

Impact of Capital Structure on Firm Performance in the Pharmaceutical Sector of Pakistan

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ABSTRACT

The study aimed at analyzing the effect on the financial performance of pharmaceutical companies on the Pakistan Stock Exchange (PSX) from 2016 to 2025. This study uses pooled Ordinary Least Squares (OLS) regression analysis for investigating the effective of the Quick Ratio (QR) Current Ratio (CR) and Debt to Assets Ratio (DAR) on Earnings Per Share (EPS) using an instable panel data set of nine pharmaceutical companies listed on the PSX (N = 90 observations). All four series are stationary at level I (0), and the results from the augmented Dickey-Fuller (ADF) unit root tests confirm this. Simple regression analysis expressed the Quick Ratio had a positive and statistically significant influence on EPS ($\beta = 11.346$, $p = 0.003$), and multiple regression analysis yielded similar results ($\beta = 17.25$, $p = 0.024$). The Current Ratio is significant in the simple regression model ($p = 0.035$), but is not significant in the combined model due to high multicollinearity with the Quick Ratio ($r = 0.863$). The Debt-to-Assets ratio shows the theoretically expected negative relationship with EPS which in this sample, is not significant at conventional levels. The overall multiple regression model is statistically significant with $F = 3.354$; $p = 0.023$; Adjusted $R^2 = 7.35\%$. The results highlight that short-term liquidity management has a greater influence on shareholders' value than leverage in the pharmaceutical industry of Pakistan, which has significant implications for the financial strategy of the companies, investors' decision-making, and regulatory policies.

Keywords: capital structure, liquidity ratios, earnings per share, pharmaceutical sector, panel data, leverage, Pakistan Stock Exchange

INTRODUCTION

The key idea of capital structure which is a mix of debt and equity financing is at the heart of corporate finance theory and practice. Following the seminal work of Modigliani and Miller (1958), which asserted that a firm's capital structure in a perfectly competitive market is irrelevant to value and performance, several studies have shown that certain market imperfections, such as taxes bankruptcy costs, information asymmetries, and agency conflicts, make these financing decisions important to firm value and performance. However, in the context of this paper, liquidity management, which is generally seen as being of secondary importance to leverage, has not been given as systematic an attention as is the case with leveraging, at least not in the same way in emerging economies. The pharmaceutical sector is a particularly relevant industry in Pakistan for the investigation. The industry has become one of the top five fastest-growing export segments in the country, and in FY 24-25, the export figure stood at USD 457 million, marking the highest value for the industry in two decades. Capital-intensive imports of active pharmaceutical ingredients (APIs), and greater regulatory, currency, and liquidity sensitivity. Such characteristics underscore the critical importance of proper financial management, including the balance between short-term liquidity and long-term financial leverage, in order to guarantee long-term profitability

and competitiveness. Although the financial sector is considered one of the most important sectors, the empirical evidence of the relationship between financial ratios, particularly liquidity ratios, with the shareholder value measures like Earnings Per Share (EPS) in Pakistan is quite limited. The majority of the existing literature on emerging markets is centered around leverage ratios, and returns on assets (ROA) or return on equity (ROE) are generally used as performance measures, whereas EPS, which is an important measure for investor decisions, has been underexplored. Moreover, the pharmaceutical industry is an industry-specific sample; however, the capital structure and firm performance have been measured in the Bangladesh and India context, so it is essential to have empirical research for this sector in Pakistan since financial markets, regulatory framework, and institutional environment are unique in Pakistan. The objective is to fill these gaps through this study which examines the interactive effect of the Quick Ratio Current Ratio and Debt to Assets Ratio on the EPS for nine pharmaceutical companies listed on the Pakistan Stock Exchange from 2016 to 2025. The theoretical and empirical literature is swotted in Section 2, the research methodology is described in Section 3, empirical results are presented and deliberated in Section 4, and policy implications and directions for future research are presented and discussed in Section 5.

LITERATURE REVIEW

Theoretical Framework

Capital structure theory has undergone significant development since Modigliani and Miller (1958) have proved that the value of the firm is unaffected by the financing mix, assuming that the markets are perfect. Later relaxations of these assumptions led to the development of several important theories. The Trade-Off Theory proposes that companies choose a target leverage ratio between the tax benefit of financing with debt and increasing costs of financial distress and bankruptcy. The level of leverage has been related to the profitability of firms with stable cash flows and significant tangible assets, but once past an optimal level, additional leverage will lead to higher financial risk and interest burden, which will reduce profitability (Fosu, 2013). From a theoretical standpoint, the Pecking Order Theory (Myers and Majluf, 1984) predicts that external investors will prefer inside funds, that is retained earnings, over external borrowing, which will be preferred over raising new equity, since external investors are less well informed about the firm than managers are. In this view, companies that have strong internal liquidity in the sense that they have ample cash on hand could be in a more advantageous position to make investments internally than take on outside financing, and thus have the potential to produce better returns for shareholders because they do not pay the costs of adverse selection that come with external financing. Agency Cost Theory also suggests that the more debt a firm has, the more it forces managers to be careful and not spend so much, but the more it does it the more it will make managers and shareholders angry at each other, making operations harder and the firm less valuable (Jensen & Meckling, 1976). Lastly, Signaling Theory proposes that capital structure decisions can also provide private information to market participants; debt issuance may signal management's expectations of future cash flows, while excessive leverage may raise concerns about financial stability.

2.2 Empirical Evidence Empirical studies in emerging markets have had mixed results. Using panel regression analysis, Saifullah et al. (2024) analyzed the pharmaceutical sector in Bangladesh and found that the debt-equity ratio and long-term debt have a significant impact on EPS; the results showed that the overall impact is similar to the Pecking Order Theory. Afroze and Khan (2022) examined the performance of pharmaceutical and chemical companies in Bangladesh and concluded that both short-term and long-term debt ratios have adverse impacts on firm performance, as measured by their earnings per share, which is consistent with the Trade-Off Theory, as financial risk and interest burden due to high leverage raise adverse effects on firms' performance. To conclude, Khan (2023) analyzed the impact of LT debt and TOTA on the EPS of Indian pharmaceutical companies and found that LT debt positively influenced EPS while TOTA negatively influenced the EPS, which confirms the significance of debt maturity structure. In the Pakistani context, capital structure has been found to make a significant impact on financial performance and the wealth of shareholders of textile firms by Mujahid and Akhtar (2014),

whereas Khan (2012) presented mixed results in the case of engineering firms. In the case of the pharmaceutical sector of the Dhaka Stock Exchange, the study by Khatoon et al. (2017) found that the capital structure variables have a significant influence on EPS. Hasan et al. (2014) discovered that leverage has a negative impact on firm performance across all the Bangladeshi listed firms. In total, these pieces of evidence indicate that the leverage-profits relation is negative in emerging markets, although the relation is different from country to country, industry to industry, and era to era.

Research Gap

However, there are several gaps in this extensive body of literature. First, most of the studies have been about leverage ratio without considering liquidity ratio separately from leverage, which is measured by Quick Ratio and Current Ratio, and has an impact on shareholder returns. Secondly, a very few empirical studies have been devoted to the pharmaceutical sector in Pakistan, one of the most important sectors which has very unique regulatory regime. Third, EPS—the most investor-focused performance indicator—is often thought of as the secondary variable of interest, as opposed to the primary. The present study addresses three gaps, considering the relationship between liquidity and leverage, to account for the variation in EPS of the pharmaceutical industry in the emerging economy of Pakistan, and thus contributes to the frontier of emerging market capital structure theory.

RESEARCH METHODOLOGY

Research Design and Data

This study is quantitative, causal and secondary data panel. In this sample, the pharmaceutical companies listed on the Pakistan Stock Exchange (PSX) for a period of 9 years (2016-2025) have been included, giving rise to 90 firm-year observations. The firms comprise of GlaxoSmithKline Pakistan, Abbott Laboratories Pakistan, Highnoon Laboratories, AGP Limited, Ferozsons Laboratories, IBL Healthcare, Macter International, Hoechst Pakistan (Sanofi-Aventis) and more. The selection of samples was done using purposive sampling which involved the following: (i) listed in the PSX throughout the study period; (ii) full audited financial information; and (iii) accounting standards were always applied. Information on finance was gathered from the audited annual reports of PSX, disclosures and publications of the State Bank of Pakistan.

Variables and Measurement

The dependent variable is the net profit after tax divided by the weighted average number of ordinary shares outstanding - Earnings per Share (EPS). This is because EPS is regarded as a performance indicator as it indicates value created for shareholders which is easily comprehended in the PSX environment. The definitions of the three independent variables are: Quick Ratio is a strong measure of current liquidity and measures the ability to pay current obligations immediately without having to sell inventories. Current Ratio (CR) = Current Assets / Current Liabilities. All current assets are combined and the Current Ratio is a general measure of short-term liquidity. Total Debt / Total Assets equals Debt to Assets Ratio (DAR). Most significant of the measures of financial leverage is the DAR, which is the ratio of purchased debt to assets.

Table 1: Variable Summary

Variable	Type	Symbol	Measurement
Earnings Per Share	Dependent	EPS	Net Profit After Tax / Ordinary Shares
Quick Ratio	Independent	QR	(Current Assets – Inventory) / Current Liabilities
Current Ratio	Independent	CR	Current Assets / Current Liabilities
Debt to Assets Ratio	Independent	DAR	Total Debt / Total Assets

Note. All variables are computed from audited financial statements of PSX-listed pharmaceutical companies.

Analytical Techniques

The analytical process goes through five stages. Descriptive statistics (mean, standard deviation, minimum, and maximum) are calculated to describe the distribution of each variable first. Second, Pearson correlation analysis looks at the bivariate linear relationships between variables and highlights possible issues with multicollinearity. Thirdly three simple OLS regressions are performed to examine the individual effect of each of the independent variables on EPS. Fourth, the fourth model is a multiple OLS regression with all variables pooled to approximation the joint effect of QR CR and DAR on EPS as follows: $EPS_{it} = \beta_0 + \beta_1 QR_{it} + \beta_2 CR_{it} + \beta_3 DAR_{it} + \varepsilon_{it}$ In which *i* denotes the index of the firm and *t* the index of the years, β_0 is the intercept, β_1 , β_2 , and β_3 are slope coefficients and ε_{it} is the idiosyncratic error term. Finally, in the fifth step, it conducted Augmented Dickey-Fuller (ADF) unit root tests for all four series to ensure that the series are stationary and that OLS estimation is valid without data transformation. All analysis is made in EViews 12 and Microsoft Excel.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics for all study variables are given in Table 2. The cross-section of EPS is highly heterogeneous, and one would have expected it to have been even more so, with the minimum value of 0.09 for Citi Pharma, and the maximum value of 93.90 for Abbott Laboratories. The average of the Quick Ratio is 1.18 (SD = 0.62), and the Current Ratio is 2.15 (SD = 1.00), which suggests that sampled firms have generally adequate short-term liquidity. The Debt to Assets Ratio has an average of 0.40 (SD = 0.13), which is considered moderate leverage, ranging from 0.15 to 0.70 in a range from conservatively to substantially leveraged firms.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
EPS (PKR)	19.85	21.58	0.09	93.90
Quick Ratio	1.18	0.62	0.41	3.35
Current Ratio	2.15	1.00	0.90	5.83
Debt to Assets	0.40	0.13	0.15	0.70

Note. N = 90 firm-year observations across 9 PSX-listed pharmaceutical companies, 2016–2025.

Correlation Analysis

The Pearson correlation matrix is given in Table 3. EPS is moderately positively correlated with both QRs and CRs, suggesting that the more liquid firms tend to have higher earnings for shareholders. DAR is moderately negatively correlated with EPS, which corroborates the leverage theory that the higher the leverage, the lower the profitability. More importantly, QR and CR are highly positively correlated ($r = 0.863$), which is indicative of a possible multicollinearity problem in the multiple regression model, and is why CR is not significant when added to the model with QR.

Table 3: Pearson Correlation Matrix

Variable	EPS	Quick Ratio	Current Ratio	Debt to Assets
EPS	1.000	0.310*	0.222*	−0.130
Quick Ratio	0.310*	1.000	0.863***	−0.563***
Current Ratio	0.222*	0.863***	1.000	−0.454***
Debt to Assets	−0.130	−0.563***	−0.454***	1.000

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. N = 90.

Unit Root Tests

All four series were run through ADF unit root tests before regression analysis to check for stationarity. Table 4 reports the results. The ADF statistics are well above the 5% critical value at level $I(0)$ for all series. This shows that the data are stationary in levels and that OLS estimation of the pooled data is valid in the absence of differencing or transformation.

Table 4: Augmented Dickey-Fuller Unit Root Test Results

Series	ADF Statistic	5% Critical Value	Integration Order	Conclusion
EPS	-4.977	-2.890	I(0)	Stationary
Quick Ratio	-3.602	-2.890	I(0)	Stationary
Current Ratio	-3.422	-2.890	I(0)	Stationary
Debt to Assets	-3.953	-2.890	I(0)	Stationary

Note. Null hypothesis: the series contains a unit root. Intercept included in test equation. N = 90.

Simple Regression Results

The three bivariate regressions are summarized in Table 5. Quick Ratio is by itself the most significant individual predictor of EPS ($\beta = 11.346$, $t = 3.059$, $p = 0.003$; $R^2 = 0.096$): A unit increase in QR would be correlated with an average increase in EPS of PKR 11.35, which is an indication that the firms with high QR would earn significantly more from their investors. Current Ratio is also a significant positive predictor in isolation ($\beta = 4.790$, $t = 2.137$, $p = 0.035$; $R^2 = 0.049$). However, the coefficient ($\beta = -21.647$) in the Debt to Assets model is negative and has an associated leverage theory sign, but the relationship is statistically insignificant ($p = 0.224$; $R^2 = 0.017$), possibly due to the relatively small range in leverage ratios seen in the sample of firms.

Table 5: Simple Regression Results — EPS on Individual Predictors

Predictor	Intercept	Coefficient (β)	Std. Error	t-Statistic	p-Value	R ²
Quick Ratio	6.696	11.346	3.709	3.059	0.003***	0.096
Current Ratio	9.563	4.790	2.242	2.137	0.035**	0.049
Debt to Assets	28.479	-21.647	17.680	-1.224	0.224 (NS)	0.017

Note. Dependent variable: EPS. *** $p < 0.01$; ** $p < 0.05$; NS = not significant. N = 90.

Multiple Regression Results

Table 6 shows the pooled multiple OLS Regression results. The model is jointly statistically important ($F = 3.354$, $p = 0.023$) for explaining 10.5% of EPS variation ($R^2 = 0.105$; Adjusted $R^2 = 7.35\%$) and Quick Ratio holds a positive and noteworthy effect on EPS at the 5% level ($\beta = 17.25$, $p = 0.024$), while the Current Ratio's coefficient becomes statistically insignificant ($p = 0.481$) due to its high collinearity with QR. The Debt to Assets Ratio's coefficient shifts sign in the combined model ($\beta = 4.32$, $p = 0.831$), likely reflecting the confounding influence of collinearity among predictors. The H_1 hypothesis—that QR significantly influences EPS—is therefore supported. H_2 (Current Ratio) and H_3 (DAR) are not supported in the multiple regression framework.

Table 6: Multiple Regression Results — Dependent Variable: EPS

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value
Constant	7.542	9.821	0.768	0.445
Quick Ratio (QR)	17.250	7.524	2.293	0.024**
Current Ratio (CR)	-2.615	3.718	-0.703	0.481
Debt to Assets (DAR)	4.320	20.412	0.212	0.831

Model fit: $R^2 = 0.105$; Adjusted $R^2 = 0.0735$; F-statistic = 3.354; $p(F) = 0.023$; $N = 90$.

Note. Dependent variable: EPS. ** $p < 0.05$. Pooled OLS estimation. All series are confirmed stationary at $I(0)$.

DISCUSSION

These results provide three aspects of financial dynamics in Pakistan's pharmaceutical industry. First, short-term liquidity, especially measured by the current Quick Ratio, appears to be a more reliable factor in shareholder returns than does leverage. This is in line with the Pecking Order theory that states that firms with liquid assets can finance operations and investment internally, which does not require paying the costs of external financing which also carry an adverse selection premium. The superiority of the Quick Ratio over the Current Ratio in predicting is probably due to the more stringent construction of the Quick Ratio, which excludes the inventory, and may represent assets that a company can convert to cash in the short term, which is relevant for a capital-intensive, import-driven industry like pharmaceuticals.

Second, while the Debt to Assets Ratio in this sample was not statistically significant, its coefficient was negative, which is directionally consistent with Trade-Off Theory, which suggests that an increase in leverage is associated with an increase in interest payments and financial distress, both of which can decrease profit. Here the absence of significance is likely due to the relatively small range of leverage ratios that were observed across the sampled firms (0.15 to 0.70) that may restrict the model's ability to detect significance even if it exists within the larger population.

Third, the low value of the coefficient of determination for the regression of the Current Ratio on the Quick Ratio ($r = 0.863$) suggests that both ratios have a significant overlap of the liquidity construct they measure, making it difficult to isolate the unique contribution of each of the ratios to EPS in a regression framework. Companies with an improved liquidity position generally also experience an improvement in liquidity in other areas. Issues that might be explored in future research are the use of a dimension-reduction technique such as principal component analysis to gain a clearer view of the individual effects of the various liquidity measures, or the use of shrinkage techniques such as ridge regression.

These conclusions stand in contrast to much of the current cross-country literature where leverage is the main factor determining the performance of the pharmaceutical industry, such as in the studies carried out in Bangladesh. This is not the case in Pakistan, however, where liquidity seems to be the more influential. The second is that of macro-economic factors: the high domestic interest rates and frequent fluctuations of the local currency make it more expensive and riskier to use debt financing, and this is why liquidity that is readily available internally may prove to be a more cost-effective cushion for companies in this group.

CONCLUSION

The relationship between capital structure, cashflow management and Earning per Share of 9 pharmaceutical listed firms on the PSX in the period 2016-2025 is analyzed for each listed firm using the Pooled regression model (OLS) and the Augmented Dickey-Fuller (unit root test) is used to confirm stationarity of the series and year. It is seen that the current ratio shows no significant effect in the two regression models, simple and multiple regression models because of overlapping between duos when the current ratio is combined with the Quick ratio. The Debt to Asset Ratio is the one that shows the negative relationship that would be expected between EPS and the ratio, but this is no longer statistically significant at the traditional levels.

The implications of these observations for the Pakistani pharmaceutical sector are practical for project manager, investors and the policymakers. Managers should perform short-term liquidity management before the Keeping Quick ratio, to ensure the survival and growth of EPS, but should consider that excessive leverage will increase the financial distress ratios in the long run, so that the EPS will be reduced. However, investor might find the liquidity ratios, particularly the Quick ratio, helpful in the analysis of the PSX listed pharmaceuticals. The sector is increasingly looking towards exports, and continues to be dependent on imported active pharmaceutical elements (APIs), making financing by these firms for short-term projects particularly relevant for policymakers and regulators.

This study is subject to certain limitations. The OLS Pooled approach does not consider firm-specific variation, and this could be captured in future studies using a fixed-effects or random-effects model to enhance the transferability of the result to other companies or to those not listed in PSX. Additionally, the model does not include control variables like firm size, asset growth, export intensity or macroeconomic conditions, and the presence or absence of these control variables could affect the size and significance of the relationships calculated. Future research builds on this work by looking at the multiple sectors, adding additional performance measures like Tobin's Q and Return on Assets (ROA) next EPS, & studying how the liquidity-EPS relation liquidity – EPS relation develops under varying economic/regulatory circumstances.

This Study test that for pharmaceutical companies in Pakistan, short term liquidity management is more value adding for shareholder value in comparison to long term capital structure management. The results contribute to the capital structure literature in emerging markets and provide managers of the dynamically competitive and strategically important industry with some guidance.

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