

Despite this growing body of work, there remains a significant gap: no empirical study has focused on **small pharmaceutical companies**. These firms are particularly distinct, as they are often listed on the Alternative Investment Market (AIM) of the London Stock Exchange (LSE), rely heavily on R&D, and face limited cash flows compared to larger pharmaceutical companies. This study responds to Tretiakova et al.'s (2021) recommendation by examining how capital structure affects profitability in small pharmaceutical firms.

The expected relationships, informed by the reviewed literature, are summarised in Table 1.

**Table 1**
**Expected relationship between capital structure and profitability**

| Proxy variable | Measurement | Expected relationship with profitability |
|---|---|---|
| Short-term Debt (STD) | Short-term debt to total assets | Negative with ROA |
| Long-term Debt (LTD) | Long-term debt to total assets | Negative/Uncertain with ROA |
| Total Debt (TDR) | Total debt to total assets | Negative with ROA and ROE |
| Debt-to-Equity Ratio (DER) | Total debt / Equity | Negative with ROE |
| Firm Size (Control) (FS) | Market value as of 2022 | Positive with ROA and ROE |

*Source: Authors' contribution*

## 4. Methodology

This study adopts a positivist research philosophy, which assumes that financial phenomena can be objectively observed and measured using quantitative techniques. The focus is on testing the extent to which capital structure affects the profitability of AIM-listed

pharmaceutical companies, thereby seeking to validate or reject predictions derived from established theories. Following a deductive approach, the study builds on the Trade-off Theory (Modigliani & Miller, 1963), Pecking Order Theory (Myers & Majluf, 1984), and Agency Theory (Jensen & Meckling, 1976) to examine empirical evidence within the context of small pharmaceutical firms.

The analysis is based on a panel dataset comprising twenty-eight AIM-listed pharmaceutical companies over five years from 2018 to 2022. Firm-level financial data were obtained from publicly available annual reports and verified databases to ensure reliability. This sector was chosen because small pharmaceutical firms often differ significantly from both larger pharmaceutical and non-pharmaceutical firms; they are typically more research-intensive, face constrained cash flows, and are subject to unique financing challenges, making them particularly suitable for studying the relationship between capital structure and profitability (Tretiakova et al., 2021).

Profitability is measured using return on assets (ROA) and return on equity (ROE), in line with prior literature (Enekwe et al., 2014; Rehan et al., 2020). Capital structure is proxied by short-term debt to total assets, long-term debt to total assets, and the debt-to-equity ratio. Firm size, measured as the natural logarithm of total assets, is included as a control variable to account for the potential scale effects identified by Abeywardhana (2015).

To investigate the relationship between capital structure and profitability, the study employs a panel regression framework. Ordinary Least Squares (OLS) is used as a baseline estimator, while Fixed Effects (FEM) and Random Effects Models (REM) are applied to account for unobserved heterogeneity across firms. The Hausman test guides the selection between FEM and REM, ensuring that the chosen specification provides consistent estimates. Panel data are particularly appropriate for this research, as they exploit both cross-sectional and time-series variation.

The regression model is formally expressed as ROA Model (1) and ROE Model (2).

$$ROA_{i,t} = \beta_0 + \beta_1 STD + \beta_2 LTD + \beta_3 TDR + \beta_4 DER + \beta_5 FS + \varepsilon_{i,t} \quad (1)$$

$$ROE_{i,t} = \beta_0 + \beta_1 STD + \beta_2 LTD + \beta_3 TDR + \beta_4 DER + \beta_5 FS + \varepsilon_{i,t} \quad (2)$$

$i$ = firm and $t$ = period.

Standard diagnostic tests for heteroscedasticity and multicollinearity are conducted to ensure robustness of the estimates.

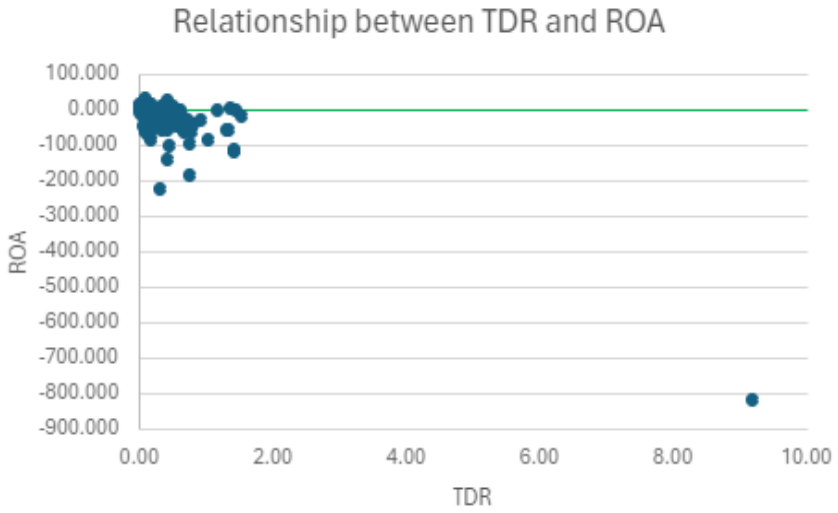
The adoption of OLS, FEM, and REM is consistent with studies in both pharmaceutical and broader SME contexts (Mohammadzadeh et al., 2013; Jacob & Ajina, 2020), allowing for comparability of results and enhancing the credibility of the findings. This methodology thus provides a rigorous framework for addressing the research question concerning the extent to which capital structure impacts the profitability of small pharmaceutical firms listed on the AIM.

## 5. Findings and discussion

The findings start with the visual relationship between capital structure and profitability.

**Figure 1**

**Total debt ratio and return on assets**

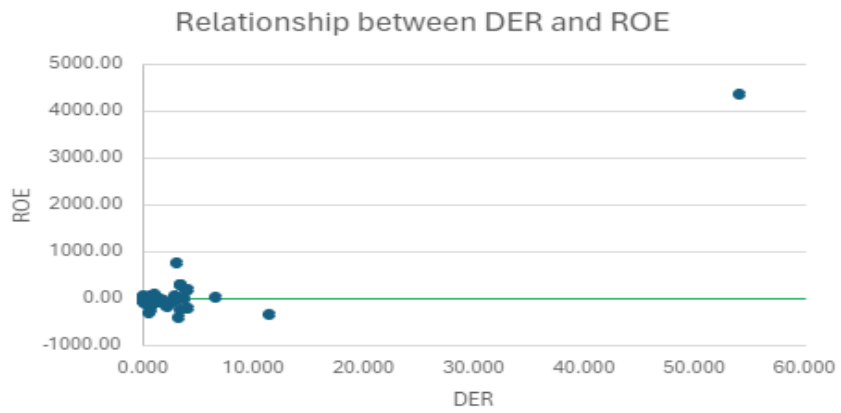



*Source: Author's own illustration*

As shown in Figure 1, the data points are clustered, indicating distinct characteristics except for an outlier. The outlier has a low asset in the year 2018, and it impacts the ROA calculation.

**Figure 2**

**Debt-to-equity ratio and return on equity**



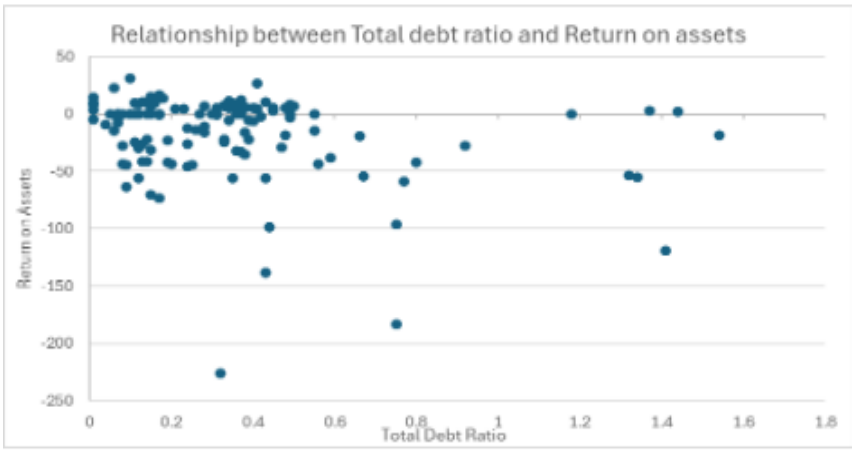

*Source: Author's own illustration*

The clustered points in Figure 2 suggest that the data points follow the same pattern; however, there is an outlier. The outlier was identified as having negative total equity and a loss in 2020.

The extreme outliers in Figures 1 and 2 might have a potential implication for the results of the regression models. The study will proceed without the extreme outliers.

**Figure 3**

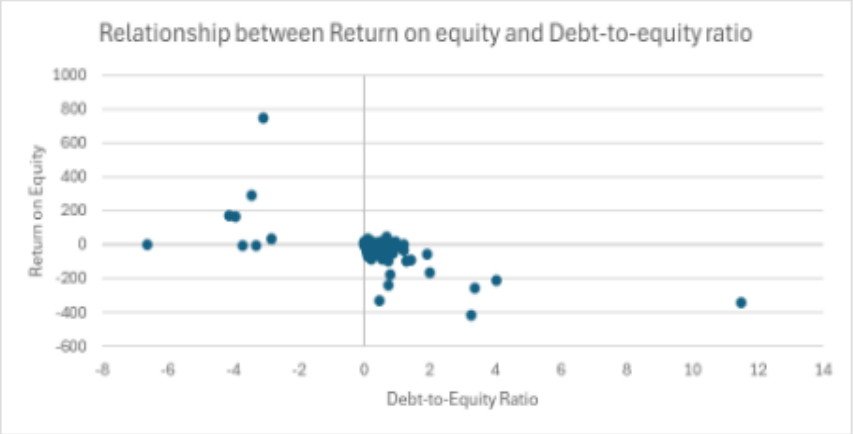
**Total debt ratio and return on assets**




*Source: Author's own illustration*

**Figure 4**

**Debt-to-equity ratio and return on equity**




*Source: Author's own illustration*

These scattered plots, without the extreme outliers in Figure 3, suggest no clear relationship between ROA and TDR (Long-term and Short-term), whereas the clustered data points in Figure 4 suggest a relationship. However, the direction of the relationship is not clear.

***Empirical Analysis and Discussion***

This study examined the relationship between capital structure and profitability in AIM-listed pharmaceutical companies, using a fixed effects model (FEM) for return on assets (ROA) and a random effects model (REM) for return on equity (ROE). After excluding two outliers, the analysis was conducted on 26 firms. Robustness checks confirmed FEM and REM as the most appropriate models.

**Table 2**

**The Hausman test - ROA**

| Hausman Test |
|---|
| data: ROA ~ STD + LTD + DER + FS |
| chisq = 2.3159, df = 4, p-value = 0.6779 |
| alternative hypothesis: one model is inconsistent |

*Source: Authors'*

The p-value of 0.6779 in the Hausman test result, which is greater than conventional significance level of 0.05 chosen by the study suggests that either of the models is appropriate to predict ROA. However, the study also ran Breusch-Pagan multiplier test on REM before a decision was made. The Breusch-Pagan multiplier test is used to determine whether random effects are significant in a panel data model (Rehal, 2022). The result is shown in table 5.3.6 below.

**Table 3**

**Lagrange Multiplier test result**

```
    Lagrange Multiplier Test - (Breusch-Pagan)

data:  ROA ~ STD + LTD + DER + FS
chisq = 64.824, df = 1, p-value = 8.19e-16
alternative hypothesis: significant effects
```

*Source: Authors'*

The significantly high Chi-square (64.824) and low p-value (8.19e-16) in the result suggest that the random effects model may not be appropriate. This result shows evidence against the null hypothesis and suggests that heteroscedasticity is present in the REM, therefore the study chose the fixed effect model.

**Table 4**

**ROA Model**

```
          Balanced Panel: n = 26, T = 5, N = 130

Coefficients:
       Estimate   Std.Error  t-value   Pr(>|t|)
STD -89.9107349   3.4241240 -26.2580   <2e-16 ***
LTD  -9.2601650  15.7151137  -0.5893   0.5570
DER   0.2647648   0.5542052   0.4777   0.6339
FS    0.0053002   0.0071517   0.7411   0.4604

Total Sum of Squares:    586870
Residual Sum of Squares: 73671
R-Squared:      0.87447
Adj. R-Squared: 0.83806
F-statistic: 174.153 on 4 and 100 DF, p-value: < 2.22e-16
```

*Source: Authors'*

The results indicate that short-term debt has a statistically significant and negative relationship with ROA (t-value = –26.258, 95%

confidence). Specifically, an additional unit of short-term debt reduces ROA by approximately 0.89 units. Case analysis of firms with high short-term debt (Redx Pharma and Hvivo PLC) revealed persistent net losses despite increased borrowings, suggesting reliance on debt to remain operational. Conversely, firms with little or no short-term debt (Ixico PLC and Anpario PLC) reported positive ROA and ROE throughout the study period.

**Table 5**

**ROE Model**

Balanced Panel: n = 26, T = 5, N = 130

Coefficients:

| | Estimate | Std. Error | z-value | Pr(>\|z\|) | |
|---|---|---|---|---|---|
| (Intercept) | 7.4618319 | 14.4288284 | 0.5171 | 0.6051 | |
| STD | -7.3902664 | 11.5632759 | -0.6391 | 0.5227 | |
| LTD | 30.6455082 | 48.1574290 | 0.6364 | 0.5245 | |
| DER | -76.0548740 | 1.9235449 | -39.5389 | <2e-16 | *** |
| FS | 0.0049942 | 0.0180484 | 0.2767 | 0.7820 | |

Total Sum of Squares: 18730000
Residual Sum of Squares: 1285200
R-Squared: 0.93138
Adj. R-Squared: 0.92919
Chisq: 1696.66 on 4 DF, p-value: < 2.22e-16

*Source: Authors'*

The ROE model identified the debt-to-equity ratio as the only significant predictor. A one-unit increase in debt-to-equity is associated with a 0.76 fall in ROE (95% confidence). Other variables, including long-term debt and firm size, were statistically insignificant.

**Table 9**

**Correlation coefficient matrix**

| | ROA | ROE | STD | LTD | TDR | DER | FS |
|---|---|---|---|---|---|---|---|
| ROA | 1 | -0.0727 | -0.8711 | -0.0557 | -0.8647 | 0.0938 | 0.0529 |
| ROE | | 1 | 0.028 | 0.2733 | 0.0966 | -0.9641 | -0.0295 |
| STD | | | 1 | -0.036 | 0.9673 | -0.0455 | -0.0485 |
| LTD | | | | 1 | 0.2184 | -0.2711 | 0.0244 |
| TDR | | | | | 1 | -0.1132 | -0.0411 |
| DER | | | | | | 1 | 0.0384 |
| FS | | | | | | | 1 |

*Source: Authors'*

The magnitude of the statistically significant variables (short-term debt and debt-to-equity ratio) in Tables 4 and 5 is consistent with the coefficients in Table 9.

***Comparison with Theory and Literature***

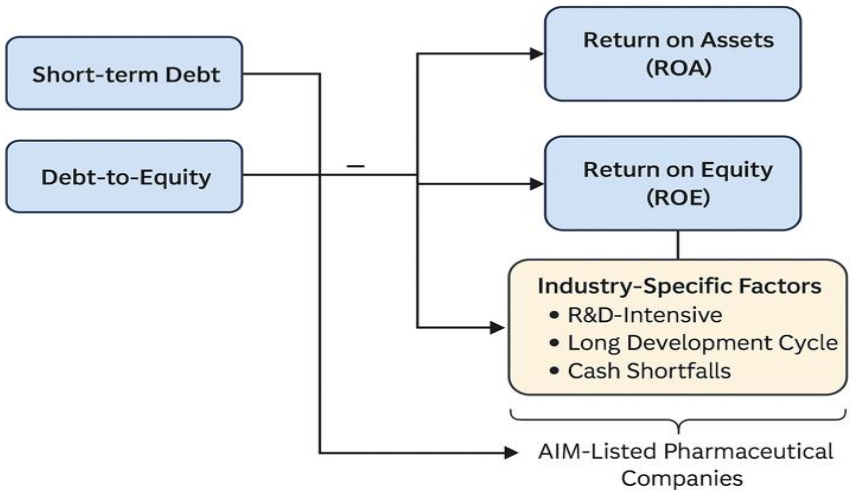
The findings align with the net operating income (NOI) approach, which posits that capital structure is largely irrelevant to firm valuation. The negative association between short-term debt and ROA, and between debt-to-equity and ROE, corroborates prior studies on pharmaceutical firms (e.g., Mohammadzadeh et al., 2013; Tretiakova et al., 2021; Mathur et al., 2021; Afroze & Khan, 2022). However, unlike Dinh and Pham (2020), this study did not observe a positive relationship between debt and profitability.

***Implications***

The results suggest that profitability challenges in AIM-listed pharmaceutical firms stem less from capital structure and more from their operational realities: long R&D cycles (10 –15 years), high upfront costs, and dependence on acquisitions by larger firms (Gelijns & Halm, 1991; Kennedy et al., 2023; Schuhmacher et al., 2023). The reliance on short-term debt appears to be a survival strategy in the face of sustained negative returns, rather than a driver of profitability.

**Figure 5**

**Conceptual Framework**




*Source: Author's own illustration*

The framework in Figure 5 illustrates how short-term debt and debt-to-equity, as significant components of capital structure, negatively influence return on assets (ROA) and return on equity (ROE), respectively. It also highlights the moderating role of industry-specific factors, such as high R&D costs, long drug development cycles, and limited revenue streams, which amplify the reliance on short-term financing and shape the profitability outcomes of AIM-listed pharmaceutical firms.

## 6. Conclusion

This study examines the relationship between capital structure and the profitability of small pharmaceutical firms with 26 AIM-listed companies, totalling 130 observations. This study concludes that while capital structure variables such as short-term debt and debt-to-equity significantly influence profitability, their negative impacts are indicative of broader sectoral challenges. Thus, capital structure alone does not determine profitability; instead, the financial fragility of AIM-listed pharmaceutical firms is deeply linked to their R&D-intensive business models and delayed revenue generation.

This study investigated the relationship between capital structure and profitability among AIM-listed small pharmaceutical companies, but several limitations constrain the findings. The limited literature on small pharmaceutical firms restricted the theoretical foundation, while profitability was measured solely by ROA and ROE, with firm size as the only control variable. The focus on Alternative Investment Market (AIM)-listed firms (a developed market managed by the London Stock Exchange) limits generalisability to other sectors or emerging economies. Industry-specific factors, such as the lengthy payback period and high costs of drug development, were excluded. Several firms reported net losses between 2018 and 2022, which may have influenced the results. Moreover, the study examined only the impact of capital structure on profitability, without testing reverse causality. Future research should therefore explore the bi-directional relationship between capital structure and profitability, extend analysis to small firms in other industries, and incorporate broader profitability measures and controls to enhance generalisability.

## References


1. Abeywardhana, D.Y. (2015). Capital Structure and Profitability: An Empirical Analysis of SMEs in the UK. *Journal of Emerging Issues in Economics, Finance and Banking (JEIEFB),* 4(2), pp. 1-14. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2816487.
2. Abor, J. (2005). The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. *The Journal of Risk Finance*, 6(5), pp. 438–445. https://doi.org/10.1108/15265940510633505
3. Afroze, S. & Khan, S.A. (2022). Impact of Capital Structure on Firm Performance: Evidence from the Pharmaceuticals & Chemicals Sector in Bangladesh. *The Cost and Management*, 50(01). pp. 27-40. Available at: https://icmab.gov.bd/journal/10895/
4. Ahmadinia, H., Afrasiabishani, J., & Hesami, E. (2012). A Comprehensive Review on Capital Structure Theories, *The Romanian Economic Journal*, 15(45), pp. 3-26
5. Baxter, N.D. (1967). Leverage, Risk of Ruin and the Cost of Capital. *The Journal of Finance*, 22(3), pp. 395-403. https://doi.org/10.2307/2978892
6. Dinh, H.T., & Pham, C.D. (2020). The effect of capital structure on financial performance of Vietnamese listing pharmaceutical enterprises. *Journal of Asian Finance, Economics and Business*, *7*(9), pp. 329–340. https://doi.org/10.13106/JAFEB.2020.VOL7.NO9.329
7. Donaldson, G. (1961). *Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity*. Harvard University, Graduate School of Business Administration, Division of Research.
8. Durand, D. (1952). *Costs of Debt and Equity Funds for Business: Trends and Problems of Measurement*, In: Conference on Research in Business Finance, NBER, pp. 215-261. Available at: http://www.nber.org/chapters/c4790.
9. Enekwe, C.I., Agu, C.I. & Eziedo, K.N. (2014). The Effect of Financial Leverage on Financial Performance: Evidence of Quoted Pharmaceutical Companies in Nigeria. *Journal of Economics and Finance IOSR*, 5(3), pp. 17–25. https://doi.org/10.9790/5933-0531725.
10. Ferati, R. (2012). Capital structure and profitability: The Macedonian case. *European Scientific Journal*, 8(7), pp. 51–62.
11. Fischer, E.O., Heinkel, R. & Zechner, J. (1989). Dynamic Capital Structure Choice: Theory and Tests. *The Journal of Finance*, 44(1), pp. 19–40. https://doi.org/10.2307/2328273.

12. Jacob, T. & Ajina, V.S. (2020). Capital Structure and Financial Performance of Pharmaceutical Companies in Indian Stock Exchange. *Asian Journal of Managerial Science*, 9(2), pp. 24–30. https://doi.org/10.51983/ajms-2020.9.2.1641.
13. Jung, E., Engelberg, A. & Kesselheim, A. (2019). *Analysis: Large pharma companies do little new drug innovation*. [online] STAT. Available at: https://www.statnews.com/2019/12/10/large-pharma-companies-provide-little-new-drug-development-innovation/.
14. Kennedy, K.H., Gomez, K., Thovmasian, N.J. & Chang, D.C. (2023). Small biotechs versus large pharma: Who drives first-in-class innovation in oncology? *Drug Discovery Today*, 28(2), 103456. https://doi.org/10.1016/j.drudis.2022.103456 .
15. Kraus, A. & Litzenberger, R.H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, 28(4), pp. 911–922. https://doi.org/10.2307/2978343
16. Lawal, A. (2014). Capital structure and the value of the firm: evidence from the Nigeria banking industry. *Journal of Accounting and Management*, 4(1), pp. 31-41. Available at: https://journals.univ-danubius.ro/index.php/jam/article/viewFile/2261/2106.
17. Mathur N., Tiwari S.C., Ramaiah, T.S., & Mathur, H. (2021). Capital structure, competitive intensity and firm performance: an analysis of Indian pharmaceutical companies. *Managerial Finance*, 47(9), pp. 1357–1382. https://doi.org/10.1108/MF-01-2020-0009.
18. Modigliani, F. (1958). New Developments on the Oligopoly Front. *Journal of Political Economy*, 66(3), pp. 215–232. https://doi.org/10.1086/258035 .
19. Modigliani, F. & Miller, M.H. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review*, 53(3), pp. 433–443.
20. Mohammadzadeh, M., Rahimi, F., Rahimi, F., Aarabi, S.M. & Salamzadeh, J. (2013). The effect of capital structure on the profitability of pharmaceutical companies the case of Iran. *Iranian Journal of Pharmaceutical Research: IJPR*, 12(3), pp. 573–7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3813274/.
21. Myers, S.C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, 39(3), pp. 574–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x.
22. Myers, S.C. (2003). Financing of Corporations. *Handbook of the Economics of Finance*, 1, pp. 215–253. https://doi.org/10.1016/s1574-0102(03)01008-2.

23. Myers, S.C. & Majluf, N.S. (1984). Corporate Financing and Investment Decisions When Firms Have Information that Investors Do Not Have. *NBER Working Paper Series*, 1396. Available at: https://ssrn.com/abstract=274547.
24. Nwafor, C.A., Yusuf, A. & Shuaibu, H. (2022). The impact of capital structure on the profitability of pharmaceutical companies in Nigeria. *International Journal of Intellectual Discourse*, 5(1), pp. 281–292. Available at: https://ijidjournal.org/index.php/ijid/article/view/81/51.
25. Rehan, M., Karaca, S.S. & Alvi, J. (2020). Capital Structure and Financial Performance: Case Study from Pakistan Pharmaceutical Sector. *Financial Studies, 24(3), pp. 66-82*. Available at: https://icfm.ro/fs.icfm.ro/Paper05.FS3.2020.pdf
26. Stiglitz, J.E. (1969). A Re-Examination of the Modigliani-Miller Theorem. *The American Economic Review*, 59(5), pp. 784–793.
27. Tailab, M. (2014). The Effect of Capital Structure on Profitability of Energy American Firms. *International Journal of Business and Management Invention*, 3(12), pp. 54-61.
28. Tretiakova, V.V., Shalneva, M.S. & Lvov, A.S. (2021). The Relationship between Capital Structure and Financial Performance of the Company. *SHS Web of Conferences*, 91, p.01002. https://doi.org/10.1051/shsconf/20219101002.
29. Ullah, A., Pinglu, C., Ullah, S., Zaman, M. & Hashmi, S.H. (2020). The nexus between capital structure, firm-specific factors, macroeconomic factors and financial performance in the textile sector of Pakistan. *Heliyon*, 6(8), p.e04741.

    https://doi.org/10.1016/j.heliyon.2020.e04741.
30. Yegon, C., Cheruiyot, J., Sang, J., & Cheruiyot, P.K. (2014). The Effects of Capital Structure on Firm's Profitability: Evidence from Kenya's Banking Sector, *Research Journal of Finance and Accounting*, 5(9), pp. 152-159.