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The Relationship Between Capital Structure and Financial Performance of Listed Companies in Pakistan

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Abstract

For companies in emerging markets, a financial issue that is crucial is the decision between debt and equity financing and between short-term and long-term financing, the interest rates and macroeconomic conditions in which these companies operate, can change rapidly. The study design adopted for this study was quantitative longitudinal research design that was based on secondary financial data to examine the relationship between capital structure and financial performance of companies listed on Pakistan Stock Exchange (PSX). 280 firm-year observations were generated by a balanced panel of 40 non-financial companies selected using purposive sampling based on full annual financial statements for the period 2019-2025. Capital structure was calculated using debt-to-equity ratio and short-term debt ratio and long-term debt ratio was used as a control variable, while performance was determined by return on assets (ROA) and return on equity (ROE), and firm size, asset tangibility, sales growth and liquidity were used as controls. The ordinary least squares, fixed-effects, and random-effects models were estimated using robust standard errors; the Hausman test indicated the fixed-effects model for ROA and the random-effects model for ROE. Leverage showed negative correlation with ROA with debt-equity ratio (β = −1.80) and short-term debt ratio (β = −18.34) being significant, while the long term debt ratio was not. The short-term debt (β = −47.35) and long-term debt (β = −30.60) showed negative association and the debt to equity ratio showed positive association (β = 3.31) with ROE. The results suggest that debt maturity mix has a significant impact on firm performance and that firms need to carefully manage short-term debt.

Keywords: *capital structure, financial performance, return on assets, return on equity, panel data, Pakistan Stock Exchange*

Introduction

One of the biggest decisions that management of a company has to make is how the company finances its assets. The mix of debt and equity that a firm uses to finance its operations and investment, called its capital structure, has a significant impact on a firm's cost of capital, its risk of financial distress, and its management and owner incentives. Several different theories have emerged from the empirical literature, each suggesting a different relationship between leverage and firm outcomes, such as trade-off, pecking-order and agency theories (Frank & Goyal 2009; Graham & Leary 2011).

Empirical research on leverage and performance is ambiguous. Others believe that if you have a higher leverage, you will perform poorly. The results in Jordan and Malaysia show that there is a

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negative relationship between debt and accounting performance measures (Salim & Yadav, 2012; Zeitun & Tian, 2007). Others, however, conclude that using leverage can enhance efficiency or performance as in agency cost arguments that leverage holds managers accountable (Berger & Bonaccorsi di Patti, 2006; Margaritis & Psillaki, 2010). The association can also be different depending on the maturity of the debt, as short-term debt was negatively related to return on equity (ROE) while long-term debt was positively related to ROE for listed companies in Ghana according to a study by Abor (2005). Studies from other emerging markets are continuing to explore the relationship between capital structure and firm value (Vo & Ellis, 2017), while recent work indicates that the relationship between leverage and performance is influenced by firm size (Ibhagui & Olokoyo, 2018; Ma et al., 2022; Zhu et al., 2024; Hussain et al., 2023).

Pakistan offers a good background to explore these questions. NNFI companies of Pakistan Stock Exchange (PSX) are heavily dependent upon borrowing and the economic environment of the country is characterized by high interest rates, inflation, exchange rate pressures and volatile economy. In the past, some research on Pakistan firms has focused on understanding the factors influencing capital structure (Shah & Khan, 2007; Sheikh & Wang, 2011; Hanif et al., 2024) and the influence of capital structure on performance of non-financial listed firms (Sheikh & Wang, 2013). It is important to note, however, that this evidence spans a period prior to the most recent period, which has involved the pandemic, a considerable monetary contraction, and adjustment. It is too early to know if earlier conclusions are valid in this more dynamic environment, and if the relationship of various components of debt to performance is different.

This study tries to answer these questions by employing a quantitative longitudinal study of 40 non-financial companies quoted on PSX between 2019 and 2025. It separates total leverage (the debt-to-equity ratio) from short-term and long-term debt, and explores the relationship of these classes with two complementary performance measures return on assets (ROA) and return on equity (ROE) while holding constant the firm size, asset tangibility, sales growth, and liquidity. The aims of the study were to (a) describe the capital structure and performance of the sampled firms; (b) estimate the relationship between capital structure for the firms with ROA and ROE using panel regression methods; (c) determine which panel specification was suitable for each performance measure; and (d) make implications for managers, investors, and policy makers.

Literature Review

The capital structure-performance link is discussed in the context of three major theoretical approaches. The trade-off view suggests that firms weigh the tax and discipline advantages of debt against the financial distress disadvantages and suggest that there is an optimal level of debt financing, after which, each extra dollar of debt has an adverse impact on performance. The pecking-order theory proposes that information asymmetries make firms' preferred financing source internal funding, then external debt financing, then external share financing, such that more profitable firms choose less external debt financing. Manager/Shareholder and Shareholder/Creditor conflicts are highlighted in agency views, and this debt discipline can also lead to risk-shifting. Frank & Goyal (2009) analyzed what factors consistently predict leverage and concluded that among others, profitable companies were more likely to be underleveraged while larger companies and those with more tangible assets were more likely to be overly leveraged. Graham and Leary (2011) have summarized the empirical capital structure literature, and they point out that there is no single theory that accounts for observed capital structure behavior; and Fama & French (2005) demonstrated that equity financing occurs with

some frequency, which contradicts the simple pecking-order ordering. Such insights suggest that the leverage–performance relationship might ultimately be an empirical issue, and could vary depending on context.

Capital Structure and Performance - International Evidence

There is a substantial amount of research that directly tests the relationship. Zeitun & Tian (2007) investigated the Jordanian companies and found that capital structure had a negative relationship with the performance of companies. Debt level was generally found to be negatively associated with accounting performance measures in the case of listed companies in Malaysia as reported by Salim & Yadav (2012). By contrast, evidence supporting agency costs theory was found in the studies by Margaritis & Psillaki (2010) and Berger & Bonaccorsi di Patti (2006) that found a positive relationship between leverage and efficiency in the banking industry. The mixed pattern implies that the leverage effect is subject to inter-institutional, industry and performance measure variations. The relationship between firm size and this relationship between leverage and performance also supports this: Ibhagui & Olokoyo (2018) found that this relationship varies by firm size, and Vo & Ellis (2017) studied the capital structure-performance-firm value relationship in Vietnam, which is an emerging-market context similar in some aspects to Pakistan.

Debt Maturity and Performance

It may be as important to the structure of debt as its amount. A positive correlation was found between both short-term debt and return on equity and long-term debt and return on equity among the listed companies in Ghana, with negative and positive relationships respectively, by B. Abor (2005). Short term debt is on average less expensive and more flexible, and carries refinancing and liquidity risk, especially if rates fluctuate; long term debt is more stable, but is tied up and usually higher in rate. With a high interest rate environment and high volatility in these rates, the results for the balance of these effects can vary from the results in more stable economies, and there may be a need to examine each debt separately.

Evidence from Pakistan

The determinants of capital structure and its implications have been studied in the context of Pakistani firms. Shah & Khan (2007) investigated the determinants of capital structure by using panel data from Pakistan and discussed their implications for the competing theories, while Sheikh and Wang (2011) studied the determinants of capital structure for manufacturing sector companies such as profitability, liquidity, firm size and tangibility. Sheikh & Wang (2013) have examined the effect of capital structure performance of non-financial listed firms in Pakistan and found that there is a negative relationship between capital structure and performance. These contributions offer a floor, but apply to earlier times, and do not account for the relationship of the component debt to performance when macroeconomic shock and adjustment were particularly strong.

Control Variables

The authors of the literature find a number of firm attributes that can affect their leverage and performance, and thus should be controlled. The relationship between diversification, access to financing and economies of scale are often linked to firm size (Frank & Goyal, 2009; Ibhagui & Olokoyo, 2018). The asset tangibility has a direct influence on borrowing power and could indicate

the capital intensity (Frank & Goyal, 2009; Sheikh & Wang, 2011). Sales growth is indicative of growth opportunities and conditions of demand, while liquidity is indicative of conditions of short-term obligations. The addition of these variables minimizes the chances of the estimated leverage coefficients being a result of differences in size, asset structure, growth or liquidity.

Research Gap and Hypotheses

The reviewed literature reveals that the relationship between capital structure and performance is theoretically ambiguous, empirically mixed, and it is dependent on the maturity of debt and limited in evidence for Pakistan for the most recent period. Based on the evidence collected, three hypotheses were formulated. H2: ROA and ROE have a negative relationship with the debt-to-equity ratio. H2: A decrease in the short term debt ratio is related to a decrease in ROA and ROE. There is a negative relationship between the long-term debt ratio and ROA and ROE.

Data & Methodology

Research Design

A quantitative longitudinal research design was used in the study, with the secondary financial data to examine the correlation between capital structure and financial performance of companies currently listed on the Pakistan Stock Exchange (PSX). A longitudinal panel design was chosen because it uses cross-sectional variation in the firms together with time variation, and thus, unobserved firm specific variation can be accommodated and the estimation sample size can be increased (Baltagi, 2021). The study was explanatory and aimed to answer the question of the association between various capital structure components and the financial performance of the company.

Sample, Sampling Technique

The companies in the sample were chosen using purposive sampling and the availability of complete annual financial statements for the 2019–2025 time frame, resulting in a sample of 280 firm-year observations (40 firms observed over 7 years). The companies included were those whose equity shares were listed on the PSX during the study period, engaged in non-financial activities and those that had provided audited annual financial statements for all the years under study. Financial institutions such as banks, insurance companies and other financial intermediaries were not included as they have their own capital structures and regulatory requirements and therefore do not have leverage ratios comparable with those of non-financial businesses. The companies chosen belonged to eight industrial categories: Textiles, Cement, Fertilizer & Chemicals, Oil & Gas & Power, Food & Personal Care, Pharma, Auto & Engineering, Paper & Other Manufacturing.

Data Sources and Collection

The data was retrieved from the audited annual reports, PSX disclosures and the publicly accessible corporate financial records (Pakistan Stock Exchange, 2025). Data for the items appearing on the balance sheet and income statement that are needed for the calculation of the study variables were collected for each firm-year and compiled into a single panel dataset. No observations were missing and figures were checked with subsequent annual reports for restatement and recording errors.

Variables and Measurement

The independent variable in this study is capital structure which is measured with three ratios. Debt-to-equity ratio (DER) was obtained by dividing the total interest bearing debt by total shareholders' equity. The short-term debt ratio (STD) was computed as the ratio of short-term borrowings to total assets and the long-term debt ratio (LTD) was computed as the ratio of long-term borrowings to total assets. The dependent variable was financial performance represented in return on assets (ROA) which is shown as percentage net profit after tax/total asset, and return on equity (ROE) which is shown as percentage net profit after tax/shareholders' equity.

Four control variables were added in. The measure of firm size (SIZE) was the natural log of total assets. Net fixed assets divided by total assets was used to measure asset tangibility (TANG). The annual percent change in net sales was used as a measure of sales growth (GROWTH). Current ratio was used to assess the liquidity of the business and was computed by dividing the current assets by current liabilities (LIQ).

Model Specification

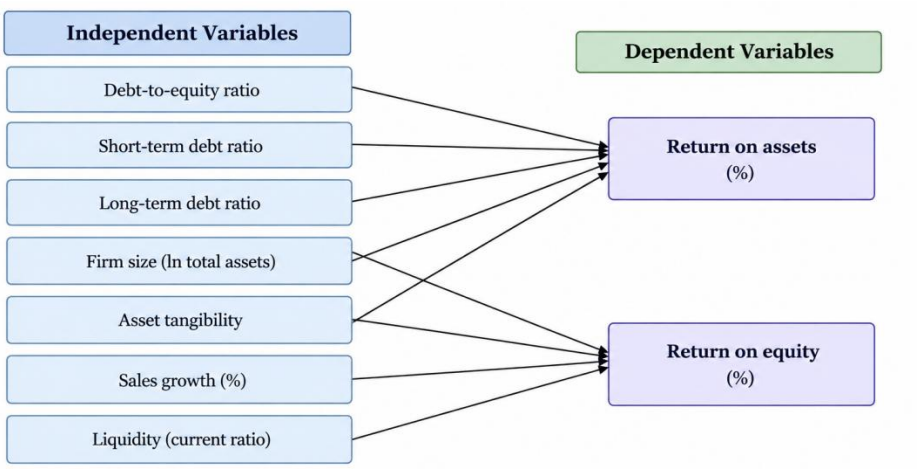
Two panel regression models were estimated to identify the link between various components of debt and financial performance of the companies, namely ROA and ROE. The overall structure was:

$$ROA_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 STD_{it} + \beta_3 LTD_{it} + \beta_4 SIZE_{it} + \beta_5 TANG_{it} + \beta_6 GROWTH_{it} + \beta_7 LIQ_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 STD_{it} + \beta_3 LTD_{it} + \beta_4 SIZE_{it} + \beta_5 TANG_{it} + \beta_6 GROWTH_{it} + \beta_7 LIQ_{it} + \mu i + \varepsilon it \quad (2)$$

The first index (i) refers to firms (1, ..., 40), the second index (t) to years (2019–2025), the intercept β_0 is not observed, the coefficients to be estimated are β_1 to β_7, the unobserved firm-specific effect is μ_i, and the idiosyncratic error term is εit.

Figure 1: Conceptual Model



Estimation Strategy

The data were analyzed using Stata (StataCorp, 2023). Firstly, descriptive statistics and correlation analysis were carried out to investigate the distribution of the variables and their initial correlations, and variance inflation factors (VIFs) were computed to examine multicollinearity among explanatory variables, where the values below five were considered acceptable. Where appropriate, Fisher-type tests based on the augmented Dickey–Fuller regressions with firm-specific intercept were performed to guarantee that the variables are stationary and that the relationships estimated are not spurious (Baltagi, 2021).

The pooled ordinary least squares (OLS), fixed-effects and random-effects estimates were then calculated for each performance measure. The Hausman specification test was used to determine the suitability of fixed-effects or random-effects models (Wooldridge, 2010). The presence of heteroskedasticity and serial correlation in the panel data were checked using the appropriate test for the two, respectively, the modified Wald test for groupwise heteroskedasticity and the Wooldridge test for serial correlation in panel data (Wooldridge, 2010). Standard errors were applied at the firm level where necessary as the violations of the classical assumptions were identified in these diagnostics. Significance at the 5% level was calculated, as well as 1% and 0.1%.

Ethical Considerations

This study was conducted without human subjects or with information available in the public domain and subject to audit. The references of all data sources were identified and the figures were not changed other than the ratios calculated above.

Analysis and Results

The results are reported in the sequence of the analytical procedures outlined in the methodology: sample composition, descriptive analysis, correlation analysis, panel unit root and diagnostic tests, and the panel regression estimates of ROA and ROE.

Sample Composition

The sample is broken down by industrial group in Table 1. The 40 firms observed 280 firm-years in the period 2019-2025. There were 20.0% (8 firms) in the “textile” category, 15.0% (6 firms) in the

"oil, gas and power" category, 12.5% (5 firms) in the "fertilizer and chemicals" category, and 12.5% (5 firms) in the "food and personal care" category. Four firms each in Cement, Pharmaceuticals, Auto and Engineering, and Paper manufacturing accounted for 10.0% of the total. The sample therefore represents a wide range of sectors other than finance.

Table 1: Distribution of Sampled Firms by Industrial Group

Industrial group	Firms	Firm-year observations	% of sample
Textile	8	56	20.0
Cement	4	28	10.0
Fertilizer and chemicals	5	35	12.5
Oil, gas and power	6	42	15.0
Food and personal care	5	35	12.5
Pharmaceuticals	4	28	10.0
Automobile and engineering	4	28	10.0
Paper and other manufacturing	4	28	10.0
Total	40	280	100.0

Note. N = 40 firms observed annually from 2019 to 2025 (balanced panel).

Descriptive Statistics

Descriptive statistics are shown in Table 2. The average firm earned a return on assets of 6.40% (SD = 6.21) and a return on equity of 14.20% (SD = 10.17), with considerable dispersion across firm-years: ROA ranged from -11.47% to 22.75%, and ROE ranged from -13.93% to 45.71%. The average debt-to-equity ratio was 1.24 (SD = 1.07), suggesting firms had a slight debt leverage, but ranged from 0.04 to 5.96. The short-term debt averaged 0.23 of total assets (SD = 0.12), while the long-term debt averaged 0.16 of total assets (SD = 0.08), suggesting higher dependence on short-term debt. The average firm size was 9.86 (natural log of total assets), tangibility averaged 0.47, sales growth averaged 14.06% (SD = 18.17) and the average current ratio was 1.22. Although three leverage measures were included simultaneously, the variance inflation factors were in the range of 1.02 to 3.51, none of which exceeded the value of 5, thus suggesting that multicollinearity was not a serious problem.

Table 2: Descriptive Statistics and Variance Inflation Factors

Variable	*M*	*SD*	Minimum	Maximum	VIF
Return on assets (%)	6.40	6.21	-11.47	22.75	--
Return on equity (%)	14.20	10.17	-13.93	45.71	--
Debt-to-equity ratio	1.24	1.07	0.04	5.96	3.51
Short-term debt ratio	0.23	0.12	0.01	0.57	2.81
Long-term debt ratio	0.16	0.08	0.00	0.43	1.91
Firm size (ln total assets)	9.86	1.28	7.14	12.93	1.17
Asset tangibility	0.47	0.18	0.09	0.94	1.24
Sales growth (%)	14.06	18.17	−26.99	59.76	1.02
Liquidity (current ratio)	1.22	0.48	0.30	2.85	1.12

Correlation Analysis

The Pearson's correlations are given in Table 3. The short-term debt ratio had a strong, negative correlation with ROA (r = -0.70, p < 0.001), the debt-to-equity ratio had a strong, negative correlation with ROA (r = -0.64, p < 0.001), and the long-term debt ratio had a weak, but significant, negative correlation with ROA (r = -0.17, p < 0.01). ROE was negatively correlated with the short-term debt ratio (r = -0.18, p < 0.01) and not significantly correlated with the debt-to-equity (r = -0.01) and the long-term debt ratio (r = 0.07). ROE was positively related to firm size (r = 0.43), sales growth (r = 0.18), and liquidity (r = 0.20) with tangibility (r = -0.41) having a negative relationship. The largest correlation between any explanatory variables was between the debt-to-equity ratio and the short-term debt ratio (r = 0.71) and none of the coefficients had absolute values exceeding 0.75. These initial correlations indicate a negative relationship between debt, especially short-term debt, and performance and are not adjusted for other factors and thus need the multivariate analysis that follows.

Table 3: Pearson Correlation Matrix of Study Variables

Variable	1	2	3	4	5	6	7	8
1. ROA	--							
2. ROE	0.35***	--						
3. Debt-to-equity	-0.64***	-0.01	--					
4. Short-term debt	-0.70***	-0.18**	0.71***	--				
5. Long-term debt	-0.17**	0.07	0.45***	-0.01	--			
6. Firm size	0.12*	0.43***	0.24***	0.31***	-0.03	--		
7. Tangibility	-0.14*	-0.41***	-0.07	0.03	-0.29***	-0.16**	--	
8. Sales growth	0.07	0.18**	0.08	0.08	0.08	-0.05	-0.02	--
9. Liquidity	0.06	0.20***	0.09	-0.02	0.20***	-0.05	-0.29***	0.01

Note. $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

Panel Unit-Root and Diagnostic Tests

The Fisher type tests of the panel unit roots are reported in Table 4. The test statistics for the acceptance of the null hypothesis (all panels contained a unit root) ranged from 103.10 for the short-term debt ratio (p = 0.042) to 139.94 for the long-term debt ratio (p < 0.001). The variables were then considered stationary in levels and were not differenced.

Table 4: Fisher-Type Panel Unit-Root Tests

Variable	**$\chi^2(80)$**	***p***	**Conclusion**
Return on assets (%)	130.28	< 0.001	Stationary
Return on equity (%)	115.88	0.005	Stationary
Debt-to-equity ratio	120.59	0.002	Stationary
Short-term debt ratio	103.10	0.042	Stationary
Long-term debt ratio	139.94	< 0.001	Stationary
Firm size (ln total assets)	139.19	< 0.001	Stationary
Asset tangibility	107.75	0.021	Stationary
Sales growth (%)	111.18	0.012	Stationary
Liquidity (current ratio)	129.43	< 0.001	Stationary

Note. The null hypothesis is that all panels contain a unit root. Tests included a firm-specific intercept; *p* values were adjusted for the short time dimension ($T = 7$). $\chi^2(80)$ = Fisher statistic with 2 × 40 degrees of freedom.

The summary of specification and diagnostic tests is presented in Table 5. The modified Wald test suggested that groupwise heteroskedasticity existed in both models ($p \leq 0.001$), while the Wooldridge test showed that serial correlation was present in the ROA model, $F(1, 39) = 25.57$, $p < 0.001$, but not in the ROE model, $F(1, 39) = 3.87$, $p = 0.056$. Standard errors clustered by firm were used for all estimates due to heteroskedasticity in both models. The Hausman test was used to determine if the fixed-effects model was preferred over the random-effects model, a test that was rejected for ROA, $\chi^2(7) = 16.83$, $p = 0.019$, suggesting that the fixed effects model was preferred as the firm-specific effects were correlated with the regressors. The Hausman test rejected the random-effects specification for ROE ($\chi^2(7) = 6.17$, $p = 0.520$).

Table 5: Heteroskedasticity, Serial Correlation, and Hausman Specification Tests

Test	ROA model	*p*	ROE model	*p*
Wooldridge test for serial correlation, $F(1, 39)$	25.57	< 0.001	3.87	0.056
Modified Wald test for heteroskedasticity, $\chi^2(40)$	828.8	< 0.001	72.9	0.001
Hausman specification test, $\chi^2(7)$	16.83	0.019	6.17	0.520
Preferred specification	Fixed effects		Random effects	

Note: Cells show the test statistic and its *p* value for each model. A significant Hausman test favors fixed effects; a nonsignificant test favors random effects.

Regression Results for Return on Assets

Table 6 shows the estimates of ROA. The preferred model from the Hausman test, the fixed-effects model accounted for 61% of the within-firm variability in ROA ($R^2 = 0.61$). Debt to equity ratio was found to have a strong negative relationship with ROA ($\beta = -1.80$, SE = 0.28, $p < 0.001$): for each unit increase in the ratio, ROA decreased by 1.80 percentage points. There was also a strong, negative association between the short-term debt ratio and ROA ($\beta = -18.34$, SE = 3.24, $p < 0.001$): For every 0.10 increase in short-term debt to total assets, ROA decreased by approximately 1.83 percentage points. The long-term debt ratio was not statistically significant with a negative coefficient ($\beta = -6.13$, SE = 4.03, $p = 0.136$). Firm size ($\beta = 1.64$, $p = 0.037$) and Sales growth ($\beta = 0.05$, $p < 0.001$) were significantly and positively associated with ROA among the controls while Tangibility ($p = .593$) and Liquidity ($p = 0.076$) were not significant. The signs of the pooled OLS and the random-effects estimates were the same for the leverage variables, but the size of the pooled estimate (-32.16) and the random-effects estimate (-22.32) were larger in magnitude for short-term debt, indicating that the former overstated the effect of the variable if firm-specific effects were not accounted for in the model.

Table 6: Panel Regression Estimates: Return on Assets

Variable	Pooled OLS	Fixed effects	Random effects

Constant	-1.89 (3.64)	--	-2.33 (2.95)
Debt-to-equity ratio	-1.50* (0.65)	-1.80*** (0.28)	-1.66*** (0.31)
Short-term debt ratio	-32.16*** (4.20)	-18.34*** (3.24)	-22.32*** (2.98)
Long-term debt ratio	-7.63 (7.62)	-6.13 (4.03)	-7.26 (4.18)
Firm size	1.81*** (0.30)	1.64* (0.76)	1.59*** (0.32)
Asset tangibility	-2.50 (2.91)	2.50 (4.64)	-2.11 (2.78)
Sales growth	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Liquidity	1.20 (0.76)	1.85 (1.02)	1.47* (0.71)
R^2	0.71	0.61 (within)	0.70 (overall)
Model test	$F(7, 39) = 71.70$***	$F(7, 39) = 52.02$***	$\chi^2(7) = 549.25$***
Observations	280	280	280
Firms	40	40	40

Note. Cells show unstandardized coefficients with firm-clustered robust standard errors in parentheses. The fixed-effects model was preferred by the Hausman test. The constant is not reported for the fixed-effects model. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$

Regression Results for Return on Equity

The estimates of the ROE are shown in Table 7. The random-effects model, which was preferred by the Hausman test, had an overall R^2 of 0.49. The debt-to-equity ratio had a positive and significant correlation with ROE ($\beta = 3.31$, SE = 0.76, $p < 0.001$), while it has a negative correlation with ROA. The short-term debt ratio was strongly negatively associated with ROE ($\beta = -47.35$, SE = 7.27, $p < 0.001$; implying a decline of ROE by approximately 4.74 percentage points for a 0.10 increase in the ratio); and the long-term debt ratio was also significantly negative ($\beta = -30.60$, SE = 7.48, $p < 0.001$; implying a decline of ROE by approximately 3.06 percentage points for a .10 increase in the ratio). The ROE was found to be positively and significantly related to firm size ($\beta = 3.67$, $p < 0.001$), sales growth ($\beta = 0.13$, $p < 0.001$) and liquidity ($\beta = 3.64$, $p < 0.001$) while tangibility was negatively associated ($\beta = -17.55$, $p < 0.001$). Similarly, the pooled OLS and fixed-effects models had the same results for the leverage variables. As one might expect, due to the limited variation in firm size across firms over seven years, the coefficient for firm size was also near zero and non-significant in the fixed-effects model ($\beta = -0.16$).

Table 7: Panel Regression Estimates: Return on Equity

Variable	**Pooled OLS**	**Fixed effects**	**Random effects**
Constant	−10.86 (8.13)	—	−8.03 (7.41)
Debt-to-equity ratio	2.91** (0.91)	3.67*** (0.83)	3.31*** (0.76)
Short-term debt ratio	−45.61*** (7.63)	−48.70*** (8.95)	−47.35*** (7.27)
Long-term debt ratio	−23.80** (7.24)	−36.40*** (9.75)	−30.60*** (7.48)
Firm size	3.92*** (0.59)	−0.16 (2.30)	3.67*** (0.57)
Asset tangibility	−16.86** (4.78)	−25.33 (17.40)	−17.55*** (4.40)
Sales growth	0.13*** (0.02)	0.13*** (0.03)	0.13*** (0.02)
Liquidity	2.90* (1.34)	6.91* (2.82)	3.64** (1.18)
R^2	.49	.25 (within)	.49 (overall)
Model test	$F(7, 39) = 24.74$***	$F(7, 39) = 15.09$***	$\chi^2(7) = 187.11$***
Observations	280	280	280

Firms	40	40	40

Note. Cells show unstandardized coefficients with firm-clustered robust standard errors in parentheses. The random-effects model was preferred by the Hausman test. The constant is not reported for the fixed-effects model. *$p < .05$. **$p < .01$. ***$p < .001$

Discussion

The findings reveal the negative relationship of leverage with the profitability of the assets of the sample companies in Pakistan. The debt-to-equity ratio and the short-term debt ratio were negatively correlated with ROA in the preferred fixed-effects model. This is an expected result as the other emerging markets studies reported opposite relationship between debt and accounting performance (Salim & Yadav, 2012; Zeitun & Tian, 2007) and the study of Sheikh & Wang (2013) for non-financial listed firms in Pakistan shows opposite relationship. A few possibilities exist for this. Interest costs will directly cut into net income, and when interest rates are high and changing rapidly, the debt load can be particularly onerous. Furthermore, the profitability of companies could impact their borrowing practices, given the pecking-order theory that suggests profitable companies would be less dependent on debt (Frank & Goyal, 2009); the negative correlation observed could thus be due, in part, to reverse causality, which the present design cannot reject. The results support poorly the agency perspective of the discipline of debt (Berger & Bonaccorsi di Patti, 2006; Margaritis & Psillaki, 2010).

The Significance of Debt Maturity

One of the central findings is that short term debt was found to be significantly and negatively related to ROA and long term debt was only significantly related to ROE. This is in contrast to what has been observed in Ghana where the short-term debt held by firms was positively associated with ROE (Abor, 2005), implying that the effect of debt maturity on firms' performance is dependent on the economic environment. The Pakistan-based companies that are dependent on a high amount of short term financing can be forced to refinance their loans at high and uncertain rates, have a higher risk of liquidity crunch, and may be restricted in long-term investment opportunities, all of which can reduce the profitability of the companies. The weaker correlation of long-term debt with ROA might be due to the fact that the debt incurred is generally to finance productive capacity (this could lead to a reduction of overall debt cost in the long term), though this association is not directly tested with the present data.

Return on Equity and Financial Leverage Ratios

The positive relationship between D/E ratio and ROE, yet the negative relationship between D/E ratio and ROA, is consistent with the mechanical effect of financial leverage, where higher the debt the smaller the base and for a given profit higher will be the return per unit of equity. Meanwhile, the negative short-term and long-term debt ratios suggest that after considering the composition of debt, short-term and long-term debt create a burden on the profit available for shareholders. The gap between ROA and ROE is informative and highlights the importance of considering both performance measures; going without a single measure would be misleading when drawing conclusions about the performance of leverage. The Hausman test, as noted above, is another way of highlighting the importance of carefully choosing the panel specification, and extra differences in the fixed-effects and

random-effects results for the controls (such as firm size) as shown here as well. Other differences between the fixed-effects vs. the random-effects results for the controls (here, firm size) as well as the Hausman test noted above highlight the importance of choosing the panel specification carefully.

Control Variables

There were positive relationships between firm size and sales growth with performance, supporting the findings of Frank and Goyal (2009) and Ibhagui and Olokoyo (2018) that larger, growing firms earn better profits due to scale and diversification, and demand effects. Liquidity was positively correlated with ROE and tangibility was negatively correlated with ROE, suggesting that a capital intensive company made less ROE when financing cost was high (Sheikh & Wang, 2011). However, the direction of these effects was quite different among specifications, so care should be taken not to draw firm conclusions regarding individual controls.

Implications

The results have a number of implications. They recommend that managers are better served by limiting the amount of short-term borrowing and by better matching the duration of the financing sources with the duration of investments. They show that not just the level of debt, but also the maturity profile of the debt, is a relevant signal to investors and lenders for the performance of companies. They also provide a rationale for policymakers to promote long-term debt financing, including corporate bonds and sukuk, and to foster a stable monetary and financial environment where debt financing becomes more expensive when borrowing rates fluctuate.

Future Research and Limitations

There are a number of caveats to be faced. The sample consisted of 40 firms based on availability of data and may have resulted in survivorship bias where firms are more likely to report if they are stable. The seven-year period is relatively brief, and contains some atypical economic periods, thus reducing the information available regarding long-run relationships. Analysis was conducted on accounting measures of performance instead of market-based measures. Associations were estimated in the regressions which could not fully account for endogeneity or reverse causality, and other factors like ownership structure, corporate governance, or industry characteristics were not incorporated. Future studies could expand the sample and the time series, consider using dynamic panel estimators to handle endogeneity, incorporate market-based performance measures and governance variables, consider for nonlinear and/or threshold effects of leverage, and examine industries individually.

Conclusion and Recommendations

The study analyzed the correlation between capital structure and financial performance of 40 non-financial companies listed on PSX for the period 2019-2025 using panel models such as Pooled OLS, fixed-effects and random-effects panel models. The Hausman test favoured fixed-effects model for ROA and random-effects model for ROE. The ratios of leverage and ROA were negatively related and ROE was negatively related with both short term and long term debt ratios, but positively related with

debt to equity ratio. The results suggest that the maturity composition of debt is a critical determinant of the capital structure-performance link and that results from any single leverage measure or performance measure could be spurious.

Based on these, the following recommendations are made. Corporate managers should avoid the temptation to take on short-term debt; match the maturity of their debt to the life of the assets they are financing; and keep an eye on liquidity and refinancing risk, particularly if interest rates are not stable. Leverage decisions should be judged in terms of both ROA and ROE, with the idea that the higher the leverage the higher the ROE, but the lower the ROA. When evaluating the performance and risk of a company, investors and creditors should pay attention to the maturity of debt as well as leverage ratios. Policymakers and regulators should encourage the growth of long-term corporate debt markets such as bonds or sukuk and create a stable and predictable macroeconomic environment to make long-term financing more affordable. Researchers should build on this with longer panels, dynamic estimators, and measures of market performance.

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