Impact of Capital Structure on Firm Value: Evidence from Listed Companies in the Materials Sector of the Colombo Stock Exchange

Ranathunga, C. N.

Department of Accountancy & Finance, Faculty of Management Studies, Rajarata University of Sri Lanka, Mihintale, Sri Lanka

mgt2022249@mgt.rjt.ac.lk

ABSTRACT

This study examines the association between capital structure and firm value among companies listed in the Materials Sector of the Colombo Stock Exchange (CSE) from 2020 to 2024. Capital structure is measured using the Debt-to-Equity Ratio (DER) and Debt-to-Total Assets Ratio (DTA), while firm value is measured using Tobin's Q. Tobin's Q is calculated as the market value of equity plus the book value of total interest-bearing debt, divided by the book value of total assets. Firm size, measured as the natural logarithm of total assets, and return on assets (ROA) are included as control variables. The study uses a balanced panel of 18 companies and 90 firm-year observations. JAT Holdings PLC was excluded because it was not listed throughout the full study period. Panel regression analysis was conducted, and the Hausman specification test ($\chi^2 = 5.2464$, $p = 0.2629$) supported the random-effects estimator. The results indicate that DER ($\beta = -0.0308$, $p = 0.5234$) and DTA ($\beta = 0.2074$, $p = 0.8136$) are not statistically significant predictors of Tobin's Q. Firm size ($\beta = -0.2444$, $p = 0.0679$) and ROA ($\beta = 2.5023$, $p = 0.0537$) are statistically significant at the 10% level but not at the 5% level. However, the overall regression model is not statistically significant ($p = 0.1108$), and its explanatory power is limited (adjusted $R^2 = 0.0406$). Accordingly, the findings do not provide sufficient evidence that the selected leverage measures explain variations in market-based firm value in the sampled companies during the study period. The results should be interpreted cautiously in view of the sample size, study period, and limited explanatory power of the model.

Keywords: *Capital Structure, Firm Value, Tobin's Q, Materials Sector, Colombo Stock Exchange.*

1. INTRODUCTION

Capital structure is an important corporate financial decision because the mix of debt and equity can affect a firm's financing costs, financial risk and capacity to sustain its operations. This issue is particularly relevant to capital-intensive businesses, which often require substantial investment in plant, machinery and other long-term assets. The operating environment in Sri Lanka changed considerably during 2020–2024, a period that included severe macroeconomic pressures. These pressures included currency depreciation, high inflation, foreign-exchange constraints and sharp increases in lending rates (Central Bank of Sri Lanka [CBSL], 2022, 2023; Weerakoon et al., 2022; Wignaraja et al., 2023). Such conditions may have affected companies' borrowing costs, debt-servicing capacity and investor assessments of risk.

In January 2020, the CSE adopted the Global Industry Classification Standard (GICS), under which the former Manufacturing classification was reorganized, and the Materials Sector was identified as a separate sector. The sector includes businesses involved in producing industrial inputs such as cement, glass, packaging, aluminium, rubber, chemicals, fertilisers and activated carbon. Earlier Sri Lankan studies examined capital structure and firm performance among listed manufacturing companies (Velnampy & Pratheepkanth, 2012; Priya et al., 2015; Chandrasiri et al., 2017). However, evidence specifically examining market-based firm value among companies currently classified in the Materials Sector remains limited.

Prior research has also reported differing relationships between leverage and firm value. In addition, accounting-based measures such as earnings per share and return on equity may not fully capture investors' forward-looking assessments of a company. This study therefore examines the association between two leverage measures and market-based firm value, using Tobin's Q, among CSE-listed Materials Sector companies over 2020-2024. The study focuses on evidence from these five years; it does not attempt to isolate the causal effect of the economic crisis.

2. AIMS/OBJECTIVES

Main Objective:

The overarching objective of this research is to investigate the impact of capital structure on the firm value of companies listed in the Materials Sector of the Colombo Stock Exchange.

Specific Sub-Objectives:

To achieve the main objective, the study addresses two specific sub-objectives:

1. To investigate whether the Debt-to-Equity ratio significantly impacts the firm value of listed materials sector companies of the Colombo Stock Exchange.
2. To investigate whether the Debt-to-Total Assets Ratio significantly impacts the firm value of listed materials sector companies of the Colombo Stock Exchange.

Formulated Hypotheses: Based on corporate finance theory and empirical literature, the following testable hypotheses are specified:

- **Hypothesis 1 (H1):** The Debt-to-Equity Ratio (DER) has a statistically significant negative impact on the firm value (Tobin's Q) of listed Materials Sector companies.
- **Hypothesis 2 (H2):** The Debt-to-Total Assets Ratio (DTA) has a statistically significant negative impact on the firm value (Tobin's Q) of listed Materials Sector companies.

3. THEORY

The theoretical foundation of capital structure originates from Modigliani and Miller's (1958) Capital Structure Irrelevance Proposition. In a baseline market without taxes or bankruptcy risks, Modigliani and Miller established that firm value is determined by physical assets and operating earning power rather than financing mix. Incorporating corporate income taxes, Modigliani and Miller (1963) demonstrated that debt financing can enhance firm value through interest tax shields.

Building upon these propositions, Trade-Off Theory (Kraus & Litzenberger, 1973) posits that an optimal capital structure balances tax-shield benefits against financial distress costs. As leverage increases beyond a threshold, distress costs escalate rapidly, creating a negative relationship between high debt ratios and market value. In developing economies facing interest rate shocks, elevated distress risks are hypothesized to outweigh tax shields, supporting Hypotheses H1 and H2.

Conversely, Pecking Order Theory (Myers & Majluf, 1984) rejects a static optimal debt ratio. Driven by information asymmetry, the theory posits a strict financing hierarchy: internal cash reserves first, low-risk debt second, and external equity last. Highly profitable companies accumulate internal cash and maintain lower debt, predicting a positive relationship between profitability and market valuation, alongside a negative correlation between leverage and profitability.

4. METHODS

The study adopts a quantitative explanatory design using a balanced panel dataset covering five financial years from 2020 to 2024. The target population comprised 19 companies listed in the CSE Materials Sector. Purposive sampling was applied based on continuous listing status and the availability of annual-report disclosures. JAT Holdings PLC was excluded because it was not listed throughout the full study period and did not provide a 2020 listed-company baseline. The final sample therefore consists of 18 companies and 90 firm-year observations.

Firm value is the dependent variable and is measured using Tobin's Q. Market value of equity is calculated using the closing share price on the final trading day of each company's financial year (31 March or 31 December, as applicable) multiplied by the number of ordinary shares outstanding. Total interest-bearing debt comprises short-term bank loans, bank overdrafts, corporate debentures and long-term bank borrowings. Non-interest-bearing trade payables and accrued liabilities are excluded.

Tobin's Q is calculated as follows:

$$Tobin's\ Q = (Market\ value\ of\ equity + Book\ value\ of\ total\ interest - bearing\ debt) / Book\ value\ of\ total\ assets$$

The independent variables are DER and DTA, calculated as:

$$DER = Total\ interest - bearing\ debt / Total\ equity$$

$$DTA = Total\ interest - bearing\ debt / Total\ assets$$

Firm size and profitability are included as control variables. Firm size is measured as the natural logarithm of total assets, while profitability is measured using return on assets (ROA), calculated as net profit after tax divided by total assets.

Because Tobin's Q and DTA both use total assets in their denominators, separate DER-only and DTA-only model specifications were also estimated as sensitivity checks. Outlier screening using studentised residuals and Cook's distance was conducted to examine extreme DER observations. One-percent winsorised re-estimations were reported as producing stable regression parameters. Panel diagnostic procedures included the Breusch–Pagan Lagrange Multiplier test, Hausman test, Modified Wald test and Wooldridge test. The reported Breusch–Pagan LM result supported a panel specification over pooled OLS ($p < 0.001$), while the Hausman test was used to select between fixed and random effects. Huber–White cluster-robust standard errors

were used to address heteroskedasticity and within-firm serial correlation; inference is nevertheless treated cautiously because the panel contains only 18 firm clusters.

The primary panel regression equation is specified as follows:

$$\text{Tobin's Q}_{it} = \beta_0 + \beta_1(\text{DER}_{it}) + \beta_2(\text{DTA}_{it}) + \beta_3(\text{Firm Size}_{it}) + \beta_4(\text{ROA}_{it}) + u_i + \epsilon_{it} \quad (1)$$

5. RESULTS

Table 1 presents the descriptive statistics for the 90 firm-year observations. Mean Tobin's Q is 1.0199, with a standard deviation of 1.0692 and a range from 0.1842 to 8.9866. DER has a mean of 0.4877 and a maximum of 11.2450, indicating variation in the leverage levels of the sampled firms. DTA has a mean of 0.2151. Mean ROA is 0.0945, with observations ranging from −0.1450 to 0.4620. Firm size, measured as the natural logarithm of total assets, has a mean of 22.5784.

Table 1: Descriptive Statistics of Sample Variables (N = 90)

Variable	Mean	Std. Dev.	Median	Minimum	Maximum
Tobin's Q	1.0199	1.0692	0.7434	0.1842	8.9866
DER	0.4877	1.3412	0.2215	0.0000	11.2450
DTA	0.2151	0.1784	0.1820	0.0000	0.7420
Firm Size	22.5784	1.1842	22.4510	20.9142	24.9510
ROA	0.0945	0.1124	0.0780	-0.1450	0.4620

Table 2 reports the Pearson correlation coefficients and variance inflation factors. The correlation between DER and DTA is 0.4125. The largest absolute correlation among the explanatory variables is between DTA and ROA (−0.6791). VIF values range from 1.05 to 1.88, with a mean of 1.48.

Table 2: Pearson Correlation Matrix and Variance Inflation Factors (VIF)

Variable	Tobin's Q	DER	DTA	Firm Size	ROA	VIF
Tobin's Q	1.0000	-	-	-	-	-
DER	-0.0812	1.0000	-	-	-	1.24
DTA	+0.0421	+0.4125	1.0000	-	-	1.88
Firm Size	-0.1942	+0.0821	+0.1241	1.0000	-	1.05
ROA	+0.2415	-0.3124	-0.6791	-0.1142	1.0000	1.76

The Hausman test produced a chi-square statistic of 5.2464 (df = 4, p = 0.2629), supporting the random-effects estimator. The regression estimates are presented in Table 3.

Table 3: Random-Effects Panel Regression Results (Dependent Variable: Tobin's Q)

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value
Constant	+6.2730	2.9498	2.1266	0.0364
DER (H1)	-0.0308	0.0481	-0.6408	0.5234
DTA (H2)	+0.2074	0.8769	0.2365	0.8136
Firm Size (FS)	-0.2444	0.1322	-1.8495	0.0679
ROA	+2.5023	1.2790	1.9564	0.0537

Source: Author's EViews calculation based on CSE disclosures (2020–2024). Weighted R-squared = 0.0838 (8.38%), Adjusted R-squared = 0.0406, F-statistic = 1.9424 (p = 0.1108).

Model statistics: Weighted R^2 = 0.0838; adjusted R^2 = 0.0406; F-statistic = 1.9424; model p-value = 0.1108.

DER has a negative coefficient (β = −0.0308, p = 0.5234), while DTA has a positive coefficient (β = 0.2074, p = 0.8136). Neither leverage measure is statistically significant at the 10%, 5% or 1% level; therefore, H1 and H2 are not supported. Firm Size has a negative coefficient (β = −0.2444, p = 0.0679), and ROA has a positive coefficient (β = 2.5023, p = 0.0537). Both control-variable coefficients are significant at the 10% level but not at the 5% level. The overall model is not statistically significant (p = 0.1108). The separate DER-only and DTA-only specifications also report non-significant leverage coefficients (p = 0.5120 and p = 0.8210, respectively).

6. DISCUSSION

The results do not indicate a statistically significant association between either leverage measure and Tobin's Q in the sampled Materials Sector companies during 2020-2024. Accordingly, the analysis does not support H1 or H2. This finding should not be interpreted as proof that capital structure is irrelevant to firm value; rather, the selected leverage measures do not provide statistically significant explanatory evidence within this sample and model.

The positive coefficient for ROA and negative coefficient for Firm Size are statistically significant only at the 10% level. Furthermore, the overall regression model is not statistically significant. These individual coefficient estimates therefore provide, at most, tentative evidence of associations and should not be described as strong or definitive determinants of firm value.

One possible explanation for the negative Firm Size coefficient is that larger capital-intensive companies may have faced greater fixed-cost commitments and lower operational flexibility during a period of macroeconomic uncertainty. However, the study does not directly measure capacity utilisation, cost structure, supply-chain flexibility or investment behaviour. This explanation is therefore tentative and requires further investigation using firm-level operational data.

7. IMPLICATIONS AND LIMITATIONS

Practical and Managerial Implications: The findings offer practical guidance for Chief Financial Officers, corporate decision-makers, and equity investors in capital-intensive sectors. Financial managers should refrain from relying solely on leverage adjustments or financial engineering to enhance market valuation. Strategic priority should be directed toward operational cost-structure optimization, operating margin defense, working capital liquidity management, and asset productivity. For equity investors, valuation models should emphasize core operating earnings (ROA) and cash-flow resilience alongside balance-sheet debt metrics during macroeconomic shocks.

Regulatory and Policy Implications: Financial regulators, including the Colombo Stock Exchange and the Central Bank of Sri Lanka, should evaluate corporate sector stability using holistic operating liquidity and cash-flow coverage metrics rather than relying exclusively on debt-to-equity thresholds during economic crises.

Limitations and Future Research Directions: This study is subject to several scope limitations. First, it focuses exclusively on 18 listed firms in the CSE Materials Sector over a five-year study period from 2020 to 2024. The relatively small sample size and limited study period may restrict the generalisability of the findings to other sectors and periods. Future researchers are encouraged to conduct comparative pre-crisis versus post-crisis evaluations, expand sample sizes across multiple CSE GICS sectors, and incorporate additional explanatory variables such as corporate governance indicators, foreign exchange exposure, and dividend payout policies.

REFERENCES

Alnajjar, M. and Belouni, A. (2022) ‘Capital structure and market valuation in emerging market firms during economic distress’, *Journal of Emerging Market Finance*, 21(3), pp. 275–298.

Bunyaminu, A., Yakubu, I.N. and Owusu, F. (2025) 'Leverage, macroeconomic volatility, and corporate value in developing economies', *International Journal of Managerial Finance*, 21(1), pp. 45–68.

Central Bank of Sri Lanka (2022) *Annual Report 2022: Economic progress and policies*. Colombo: Central Bank of Sri Lanka.

Central Bank of Sri Lanka (2023) *Financial Stability Review 2023*. Colombo: Central Bank of Sri Lanka.

Chandrasiri, M.A.K., Piratheepan, T. and Nimalathasan, B. (2017) 'Capital structure and firm value: Empirical evidence from Sri Lanka', *Journal of Accountancy and Finance*, 4(1), pp. 15–28.

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

Kruk, H. (2021) 'Firm scale, operational flexibility, and corporate performance in times of macroeconomic crisis', *Journal of Business Research*, 128, pp. 412–425.

Modigliani, F. and Miller, M.H. (1958) 'The cost of capital, corporation finance and the theory of investment', *The American Economic Review*, 48(3), pp. 261–297.

Modigliani, F. and Miller, M.H. (1963) 'Corporate income taxes and the cost of capital: A correction', *The American Economic Review*, 53(3), pp. 433–443.

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

Ngoc, T., Nguyen, X.H. and Pham, K. (2023) 'The effect of capital structure on firm value: A study of companies listed on the Vietnamese stock market', *International Journal of Financial Studies*, 11(3), Article 100.

Nguyen, T.H. and Nguyen, V.C. (2022) 'Financial leverage and corporate value under macroeconomic shocks: Evidence from Southeast Asia', *Journal of Risk and Financial Management*, 15(8), Article 342.

Nguyen, V.C. and Nguyen, T.H. (2023) 'Operational efficiency, capital structure, and market performance in emerging Asian equities', *Finance Research Letters*, 54, Article 103781.

Priya, K., Piratheepan, T. and Nimalathasan, B. (2015) 'Impact of capital structure on the firm value: Case study of listed manufacturing companies in Sri Lanka', *Scholars World*, 3(1), pp. 47–52.

Tesema, T.N. (2024) 'The effect of capital structure on performance: Empirical evidence from manufacturing companies in Ethiopia', *Cogent Economics & Finance*, 12(1), Article 2300926.

Velnampy, T. and Pratheepkanth, P. (2012) 'Capital structure and firm performance: A study of listed manufacturing companies in Sri Lanka', *Global Journal of Management and Business Research*, 12(13), pp. 1–7.

Weerakoon, D., Jayasuriya, S. and Arunatilake, N. (2022) *Sri Lanka's economic crisis: Causes, consequences, and policy options*. Colombo: Institute of Policy Studies of Sri Lanka.

Wignaraja, G., Panditaratne, D., Kannangara, P. and Hundlani, D. (2023) *Sri Lanka's economic crisis: Lessons for managing debt and resilience*. London: Overseas Development Institute.