

Majors: FIN

Major/No. F23

Impact of Capital Structure on firm financial Performance

In the pharmaceutical sector of Pakistan



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Fall 2025

FINAL PROJECT/THESIS APPROVAL SHEET

Viva-Voce Examination

Open defense Date:13/01/2026

**Topic of Research:(Impact of Capital structure on firm Financial Performance in the
Pharmaceutical sector of Pakistan)**

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ACKNOWLEDGMENT

I want to thank the Almighty Allah with the bottom of my heart, and his grace and mercy make my present success possible. My eagerness to acknowledge my supervisor Dr. Tanveer Illahi as being significantly involved in every aspect of this rigorous research work is with all her kindness since this support and patience were pivotal in significant aspects. He is highly versed, has a wealth of sound advice and support that has played an important role in the development of this thesis as well as the overall quality of this thesis.

My friends have also been credited with the credits of discussing various topics which made the thesis process very interesting and inspired a collaborative atmosphere that helped the project move on. And finally, I would like to thank my dearest ones in this world, namely, my loving parents and my motivating siblings, and their support without a doubt. Your boundless support, encouragement, patience in the face of my lengthy disappearances, and emotional strength have all been the source of my inspiration, and I dedicate this thesis to all of you, who have struggled alongside me to make its completion possible. It has taken all of us, and hence, the thanks are equally well-deserved.

ABSTRACT

Capital structuring has always remained one of the vital aspects of corporate strategy, although the effect of capital structuring on profitability remains debatable, especially within the pharmaceutical industry in the emerging economy of Pakistan, which remains capital-intensive and heavily regulated. Although financial theories state the advantages of structuring through debt, the effectiveness within the emerging economy that remains dominated by higher interest rates and higher price regulations remains to be established.

In this context, the paper aims to analyze the existing relationship using the sample data of the top pharmaceutical companies in the Pakistan Stock Exchange across the period of ten years (2014-2024). S&P Global data were accessed through the annual reports of the company for the purpose of using Panel Least Square Regression and testing the effect of the Debt/Equity ratio on Return on Assets (ROA) and Return on Equity (ROE) in the pharmaceutical industry in Pakistan.

The results showed that Market Capitalization emerged as the most robust and significant positive driver for both ROA and ROE across the dataset. Total Equity demonstrated an inverse relationship with ROE, while Firm Size showed a marginal negative impact specifically on asset efficiency (ROA). Interestingly, the measures of debt (total debt and debt-to-equity ratio) did not provide any meaningful results in both models, which might indicate that their influence on performance has a direct linear effect that is limited by the specific sample under study. The consequences of this article are thus key to the establishment of financial policies that would alleviate the high costs of the high cost of debt, offering important indicative information to policy makers who are interested in the sustainability of the healthcare sector in cases of financial instability.

Keywords: Capital structure, Profitability, Pharmaceutical sector, Return on Assets (ROA), Return on Equity (ROE), Trade-off Theory, Firm Performance.

CHAPTER 1:

INTRODUCTION

The pharmaceutical industry in Pakistan is huge in terms of both its scope and investment. It forms the backbone of the healthcare structure in Pakistan, fulfilling the needs for essentials in medication for a population of over 240 million people. It is an enormous industry, with more than 750 pharmaceutical companies involved in producing a host of pharmaceutical products. The structure of this industry is very peculiar. Some of the companies are much bigger as compared to the rest because mergers and acquisitions were a very common phenomenon in this industry in the recent past. For that reason alone, the industry has concentrated at the top where the top fifty companies possess about 90% of the market share in this industry.

Out of this huge number of firms engaged in the manufacture of drugs, only twelve are listed on the Pakistan Stock Exchange Market (PSX). In this case, this paper will consider a selected number of those firms. There are ten (10) firms in this category. The sector is made up of local firms as well as foreign firms. There are seventeen foreign firms operating in this industry, only six to seven out of this number are actively engaged in this business; the rest have contracted others to produce for them. These others are local firms operating in the private sector.

Moreover, this is a highly regulated sector due to the nature of the products being very sensitive. The Drug Regulatory Authority of Pakistan (DRAP) strictly regulates prices, which hinders the amount of profit that can be earned. However, in spite of all this, there are still issues regarding the over-the-counter sale of counterfeits, which is a significant concern for the health sector in Pakistan. In this challenging environment, the selection of how to fund the business, known as "Capital Structure," becomes a make-or-break aspect.

Capital structure is the combination of debt and equity that a firm needs to finance its operations. In finance theory, debt is regarded as an attractive source of funding for companies, as the payment of interest is tax deductible. This is referred to as the "tax shield." But when it comes to Pakistan, because interest rates are high and the environment is not very stable, too much debt can be hazardous for companies. This might result in "financial distress" for companies, which

might then have difficulty paying its bills. This is why pharmaceutical companies need to balance their performance between using their own funds (equity) and borrowed funds (debt).

1.1 Definition of the Pharmaceutical Company

A pharmaceutical company is also known as a drug company, and it is a body corporate approved to research, develop, manufacture, and market drugs for human or veterinary use. Under the regulatory supervision of the Drug Regulatory Authority of Pakistan (DRAP), all aspects, including production (GMP compliant) to the retail price, of every drug company functioning in Pakistan come under its observation. The drug companies also classify into multinational drug companies (MNC) and domestic drug companies, which entail high capital investments since they require high-tech machinery, clean rooms, along with laboratory analysis.

1.2 Importance of Pharmaceuticals in the Economy

The pharmaceutical industry is a high-volume, critical sector that provides life-saving products for the constantly growing population. As a sector, it has immense economic importance, which creates jobs and generates taxes for the country, thus adding to the manufacturing GDP of Pakistan. Moreover, the sector also has huge potential for exports, which will make Pakistan a hub for the export of generic drugs, thus providing the country with the much-needed foreign exchange reserves.

1.3 Problem Statement

The capital structure of a firm has long been recognized as a critical determinant of corporate performance, as highlighted by prominent scholars such as Durand (1952), Modigliani and Miller (1958), Weston (1963), and Solomon (1963). Their studies emphasize the pivotal role of the optimal mix of debt and equity in enhancing profitability and maximizing shareholder wealth. The concept of an “optimum capital structure” is particularly significant, as it represents the proportion of financing that generates the highest return for common stockholders and supports sustainable corporate growth (Weston, 1973).

Despite the extensive theoretical foundation, there remains a lack of strong empirical evidence regarding the impact of the debt-to-equity ratio on key financial performance indicators within specific sectors. In the context of Pakistan, especially within the pharmaceutical industry, the effect of financial leverage on profitability measures such as Net Profit Margin, Earnings per

Share (EPS), Return on Assets (ROA), and Return on Equity (ROE) remains largely unexplored. This uncertainty creates challenges for financial managers in making informed capital structure decisions aimed at profit maximization.

The pharmaceutical industry in Pakistan operates under unique constraints, including heavy reliance on imported raw materials, high cash flow requirements, and stringent price controls imposed by the Drug Regulatory Authority of Pakistan (DRAP). These factors may limit revenue growth and amplify the risks associated with excessive debt financing. While debt offers potential tax shield benefits, it may also increase financial distress costs, raising questions about whether the advantages of leverage outweigh its risks in this sector. Recent empirical evidence, such as the study by Safdar and Khan (2024), suggests that short-term debt negatively affects profitability in the non-financial sector; however, it remains unclear whether similar outcomes apply to leading pharmaceutical firms.

To address this research gap, the present study aims to empirically examine the relationship between financial leverage and the financial performance of pharmaceutical companies listed on the Pakistan Stock Exchange. Specifically, the study seeks to answer the following research question: **What effect does financial leverage have on the financial performance of the Pakistani pharmaceutical industry?** By analysing the association between debt levels and key profitability indicators, this research intends to provide valuable insights for financial managers, investors, and policymakers regarding optimal capital structure decisions in the pharmaceutical sector of Pakistan.

1.4 Research Objectives

The purpose of this thesis is:

1. To evaluate the impact of the debt-to-equity ratio on the financial performance (ROA and ROE) of pharmaceutical firms listed on the PSX.
2. To determine how independent debt and equity levels influence asset efficiency and shareholder returns.
3. To examine the moderating role of firm size and market capitalization in the relationship between capital structure and performance.

1.5 Research Questions

To achieve the objectives above, this study seeks to answer the following questions:

1. What is the impact of the debt-to-equity ratio on the financial performance (ROA and ROE) of pharmaceutical firms in Pakistan?
2. To what extent do debt levels and equity levels independently affect the profitability of these firms?
3. Does the size of the firm moderate the relationship between capital structure and financial performance?

1.6 Research Hypotheses

The research questions, the particular economic environment of the country of Pakistan (high interest rates and regulatory restrictions), and a particular theory the Pecking Order Theory, allow developing a set of hypotheses to be tested in this paper.

H1: Effect of Debt to Equity Ratio on Return on Assets (ROA).

Hypothesis the Debt-to-Equity Ratio (D/E) levels are anticipated to have a strong negative correlation with Return on Assets (ROA).

Connection to Findings: This hypothesis can be empirically supported by Pearson Correlation Matrix which shows that D/E Ratio is statistically significantly negatively correlated to ROA, $r = -0.298$ ($p < 0.05$). However, under the multivariate regression model (Model 1), the coefficient relating to the dter variable is -0.002 and it is not significant.

Conclusion: The hypothesis is not confirmed in the final regression model although one can observe the preliminary negative correlation between these two variables before the role of control variables is considered (Market Capitalization).

H2: The Value of Debt-to-Equity Ratio in Return on Equity (ROE).

Hypothesis: Debt to Equity (D/E) is expected to contribute significantly to Return on Equity (ROE) in negative way.

Connection to Findings: Model 2 has a dter coefficient of 0.011 that is not negative and statistically non-significant ($p = 0.557$). Interestingly, it shows a negative relationship at a

significant level (Total Equity -0.905, $p < 0.05$) but this influence is on the equity and not the D/E ratio.

Conclusion: In that way, the hypothesis is dismissed, and the data does not show statistically significant linear relationship between the D/E ratio and shareholder returns in this particular sample.

H3: The Effect of Firm size on financial performance.

Hypothesis: Firm Size It is hypothesized that Firm Size had a significant positive effect on the financial performance of the pharmaceutical firms.

Connection to Findings: Contrary to the hypothesis, a significant negative result of Firm Size was found in Model 1 (ROA), with coefficient equal to -7.980 ($p > 0.1$). This implies that, with expansion of firms in regard to assets, their operation efficiencies based on ROA are most likely to decrease.

Conclusion: As such, this hypothesis is not accepted in its positive form, but rather the research does find support of diseconomies of scale in which size has a negative effect on asset efficiency.

1.7 Significance of the Study

The study is relevant to the economy since it has several major stakeholders:

To the Corporate Managers: The current research has practical advice. In case the results are conducive to the hypotheses that debt adversely affects performance, the managers will be in a position to rely on the core savings (retained earnings) instead of bank loans.

To Investors: It is crucial that Investors in the Pakistan Stock Exchange (PSX) understand the safe companies. With the knowledge of the relationship between debt and profit, investors are able to know about risky companies (those with excessive debt) and avoid them.

To the Policymakers (DRAP and SBP): Government must know the impacts of financial pressure on health sector. In case it is the high interest rates which are crippling pharmaceutical manufacturers, the policymakers may view special financial stimulus.

In the case of Academic Researchers: The research is relevant to existing literature as it attempts to test Western-based theories of finance (such as the Pecking Order Theory) in the environment of a developing economy such as the Pakistani one.

1.8 Scope and Research Study Limitations.

The research is clearly confined to the Pharmaceutical Sector of Pakistan, and 10 companies listed in the PSX are used in fulfilling the scope of current research to offer full information on the 2014-2024-study period. The major disadvantage is the size of the sample, which is relatively small, 10 firms, which is the condition of a balanced panel dataset. As well, the research relies on secondary sources of history and presupposes that audited annual reports are correct, including the fact that macroeconomic elements such as inflation and exchange rates are not directly manipulated in the regression models.

1.8.1 Sectoral Scope

The current study will be limited to the Pakistani pharmaceutical industry. It is an important part of the national economy as it brings about benefit to the nation in terms of health delivery to the people, hence the provision of jobs, export potential, and the growth of industries. A high level of research and development spending, stricter regulatory and governmental policing, price restrictions, and capital-intensive processes characterized pharmaceutical companies, which makes capital structure decision-making particularly decisive.

The pharmaceutical industry is an exceptionally narrow focus that reduces the cross-industry heterogeneity of the study, providing sector specific information. Capital structure dynamics in industries differ significantly due to the variation in the asset tangibility, risk, regulatory regimes, and future growth. In its turn, a one-sector focus enhances the internal validity of the analysis and allows interpreting the empirical findings in a more meaningful way. However, the limitation suggests that the results can be generalized only to pharmaceutical companies and cannot be easily transferred to other industries like textile, banking, or manufacturing.

1.8.2 Population of the Study

The sample that is considered in the studies is comprised of all pharmaceutical companies that are listed publicly on the Karachi Stock Exchange (PSX). The high financial reporting standards and corporate governance and disclosure requirement to listed entities by regulatory bodies such

as the Securities and Exchange Commission of Pakistan (SECP), ensures greater reliability, consistency and comparability of the financial information.

The restricted attention to PSX-listed firms allows researching the active company involvement in capital markets and consistently making capital-structure choices related to debt and equity financing. On the other hand, unlisted or privately-traded firms (in terms of size) do not necessarily or tend to report financial data publicly and have a different funding profile; thus, do not qualify as the mentioned population of the proposed research.

1.8.3 Sample Selection

Out of the population identified, ten pharmaceutical companies listed on the PSX were picked up as a sample. The availability of full and consistent financial information over the course of the study was the main selection criterion, which allowed creating a balanced panel dataset.

The conditions of the balanced panel dictate that all firms will have measurements in all variables in every year of the research. Although this method strengthens and makes the panel-data regression methods stronger and more reliable, it drastically decreases the samples. Clustered sampling was used to select several of the listed companies after excluding those that did not transmit data, were delisted, merged, or acquired, or were not consistent with the study period.

The companies chosen therefore are a few of the oldest and busiest organizations in the industry in terms of funds. The sample size is also rather small but it is considered as appropriate considering the limitation of the data and approaches used to do the analysis.

1.8.4 Time Period of the Study

The time interval of the study (2014-2024) can help to perform the in-depth analysis of the capital structure and financial performance changes through the lenses of long-term and variation factors. A long-time horizon assists in the dampening of short-term volatilities created by temporary economic shocks, changes in policy or firm specific incidents.

1.8.5 Variables Covered

A reviewed set of carefully chosen variables is included in the range of the investigation and focused on the previous literature and concepts in corporate finance.

Independent Variables (Capital Structure Measures):

- Total Debt
- Debt-to-Equity Ratio
- Total Equity

These variables capture different dimensions of capital structure, including leverage, financing mix, and ownership structure.

Dependent Variables (Financial Performance Measures):

- Return on Assets (ROA)
- Return on Equity (ROE)

ROA measures the efficiency with which a firm uses its assets to generate profits, while ROE reflects the returns generated for shareholders.

Control Variables:

- Firm Size
- Market Capitalization

We include the control variables to address the firm-specific factors that can affect financial performance without being related to capital structure decisions.

1.8.6 Data Sources

In this research, the secondary sources are the only sources of data used as secondary sources have been used to ensure that there is accuracy and reliability. These sources include:

- The Pakistan Stock Exchange (PSX) data portal
- S&P Global financial database

- Published annual reports of the selected pharmaceutical companies

These sources provide audited financial statements, balance sheets, income statements, and market-related data necessary for calculating the study variables.

1.9 Summary

Overall, this study has a well-defined scope that addresses the sector, population, sample, variables, time and sources of data, which is why it is possible to close and systematic investigation of capital structure and financial performance in the Pak pharmaceutical industry. Simultaneously, the limitations, especially regarding the size of the sample, the constraints of the data and the generalization, pinpoint the point that should be considered with care and offers prospects to the further research. Future research can contribute to the current findings of the research by increasing the sample size, considering private companies, adding more variables, or doing cross-country comparison.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive criticism of theoretical and empirical literature on capital structure and its implications on the financial performance of the corporate realm. In the specific environment of Pakistani pharmaceutical industry, it is essential to understand the role of financing decisions that can adjust the profitability because of the background of the specific industry, which are highly capital intensive and highly reliant on the imported raw materials. The general purpose of this chapter is to develop a stern theoretical framework through the progression of general financial principles to particular dogmas and empirical data based on the global and local backgrounds. The review incorporates the findings of the latest studies published between 2020 to 2025 to give the question some standing on the current economic reality, which is increasingly burdened with high interest rates and currency instability.

2.2 Literature Review: Performance and Capital Structure.

The interface of capital structure and performance of the firm is a highly controversial area in corporate finance. Capital structure refers to the accurate combination of debts and equity used by a corporation to fund its business and investment activities. In the case of pharmaceutical businesses which operate in Pakistan, strategic application of leverage incorporates a thin line between the potential promising return of investments and the risks within the financial times of distress.

The leverage of a leverage is always a two-sided tool that empirical research has demonstrated in Pakistan. Although indebtedness may increase the financial base of a firm and in turn multiply returns on equity, it has got fixed interest payments that should be fulfilled regardless of whether the finances were made or not. In the pharmaceutical industry, where governmental prices are regulated through the Drug Regulatory Authority of Pakistan (DRAP) the situation occurs often whereby, when interest rates rise, companies often tend to suffer a squeeze in the margin which they cannot easily pass to consumers.

The recent research, such as the works of Rehan et al. (2020) and Safdar and Khan (2024) demonstrates that high rates of debt capital are negatively correlated with organizational profitability in the Pakistani pharmaceutical, as well as in the non-financial industries, in general. These observations indicate that in emerging markets that have unstable market structures, rising leverage usually can act as a drag that wipes out the value of the firm.

2.3 Capital Structure Theories.

Theory sets provide the logic behind the choice of specific financing approaches taken by firms.

2.3.1 The Miller and Modigliani (MM) Theory

Modigliani Miller theory Modigliani Miller theory is a fundamental contribution to the modern capital structure theory, having been coined by Franco Modigliani and Merton Miller in their landmark book, *The Cost of Capital, Corporation Finance and the Theory of Investment*, in 1958. It was a groundbreaking work that made Modigliani the 1985 laureate in the prize of Nobel Prize in Economics and a theoretical shift in the thinking of corporate financing decisions in the field of financial economics.

The initial MM Proposition I premised on the finding that, in perfectly efficient capital markets, that is, devoid of taxes, cost of bankruptcy, and cost of transactions, and perfectly symmetric information and the same cost of borrowing by individuals and firms, the market price of a firm is independent of its capital structure. This is to say that it does not matter whether a firm uses debt or equity or a combination of both as this does not affect the overall value of the firm. This radical suggestion nullified the dogma which argued that debt financing was naturally value-generating by lower cost of capital when compared to equity.

The intuition of this supposition is based on the value conservation and arbitrage principle. Holding In perfect markets, investors are capable of recreating any capital structure of a corporation through individual lending and borrowing. Rational investors, given the presence of two identical firms with the exception of the capital structure, and when they are trading at different valuations, would arbitrage the situation through selling overvalued firm and buying the undervalued firm until they converge. Therefore, capital structure cannot make or take away value, it simply changes the distribution of cash-flow claim among debt and equity holders.

A complement to this framework was given by MM Proposition II which stated that as leverage increases, the cost of equity increases correspondingly to maintain a fixed weighted average cost of capital (WACC). As much as debt might seem cheaper to the equity, a greater leverage can lead to increased financial risk to the shareholders who in turn will require higher returns to cover that risk. Such counterparts nullify any apparent benefit on debt financing on the frictionless environment of the original MM model.

In the case of Pakistani pharmaceutical companies, this speculative tableau suggests that the debt might, in principle, have a non-deteriorating impact in case the value of the tax shields in the present value exceeds the aggregate cost of debt financing. The Corporate tax regime in Pakistan on pharmaceuticals has been going up and down between 29 percent and 35 percent in the past few years indicating relevant potential of shield against taxes. As an example, a drug company paying annual interest of Rs. 100 million at 30 percent rate of tax would save 30 capital of annual tax which is a huge amount that can be used to fund research and development or an upgrade to a new facility.

However, there are major limitations of implementing MM theory as practiced in the pharmaceutical industry in Pakistan. The capital market assumptions of perfection are severely compromised in the emerging market settings that the theory presumes. The capital markets in Pakistan are very imperfect with high level of transaction cost, large information asymmetry between corporate insiders and external investors, limited accessibility to international capital markets by most firms, and intermittent liquidity constraints to the extent of accessing credit. The cost of financial distress, which is entirely based on the original MM framework also has a huge cost in terms of the expenses of financial distress in the economic context of Pakistan, characterized by nominal interests' rates that are high, fluctuating movements of currencies, and regulatory price floors that inhibit the adjustments of revenues made by the firms in accordance with increased costs.

It follows that, though MM theory provides a fundamental theoretical context as well as outlines the future tax benefits of debt financing, its prescriptive value to Pakistani pharmaceutical firms is indirectly constrained. The theory is more useful as a guideline - a hypothetical ideal founded on which the empirical deviations can be calculated and clarified than as a practical tool of determining the most optimal capital structure.

2.3.2 Static Trade-Off Theory

The Static Trade-Off Theory is an organized generalization and improvement of the Modigliani Miller structure, with a clear incorporation of real-life expenses that MM model does not have. Accepting the fact that, debt financing is always accompanied by cost and benefit, the theory assumes that a systematic process leading to optimal capital structure should be achieved by a rational balancing of the tax advantages and cost of debt financing in reference to the cost of financial distress and bankruptcy.

A conceptual diagram may indicate a theoretical construct whereby the firm value increases with leverage due to accruing tax shields then leveling off and later decreasing as the expected distress costs commences. At the optimal capital structure, the incremental value of tax shields due to an extra unit of debt known as incremental tax shield is exactly offset by incremental cost which is the incremental increase in expected cost of distress. Such equilibrium of firms and markets varies depending on the firm and sector attributes: The tangible nature of assets, variability of the business, growth potential of business, and the prevailing tax environment.

The interest tax shields outlined by Modigliani and Miller preponderate in the benefits facet of the trade-off. These tax savings are converted into cash flows that can be used to fund productive investments, pay out dividends or are saved to strengthen the balance sheet. In massively profitable pharmaceuticals companies, which have to compete with the corporate tax level in Pakistan of about 29.35 percent, this tax shelter can be significant, and may produce a big incentive in the face of moderate leverage.

The costs side is more complex and multidimensional, which is split into both the direct and the indirect financial-distress costs. Direct bankruptcy costs include legal expenses, administrative expenses, advisory expenses and court expenses to undergo formal bankruptcy proceedings. Even though these costs can be measured and are at times substantial e.g. 3 -10% of firm value in the event of bankruptcy, indirect costs of distress are generally of greater consequence.

The symptoms of indirect distress costs appear way premature to actual bankruptcy and include broken supplier relations where creditors become reluctant to provide trade credit or insist on cash-on-board conditions, loss of customer base perceived by unavailability of products or warranty support, inability to attract and retain skilled personnel who attitudes tend to regard the firm as a poor career choice, reduced strategic flexibility where management would focus on

survival, rather than growth, forced asset sales at fire-sale rates to obtain liquidity, and an increased cost of capital with creditors imposing high risk-premiums. All these indirect costs can destroy the value of the firm to such an extent that it may enter bankruptcy notwithstanding the eventual avoidance of the proceedings.

The applicable insights that can be embraced by the Static Trade-Off Theory in the present context of the pharmaceutical industry of Pakistan are very much relevant to the findings provided herein in terms of their alignment to the empirical findings. In Pakistani macro-economic environment, the principle is to change the computation of the trade-off between the highest leverage ratio and only in a systematic manner, undermining that of advanced economies.

To begin with, nominal interest rates in Pakistan tend to be above 1520 per cent at times when the monetary policy of the State Bank of Pakistan is in tightening mode, and thus, substantially increases the fixed cost of debt servicing. In the case when a pharmaceutical company has to make 15-20 percent returns so that it can cover debt expenses (before considering equity gains) the conditions of profitable spending on debts are extremely high.

Second, the price controls by regulatory authorities in Pakistan that regulate the drug market by the Drug Regulatory Authority of Pakistan (DRAP) offer revenue floors restricting the capacity of firms to transfer cost increases to consumers. In situations where the cost of inputs increases because of the depreciation of the currency or inflation of the prices of raw materials yet the going selling prices are held constant or increase only by a small margin then the profit margins will be reduced drastically. In the case of levered companies, this compression of margins can rapidly turn into the financial distress where a declining share of fixed interest payments swallows up an ever-reducing amount of profits.

Third, there is significant currency risk to the pharmaceutical facet in Pakistan which is depends on imports. Having imported 95 per cent of active pharmaceutical constituents, production expenses are immediately hiked when the Pakistani Rubber is depreciated. The levered firms are not able to accommodate such currency shocks with much financial flexibility hence leading to spirals of distress where higher costs, stagnant prices and fixed interest payments converges to destroy profitability.

Fourth, financial distress costs increase at an especially steep rate in the pharmaceutical industry of Pakistan because of the industry-related necessities. Pharmaceutical production requires a twenty-four-hour operation to ensure a sustainable economy of scale and regulations. Any delays caused by financial burden may lead to the loss of manufacturing licenses, loss of spent regulatory approvals and permanent damage of professional reputation. Additionally, the long working -capital cycle, during the procurement of raw materials to the production process, distribution and subsequent payment collection, means that liquidity pressures may easily expand to crises of operations.

All these surrounding circumstances are why the ideal leverage ratio of Pakistani pharmaceutical companies will lean more towards the right-hand side of industry leverage ratio. The Trade-Off Theory is a predictor, and the empirical result in this study is consistent, that the cost of distress increases exponentially in this setting and that the optimal balance is shifted decisively to the lower levels of debt. The signaling by firms with greater equity foundations and greater market capitalization is an indication of recognition in the market that financial conservatism is a strategic prudence as opposed to over-cautious behavior in such a volatile operating environment.

2.3.3 Pecking Order Theory

Another paradigm as opposed to the traditional ideal capital-structure hypothesis developed by Trade-Off Theory, is the Pecking Order Theory, officially set out by Myers and Majluf (1984) in their seminal paper *Corp. Financing and Investment Decisions When Firms Have Compared to Investor information*. Instead of assuming that companies attempt to achieve an ideal debt-equity ratio, the Pecking Order model argues that financing choices arise due to a rank of preferences which is indicative of informational asymmetry and striving to minimize the cost of adverse selection.

The theory outlines distinct flow of financing: firms make use of internal financing that is limitless; only when internal financing is not sufficient, they turn to debt issuance; finally, external equity is used, as the last option when the debt is not convenient or impossible. Such ranking is motivated by the fact that the corporate insiders (especially the top managers and the board of directors) have better information about the actual value, future projections, and risk profile of the firm compared to the external shareholders. The existence of such information

asymmetry creates adverse selection prospects that make outside financing expensive and even value-destroying.

The nature of the logic of pecking order can be outlined in the following manner. The issuance of new equity would transfer wealth of current shareholders to new investors when the firm has positive private information that market is underpricing the firm, and therefore, the new share will be issued at unrealistically low prices. Rational managers who are sensitive to the interests of the shareholders thus will not issue equities when they see that there will be underpricing of its share. The market in its turn explains equity issuance announcements as bad ones; managers usually sell equity when they think that they view the shares as overpriced, in such a way that they can sell the overpriced securities to unsophisticated investors.

The financing of debts issues less serious problems of information since debt is a fixed claim that has precedence over equity in future bankruptcy cases. As a result of the value of debt being largely reliant on the possibility of default as opposed to full distribution of future cash flows, it is less sensitive to information asymmetries. Therefore, debt issue sends across word of the mouth; less negative information compared to equity issue; hence, it is the best place to resort to when inside funding is no longer possible.

Internal capital financing maintains no information asymmetry issues because the transaction, i.e. the payment to external sources does not take place. Firms can utilize internal cash flows that they generate without the occurrence of adverse selection costs, negative signaling, and dilution. Thus, Pecking Order Theory says that profitable companies which yield high internal cash flows will be characterized by low leverage ratios not because they are purposely aiming to stay at low levels of debt, but because they do not need to borrow to fund their investment activities since they can do this using internal funds.

The findings of the empirical research of the pharmaceutical industry in Pakistan are strong arguments to prove the forecasts made by the Pecking Order Theory. Results in the research are consistent with the theoretical findings, where a strong positive correlation between market capitalization and financial performance and no major positive impact of conventional debt parameters are found. These findings are a strong indication that prosperous pharmaceutical companies largely depend on in-house financing and built financial capacity as opposed to vigorous outside lending.

The pecking order pattern appears quite vividly in the pharmaceutical industry of Pakistan because of the effects peculiar to the industry. The high working-capital demands of the sector due to long cash-conversion periods and high degree of dependence on imported inputs, means that its financial flexibility is mainly dependent on the internal capacity to raise cash. The high cash flows generated by firms can be used to finance such working-capital requirements; weaker firms need to borrow at high interest rates in Pakistan. Moreover, the regulatory price-control environment means that the profit margins are quite sensitive to the operational efficiency and cost management as opposed to the pricing power.

The results of the current study, where market capitalization was the most dominant measure of performance, and the debt measures did not have any significant positive effects, can be taken as the best empirical confirmation that the Pecking Order Theory can be applied in the given situation. Market capitalization, which measures the characteristics of accumulated success and financial-based strength which is accrued over years of profitable operations and accumulation of retained earnings, is an accurate reflection of the trend which the Pecking Order Theory suggests is characteristic of successful companies. The theory thus has better explanatory power as compared to Trade-off Theory in explaining capital-structure patterns and performance relationship in the pharmaceutical sector in Pakistan.

2.3.4 Agency Theory

Developed in the seminal work by Jensen and Meckling (1976) entitled Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, the agency theory presents some serious questions pertaining to the conflict of interest that is the consequence of the separation of ownership and control that the modern corporations are known by. This theoretical model examines the relationships between the principals (shareholders who own the firm) and agents (managers who are in charge of running the day-to-day activities) without disregarding the fact that there might be conflicts of interests between them and that these parties do not have common goals nor have the possible advantages of information, therefore, generating the threat of value-destroying conflicts.

The central agency problem arises when agents, who represent shareholder principals (managers) follow their individual interests disregarding their principal objectives of maximizing shareholder wealth. These conflicts may manifest themselves in a number of mechanisms,

among which are excessive perquisite (the luxurious offices, corporate jets, lavish entertainment), empire building through acquisitions, which raise levels of managerial prestige at shareholder detriment, the avoidance of appropriate risk levels by taking excessively conservative actions to preserve managerial employment, and the action against personal threats to shareholder wealth, such as by selling assets or incurring restructurings.

The capital structure choices, especially the choice in financing either by debt or equity financing, have a considerable implication on the efficiency of the agency conflicts in several ways. The agency theory assumes that debt can be useful as a disciplinary tool that will in part align the interests of managers and those of shareholders. Debt financing places fiscal discipline on the managerial discretion in corporate resources through the obligation of firms to make fixed legally binding payment of interests and principal, which the firms are not allowed to breach.

The punitive aspect of debt takes place in a number of ways. To begin with, debt decreases the amount of free cash flow i.e. the cash inflow remaining after allocating funds to those projects that have-positive net present value. One of the hypotheses, the free cash flow hypothesis by Jensen (1986) argues that excess cash gives managers resources to fund pet project, engage in empire-building, or to be inefficient and will not be punished immediately. This surplus cash is absorbed by debt obligations through an obligatory payment of interest and in so doing reduces managerial discretion and instills more discipline in operations.

Second, the approaching risk of financial distress and bankruptcy due to the excessive leverage creates strong incentive amongst managers to humanely run companies and also create enough cash flows to service their debt. The harsh individualized cost of bankruptcy, consisting of loss of jobs, damaged reputations and career breakdown are reasons why the managers would avoid such an event by improving their performance. Third, debt financing in most cases comes in the form of restrictive covenants which legally restrict the managerial behavior in many aspects which include banning further borrowing, demanding liquidity level or interest coverage ratio, dividing the payment, liquidation of assets and subjecting management to periodical payments to creditors which must be reported in a financial form. These covenants provide an external control and limit high-value-destroying actions on the part of managers.

However, the agency theory also acknowledges there are agency problems associated with debt as well as increased leverage. Two prominent agency issues around the aspect of debt, namely asset substitution and underinvestment, have garnered a lot of academic interests.

The agency theory provides relevant but finite information in the case of the pharmaceutical industry in Pakistan. The Pakistani pharmaceutical market consists mainly of professionally run corporates of which many have strong multinational shareholders or are listed on the Pakistan Stock Exchange, which creates real principal-agent relationships in which agency concerns do exist. Debt would theoretically play favorable disciplinary roles in restraining what might be a wasteful spending and in imposing efficiency into operations.

Nevertheless, the harsh operating environment facing Pakistani drug companies, such as price dictate by the government, reliance on imports, foreign exchange variations and stiff competition, makes the problem of free cash flow quite tamed. The majority of pharmaceutical firms can face capital restraints and not excess cash flows, which reduces the usefulness of debt as a constraining tool. Furthermore, underinvestment issue by leveraged firms is increased by the high expenses of financial distress in this regulated sector. Pharmaceutical companies require constant funding in facility improvement, quality improvement and regulatory compliance; highly leveraged pharmaceutical companies may deliberately underinvest in these paramount elements to maintain liquidity to pay off debts which will look at causing a downward spiral of diminishing quality, regulatory problems and market share losses.

To sum up, the four major theoretical models with Modigliani-Miller, Trade-Off, Pecking Order, and Agency theories as their name suggest provide their angles of interactions to understand the capital structure decisions and their possible impact on the performance. The empirical findings of the pharmaceutical industry in Pakistan are the closest to the theory of Pecking Orders, although it is suggested that the trade-off methodically adheres to financial conservatism in such a difficult environment of operations. A subtle solution to these theoretical underpinnings will give much-needed background upon which to explain empirical observations and give strategic prescriptions to pharmaceutical companies operating in the complex financial and regulatory environment of Pakistan.

2.4 Empirical Evidence on Capital Structure and Firm Performance

A substantial body of empirical literature has examined the relationship between capital structure and firm performance across different sectors and economies, yielding mixed and sometimes contradictory results. In the context of Pakistan, Sheikh and Wang (2010) examined the financing behaviour of 75 listed textile firms over the period 2002–2007 using regression analysis. Their findings revealed that a higher proportion of debt in the capital structure negatively affects firm profitability. Similar conclusions were drawn by Ahmad (2014) and Memon et al. (2012), who reported that an increase in leverage leads to a decline in firm profitability.

Mirza and Javed (2013) investigated the determinants of financial performance in Pakistan by applying correlation and fixed-effect models to data from 60 firms for the period 2007–2011. Their results indicated that Return on Equity (ROE) is positively influenced by the debt-to-equity ratio (DER), while long-term debt to total assets (LTDTA) and short-term debt to total assets (STDTA) negatively affect firm performance. These mixed findings suggest that the maturity structure of debt plays a crucial role in determining profitability.

International evidence further highlights the complexity of the leverage–performance relationship. Abor (2005), in a comprehensive study of firms listed on the Ghana Stock Exchange, found that short-term debt to total assets (STDTA) and total debt to total assets (TDTA) positively influence ROE, whereas long-term debt exerts a negative effect. Similarly, Malik (2011) reported that equity financing is positively associated with profitability (ROA) in Pakistan’s insurance sector, while leverage negatively affects performance.

Raheman et al. (2007) analysed 94 non-financial firms in Pakistan over the period 1999–2004 and found that equity and firm size positively influence profitability, whereas leverage has a significant negative impact. These findings are consistent with the Trade-Off Theory, which argues that excessive debt increases financial distress costs. Titman and Wessels (1988) further noted that firm size negatively affects short-term debt ratios, while non-debt tax shields and growth opportunities have limited influence on leverage decisions.

Several studies emphasize the role of industry characteristics in shaping the leverage–performance relationship. Singapurawoko and Mustofa El-Wahid (2011) reported that debt and firm size are positively associated with profitability; however, firm performance is also

significantly affected by the nature of the industry in which firms operate. This observation is particularly relevant for regulated and capital-intensive industries such as pharmaceuticals.

In Pakistan's textile sector, Khan et al. (2013) found that leverage, ROE, EPS, and cash flow ratios positively affect stock returns. Mujahid and Akhtar (2014) further concluded that capital structure is positively linked with stockholder wealth and firm performance indicators such as ROA, ROE, and EPS. However, contrasting evidence from San and Heng (2011), based on Malaysian construction firms, revealed a negative relationship between earnings per share (EPS) and debt ratios, particularly among small and medium-sized firms.

Evidence from other emerging economies largely supports a negative relationship between leverage and performance. Zeitun and Tian (2007) reported that debt negatively affects firm performance in Jordan using both accounting-based (ROA) and market-based (Tobin's Q) measures. Hijazi and Tariq (2006) found that profitability and firm size negatively influence leverage in Pakistan's cement sector, while asset tangibility and growth show a positive association.

Sector-specific studies in Pakistan also demonstrate consistent patterns. Amara and Aziz (2014) and Khanam et al. (2014) found an inverse relationship between leverage and profitability (ROA and ROE) in the food sector. Ahmed et al. (2010) reported a negative association between financial leverage and profitability in Pakistan's life insurance sector. Similarly, Gul et al. (2012) documented the negative impact of leverage on firm performance in the textile sector.

Internationally, Yusuf et al. (2014) examined Nigerian firms and found a significant relationship between ROE and debt-to-equity ratio, while other leverage measures showed weak associations with performance. Ebaid (2009) also reported a weak or insignificant relationship between capital structure and firm performance in Egypt. In contrast, Tayyaba (2013) found that financial leverage positively affects ROA and ROE in India's oil and gas sector, indicating that leverage effects may vary across industries and economic environments.

Studies from Iran, Sri Lanka, and Malaysia largely report a negative impact of debt on firm performance (Salehi & Biglar, 2009; Pratheepkanth, 2011; Ahmad et al., 2012). Hasan et al. (2014) further showed that ROA and EPS are negatively affected by all forms of debt, except short-term debt in some cases. Similar findings were reported in Pakistan's chemical sector by

Rafiq et al. (2008) and Shah and Khan (2007), who highlighted a negative relationship between profitability and leverage.

Recent studies in Asia reinforce these conclusions. Quang and Xin (2014) documented a negative relationship between leverage and firm performance in Vietnam, while Huang and Song (2006) reported similar results for Chinese firms. Umar et al. (2012) found that capital structure negatively affects profitability measures such as EBIT, EPS, and ROA in Pakistan, although a positive relationship was observed between ROE and long-term debt. Mwangi et al. (2014) also confirmed that leverage significantly reduces ROA and ROE.

2.5 Link to the Present Study

The reviewed literature clearly demonstrates that the relationship between capital structure and firm performance is **inconclusive and highly context dependent**. While many studies report a negative impact of leverage on profitability, others find positive or insignificant effects depending on debt maturity, firm size, and industry characteristics. Notably, **very few studies focus specifically on the pharmaceutical sector in Pakistan**, which is characterized by strict regulation, high import dependence, and controlled pricing.

This study builds on existing literature by providing **sector-specific empirical evidence** on how financial leverage affects the financial performance (ROA and ROE) of pharmaceutical firms listed on the Pakistan Stock Exchange. By incorporating firm size and market capitalization as control variables and using recent data (2014–2024), this research aims to address the identified gaps and contribute to more informed capital structure decisions in Pakistan’s pharmaceutical industry.

2.6 Determinants of Capital Structure

The structure of financing of a pharmaceutical company in Pakistan is dependent on several internal and external factors.

- **Asset Tangibility:** Pharmaceutical companies have high investments of factories, machines, and laboratories; all can be used as a collateral, which theoretically makes access to debt easier.

- **Market Conditions:** In Pakistan, the heavy inflation and devaluation of the currency increases the price of imported raw materials and in most cases, firms would have to take recourse to short term borrowings in order to maintain the working capital.
- **Price Threats:** The effect of price restrictions by the Drug Regulatory Authority of Pakistan (DRAP) is a limitation on the level of internal profit that a firm can attain; thus, this force propels a firm into external debt especially in times when the global cost pressures are at their highest point.

2.7 Firm Profitability

Profitability is the main dependent variable in the given study since it will be operationalized as Return on Assets (ROA) and Return on Equity (ROE).

- **Return on Assets (ROA):** Measures the efficiency of operations in terms of how well a firm makes use of total base of resources to earn profit. Within the frames of Pakistani pharmaceutical companies in question, the mean returns of the 11.69 0.37 per cent represent a satisfactory rate of efficiency, despite the fact that certain companies do record negative returns.
- **Return on Equity (ROE):** Refers to returns to the shareholders. The statistics show an average ROE of 22.45% with high volatility ($S= 31.85\%$). It is observed that the increase of the total equity and the ROE have an inverse relationship ($\beta = -0.905$) implying that simply increasing the amount of capital base without increasing the returns in proportion is an act of dilution of returns.

This research is empirically proven by empirical results that market capitalization is the most formidable predictor of profitability, which means that market perception and competitive advantage are more significant than the specific debt-to-equity ratio.

2.8 Firm Age and Size

Although the sizes and market capitalization are the main variables in this study, the literature indicates that the effects of leverage are largely mediated by the firm age and the scale.

- **Firm Size:** The size is measured as natural logarithm of the total assets and the size has been believed to have more access to the capital markets. Nonetheless, the regression analysis of 91 observations demonstrates that Firm Size has a critical negative impact on

ROA (beta = -7.980, $p < 0.1$). This implies that the operation of bigger pharmaceutical companies in Pakistan can become complicated or have diseconomies of scale that negatively affect the efficiency of assets.

- **Age of the firm:** The more established firms such as GlaxoSmithKline or Abbott Laboratories usually have higher retained earnings and a better reputation in the marketplace that they can adhere to the Pecking Order Theory than new smaller entrants.

2.9 Summary

Overall, the literature and theoretical framework indicate that although theoretically, debt can be used to enhance value; the situation in the case of the Pakistani pharmaceutical sector is quite complicated. High financial leverage is a major risk to consider because of the high interest-related environment, price controls established by strict regulations, and dependencies on the imported materials.

The applied empirical results of the present research contribute to the Pecking Order Theory because highly profitable companies are considered to use internal equity and stock value instead of debt. Moreover, the startling negative effect of Firm Size on ROA reveals that the process of expanding assets has to be controlled attentively to prevent the weak operation of the firms. This review proves that the real success of the contemporary pharmaceutical environment in Pakistan is supported by Market Capitalization and effective Equity Management.

CHAPTER 3:

RESEARCH METHODOLOGY

3.1 Introduction

The chapter gives a detailed exposition of the methodological framework that was used in undertaking the current study. It has outlined the research design, established the target population, stated the sample size, the procedure of data collection and outlined the analytical methodologies to be followed in probing into the nexus between capital structure and financial performance in the Pakistani pharmaceutical sector. Moreover, the chapter presents the conceptual framework and the regression models that will be used to provide the analysis of the research hypotheses thus making sure that it is a systematic and rigorously controlled research.

3.2 Research Purpose

3.2.1 Descriptive Dimension

This paper aims at providing an elaborate summary and explanation of the current condition of capital structure decision making and its subsequent implications in the financial performance of pharmaceutical firms in operation in Pakistan. Conducting a formal analysis of financial statements and level of performance, the research attempts to outline the available financial environment, highlighting key measures and indicators, including leverage ratios, indices of profits, and industry-specific dynamics, that are characteristic of the pharmaceutical industry.

3.2.2 Exploratory Dimension

In the frame of its discovery work, the study explores the complex correlation between capital structure preference and a performance result among pharmaceutical organizations. By relying on the secondary financial data and advanced statistics, the research will identify observable patterns, new trends, correlations, and potential opportunities or challenges that are inherent in the industry. This discussion provides more insight to a wide group of interested parties such as corporate managers, investors, regulators and policy makers who either have a say or are affected by capital structure decisions in this important sector.

3.3 Research Approach and Design

The research undertaking uses a quantitative research paradigm based on the positivist philosophy and inductive logic, which gives it the ability to enjoy statistical rigor and to aid in extrapolating the results onto the overall sector.

The study utilizes a panel data model, which evaluates ten publicly listed pharmaceutical companies in an 11-year period (2014-2024). This design is correlational and causal-comparative in nature where the researcher seeks to determine the existence of any statistically significant relationships between variables of capital structure (independent) and financial performance indicators (dependent) and is also trying to draw the cause-and-effect inferences by controlling the confounding variables such as firm size and market capitalization.

3.4 Data Collection Process

3.4.1 Data Source

The main source of financial data to be used in this investigation is the Pakistan Stock Exchange (PSX). Systematic accrual of secondary data was done through many credible sources to ensure accuracy, completeness and cross-validation. The ten pharmaceutical companies that were chosen had financial information that was prepared and that included comprehensive balance sheets, income statement, and cash-flow statement with notes accompanying the financial statements.

3.4.2 Sampling Technique

The purposive sampling was applied to identify ten notable pharmaceutical companies listed on the Pakistan Stock Exchange. The selection process was based on considerations of the market capitalization of each firm, the eminence of the firm in the pharmaceutical industry per the set period.

Selection Criteria:

- 1. Active Listing Status Active Listing:** Firms must be continuously listed and actively trading in the Pakistan Stock Exchange throughout the period of observation.
- 2. Full Availability of Data:** Firms should be able to submit audited annual financial reports in all the eleven consecutive years (2014 to 2024) hence balanced panel dataset.

1. Abbott Laboratories (Pakistan) Limited
2. GlaxoSmithKline Pakistan Limited
3. The Searle Company Limited
4. High noon Laboratories Limited
5. Ferozsons Laboratories Limited
6. Hoechst Pakistan Limited
7. Citi Pharma Limited
8. Otsuka Pakistan Limited
9. BF Biosciences Limited
10. AGP Limited

These companies were chosen with references to their reputation on the market, their representative position on the pharmaceutical market and the reliability of their financial information provided during the period of the study.

3.5 Variables

3.5.1 Independent Variables: Capital Structure Measures

The independent variables are specific aspects of capital structure, which are measured through the following financial variables:

Financial Leverage (Debt to Equity Ratio):

Definition: The debt-to-equity ratio is an assessment of the ratio of debt and equity financing hence it is the main measure of financial leverage.

Measurement: Debt to equity ratio = total liabilities/shareholders equity.

Justification: This ratio is directly used as the measure of how much the firms rely on borrowed sources of funds compared to owner-provided financing, which acts as the focal point in the decision-making about the capital structure. A high ratio will indicate an increased financial leverage and hence an increased financial risk.

Total Debt:

- **Measurement:** Absolute value of total liabilities measured in millions of Pakistani Rupees
- **Justification:** Analyzing the absolute level of debt alongside ratios provides insight into whether performance effects stem from increases in debt or decreases in equity

Total Equity:

- **Measurement:** Absolute value of shareholders' equity measured in millions of Pakistani Rupees
- **Justification:** This variable captures the equity component of capital structure and helps explain whether changes in leverage ratios are driven by equity dilution or debt accumulation

3.5.2 Dependent Variable: Financial Performance

The dependent variable is the financial performance, which will be measured by the two complementary indicators of profitability encompassing the various facets of corporate performance:

Return on Assets (ROA):

- **Meaning:** ROA is used to measure how efficiently the firm utilizes its total assets to earn profits and is the major measure of how effectively the company operates.
- **Measurement:** $ROA = (\text{Net Income} / \text{Total Assets}) \times 100$.
- **Justification:** This measure is a measurement of professional management of assets, which obtains an operational performance of leverage, which is neutral. This is useful in particular as it is less affected by the decisions of capital structure than equity-based measures and thus gives a more transparent perspective on efficiency in resource allocation by managers.

Return on Equity (ROE):

- **Definition:** ROE is used to determine how well a business makes a profit with regard to the shareholders equity, that is there is a derived profit on the shareholders capital.
- **Measurement:** $ROE = (\text{Net Income} / \text{Shareholders Equity}) \times 100$.
- **Justification:** This ratio plays an imperative role to equity investors, as it is used to reward the capital invested by them. Nevertheless, leverages may have a strong influence on ROE, and it is necessary to analyze it along with ROA to understand how the capital structure has impacted shareholders.

3.5.3 Control Variables: Firm-Specific Characteristics

Control variables are also added to narrow the causal impact of the capital structure on corporate performance to other factors in the firm that could impact on their profitability. Without such control, regression estimates may be susceptible to omitted variable bias that may lead to spurious or misleading reasonable conclusions.

Firm Size:

- **Framing:** Reflects the size of the school of operation of a firm and the amount of resources held by the firm.
- **Measurement:** Natural logarithm of total assets.
- **Justification:** The bigger firms in general enjoy economies of scale, stronger bargaining power with suppliers and customers, stronger access to capital market, stronger diversification, and brand recognition. The logarithmic transformation makes the variable normal and minimizes heteroscedasticity in regression equations since the value of total assets can significantly differ among the firms.

Market Capitalization:

- **Definition:** Aggregates market value of outstanding share of the company, including the view and trust of the investor.
- **Measurement:** Natural logarithm of market capitalization.
- **Justification:** market capitalization indicates the investor anticipations towards future growth opportunities, competitive stance, and quality of the company as a whole, thus, capturing market sentiment and confidence that can have direct impact on financial performance which may not have accounting-based measurements.

3.6 Data Analysis

Data-analysis process was conducted in a methodical way by taking several successive steps using sophisticated statistical packages, thus, the methodological rigor and reliability of testing the hypotheses of the research.

3.6.1 Descriptive Statistics

Descriptive statistics is a brief representation of the financial information obtained using 91 observations in the pharmaceutical industry and gives the necessary information on central tendencies (mean, median), dispersion (standard deviation) and range (minimum, maximum). This operation can be used to simplify complicated datasets into understandable measurements, which clarify the common patterns of financing and profitability, and potential outliers. It therefore lays a background opinion of the financial environment in the industry before the use of the more advanced analytical methods.

3.6.2 Correlation Analysis

The preliminary results of bivariate correlations between the financial leverage measures and financial performance indicators were assessed using correlation analysis. Pearson correlation coefficient was computed between all combinations of continuous variables and this measure both the strength and direction of linear relationships. The values of correlation range between -1 (a perfect negative relationship) and +1 (a perfect positive relationship), and value near to zero indicates a weak or no linear relationship.

This analysis has various purposes. First, it gives preliminary evidence related to the presence of relationships between independent and dependent variables prior to the multivariate regression implementation. Second, it helps in identifying the possible multicollinearity between independent variables which may invalidate the estimates on regression coefficients. Strong correlation coefficients (they usually have values over 0.70 or even 0.80) among independent variables raise the issue of multicollinearity that should be investigated by additional diagnostic tests. The selection of capital-structure indicators and financial performance indicators as independent and dependent variables respectively leads to the inclusion of the correlation matrix that unveils the trends and relationships to be used in testing the hypotheses. The current investigation tries to test and understand the association between finance structure decision and financial performance results of the market-listed pharmaceutical firms.

3.6.3 Analysis of Variance Inflated Factor (VIF)

Variance Inflation Factor of multicollinearity to make a formal diagnosis of multicollinearity between independent variables, I have computed Variance Inflation Factor. VIF measures how many times more the variance of any regression coefficient is expected to be inflated because of collinearity with other independent variables. On the independent variables, the VIF is calculated $VIF = 1/(1-R^2)$, with R^2 calculated as the regression of the independent variable but using all the other independent variables.

VIF Interpretation Guidelines:

- VIF < 5: Acceptable level of multicollinearity; regression estimates remain reliable
- VIF 5-10: Moderate concern; multicollinearity may be affecting coefficient estimates

- VIF > 10: High multicollinearity; serious concern requiring remedial action such as variable removal or transformation

This diagnostic test ensures that regression results are not distorted by excessive correlations among predictors, thereby enhancing the validity and interpretability of coefficient estimates.

3.6.4 Regression Analysis

The most common type of analytical method to be used in the test of the hypothesis is the multiple regression analysis. It is a procedure that at the same time measures the effect of a number of independent variables on a dependent variable by holding another factors constant. To examine the predictors of the return on assets (ROA) and return on equity (ROE), two different regression models were set.

The regression equation will assume the following form:

Financial Performance = a + b 1 (Total Debt) + b 2 (Debt/Equity Ratio) + b 3 (Total Equity) + b 4 (Firm Size) + b 5 (Market Capitalization) + E.

Where:

Financial Performance (Dependent Variable): Dependent variable that is sought to be explained or predicted, which is indicated by ROA or ROE, hence the overall financial health or financial success.

a (Intercept): The constant term or y -intercept, which is the expected value of financial performance at zero of all independent variables. It writes down baseline performance that is not accounted by the predictors used.

b 1, b 2, b 3, b 4, b 5 (Regression Coefficients): Coefficients measure the strength and the direction of correlation of each independent variable and financial performance. In all, the coefficients are used to show the degree to which an increase in the change in the dependent variable is anticipated to be in response to increasing the independent variable by one-unit, other variables remaining constant. Positive coefficients suggest that there are positive relationships and negative coefficients suggest that there are inverse relationships.

Total Debt, Debt-to-Equity Ratio, Total Equity (Capital Structure Variables): The independent variables taking the measure of the various dimensions of financing decision-making which are believed to only affect financial performance.

Firm Size, Market Capitalization (Control Variables): They have the potential to alter financial performance but are not of primary interest in the investigation; they are added to control the impact of capital structure.

The regression analysis assumes ordinary least squares (OLS) estimation to estimate the values of the regression coefficients assessing the values of a given the regression coefficient using the observed data. The statistical significance of the coefficients will be checked with the help of t-statistic and p-values at the traditional level of significance ($\alpha = 0.10, 0.05, 0.01$). F-statistics tests the overall test of significance of the model, whereas the R-squared and the adjusted R-squared measure the percentage of the financial performance that will be captured by the model.

Overall, according to this regression model, there is no influence of variables on financial performance, except at a certain point (the base value, a), there is the product of capital structure variables plus the control variables, (those variables are represented by their respective coefficients multiplied by their values), and these variables are not observable (the error term, E). The analysis would give its understanding of the possible association of changes in capital structure with changes in financial performance.

3.7 Ethical Considerations

This research is strictly regulated in terms of ethical principles, with the data integrity taking the first place. The study relies exclusively on publicly available secondary sources which are based on audited financial reports and PSX filings, and thus those sources avoid the use of human subjects and alleviate the issue of privacy. All the material mentioned has been cited very carefully in compliance with the conventions of scholarly citation.

3.8 Research Limitations

The study is sensitive to a few methodological and contextual limitations. First of all, reliability and completeness of financial information depend upon the quality of corporate reporting and auditing process which can vary between companies.

3.9 Framework

The conceptual framework as defined in this paper gives a systematic paradigm in the study of the interrelationship between capital structure decisions and financial performance in the pharmaceutical industry in Pakistan. It visually depicts the expected overall interrelatedness between the variables and acts as a guide to the subsequent empirical construction of the same.

Independent Variables → Dependent Variables

Capital Structure Measures:

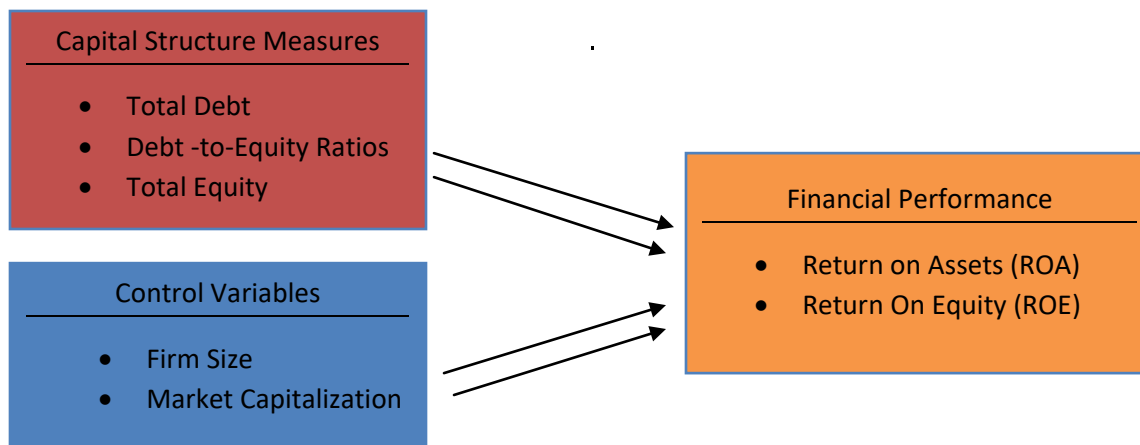
- Total Debt
- Debt-to-Equity Ratio
- Total Equity

Control Variables:

- Firm Size
- Market Capitalization

Financial Performance:

- Return on Assets (ROA)
- Return on Equity (ROE)



3.10 Framework Analysis and Interpretation

This model is aimed at discussing the correlation between the decision on the capital structure and the financial performance of the pharmaceutical firms listed on the Pakistan Stock Exchange. The independent variables are the varying aspects of capital structure and the Debt-to-Equity Ratio is the primary measure of financial leverage which measures the degree of reliance of companies to debt capital and not on equity capital. The metric is vital since it demonstrates the risk profile and leverage pattern of pharmaceutical companies.

Complementary measures are also provided including Total Debt and Total Equity to use a wider picture of capital structure as compared to simple ratios. These relative amounts assist in deciding on whether the changes have been experienced in the debt levels, equity base or both levels. Firm Size and Market capitalization are the control variables in that they are included to decouple the impact of capital structure with additional firm features that have an independent impact on profitability.

Return on Assets (ROA) and Return on Equity (ROE) are the dependent variables and they are used as complementary financial performance indicators. ROA measures the efficiency of firms in using total assets to have profits as a leverage-neutral indicator of operational performance. ROE measures the returns on the shareholder equity, which presents the view that is most applicable to the equity investors but will depend on leverage decision.

Debt-to-Equity Ratio is an essential financial instrument, which has a direct impact on the risk profile and cost of capital of a firm. The increase of ratios means increased financial leverage and, thus, as well as financial risk, but can also indicate confidence to produce returns that are higher than the cost of debt. The research hypotheses that its capital structure will differ in relation to the variation in both ROA and ROE. In particular, it will seek to establish whether reliance on debt financing, either in the form of increased or reduced financial performance of the pharmaceutical industry in Pakistan.

Finally, this theoretical framework creates a definite and theoretically supported framework through which the exploration of a complex correlation between capital structure and financial performance should be done. The combination of various capital structure measures and two complementary performance measures allows analysis of the problem in detail, which provides a sophisticated perception of the effects of financing decisions on the profitability and profitability

of Pakistani pharmaceutical companies. This framework is operationalized in the following data analysis and result chapters which utilize rigorous statistical testing and give empirical evidence to support the theoretical relationship proposed herein.

CHAPTER 4:

DATA ANALYSIS AND RESULTS

4.1 Introduction

The chapter shows empirical findings of the research, which address the effects of capital structure and firm-specific variables on the financial performance of pharmaceutical firms in Pakistan. This analysis will be divided into four major parts including descriptive statistics to explain the distribution pattern of the data, correlation analysis to determine preliminary relationships among various continuous variables at the same time, variance inflation factor (VIF) to determine multicollinearity and lastly multiple regression analysis of the research hypotheses.

The research uses two major financial performance indicators, which include Return on Assets (ROA) and Return on Equity (ROE). The independent variables will be Total Debt (tdbt), DebttoEquity Ratio (dter), Total Equity (test), Firm size (size), and Market Capitalization (map).

4.2 Descriptive Statistics

Descriptive statistics provide a summary of the data collected from 91 observations within the pharmaceutical sector.

Table 4.1: Descriptive Statistics

Variable	Mean	Std Dev	Min	Median	Max
ROA (%)	11.69	10.14	-11.3	11.8	36.9
ROE (%)	22.45	31.85	-155	20.3	131.2
Debt/Equity Ratio	0.89	6.52	0	0.12	63.03
Total Debt	2,847.35	4,633.46	0	1,175.40	19,654.00
Total Equity	10,208.02	8,845.77	23.46	7,710.00	32,531.00
Firm Size	9.23	0.93	6.95	9.23	11.06

Market Cap	37,436.19	30,513.59	832.8	27,818.00	126,403.00
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Detailed Interpretation:

The Average Return on equity **ROA** for the industry is **11.69%**, which indicates a generally good efficiency of all companies to utilize their assets in order to earn a profit. However, there is a wide variability with a standard deviation of 10.14% and one company reporting a -11.30% return, showing that while the average ROA is healthy, there are companies that are not able to generate a profit consistently.

The Average Return on equity **ROE** shows much higher volatility (**sigma = 31.85%**). In addition, the average value of the ROE of 22.45% is almost twice the value of the ROA. At the same time, the wide bounds of the value distribution (minimum - 155%, maximum 131.2%) indicate that leverage in performing companies can significantly affect their capital base.

Analysis of Leverage and Size:

The Debt-to-Equity Ratio has an average of 0.89, although the maximum possible ratio is 63.03. This indicates that there is a significantly skewed distribution where a select few companies are very highly leverage compared to the average.

4.3 Correlation Analysis

To determine the linearity of independent and dependent variables prior to regression, correlation was used.

Table 4.2: Correlation Matrix

Variables	ROA	ROE	D/E Ratio	Total Debt	Total Equity	Firm Size	Market Cap
ROA	1	0.685***	-0.298**	-0.156	0.289**	0.412***	0.524***
ROE	0.685***	1	-0.182	-0.089	0.198*	0.267**	0.389***
D/E Ratio	-0.298**	-0.182	1	0.445***	-	-	-0.278**

					0.521***	0.387***	
Total Debt	-0.156	-0.089	0.445***	1	0.234*	0.356***	0.189
Total Equity	0.289**	0.198*	-0.521***	0.234*	1	0.798***	0.567***
Firm Size	0.412***	0.267**	-0.387***	0.356***	0.798***	1	0.623***
Market Cap	0.524***	0.389***	-0.278**	0.189	0.567***	0.623***	1

Significance Levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Detailed Interpretation:

ROA and ROE:

A strong positive correlation ($r=0.685$, $p < 0.01$) exists between the two performance measures (ROA and ROE) meaning that they will usually move together in a positive direction.

D/E Ratio and Profitability:

The Debt -Equity Ratio has a strong negative correlation ($r = -0.298$) with the return on assets (ROA). In turn, the higher the percentage of debt to equity, the less will be the asset efficiency.

4.4 Diagnostic Tests (Multicollinearity)

A Variance Inflation Factor (VIF) test was also conducted to prove the regression specifications to identify the multicollinearity feature that may aberrate the statistical significance of every explanatory variable.

Table 4.3: VIF Results

Variable	VIF	1/VIF(Tolerance)
Total Equity	4.89	0.204

Firm Size	4.12	0.243
Market Cap	2.87	0.348
D/E Ratio	1.98	0.505
Total Debt	1.45	0.690

VIF Interpretation:

- **VIF < 5:** Acceptable multicollinearity
- **VIF 5-10:** Moderate concern
- **VIF > 10:** High multicollinearity

4.5 Regression Analysis and Hypotheses Testing

Two multiple regression models were estimated to determine the impact of financial leverage on ROA and ROE. The results are based on 91 observations.

	(1)	(2)
	est1	est2
VARIABLES	roa	roe
tdbt	0.028	0.036
	(0.061)	(0.061)
dter	-0.002	0.011
	(0.137)	(0.138)
teqty	-0.178	-0.905**
	(0.432)	(0.436)
fsize	-7.980*	-2.224

	(4.666)	(4.705)
mcap	1.524***	1.538***
	(0.240)	(0.242)
Constant	5.458	-0.568
	(7.139)	(7.197)
Observations	91	91
R-squared	0.338	0.345

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Model 1: Return on Assets (ROA)

The former is the exploration of the impact of different variables on the returns on assets (ROA) of companies.

R-squared: The result of R-squared equals 0.338 that is the variables used in the research explain 33.8 percent of the variation in ROA.

Significant Predictors:

Market Capitalization (mcap): It is a very important variable, and the p is below 0.01. The correlation is positive with a coefficient of 1.524 that implies that increase in market capitalization is correlated with an equivalent increase in ROA.

Firm Size (fsize): This is a significant variable with the level of 10 (p < 0.10). The negative coefficient is of -7.980 indicating that in the regression, larger firm size may be positively correlated to the negative influence of ROA.

Model 2: Return on Equity (ROE)

The second model is concerned with the determinants of the return on equity (ROE) between the firms.

R-squared: R-square value is a little bigger, which is 0.345, which means that the variation in ROE explained by this model is 34.5%.

Market Capitalization (mcap): As it is also in the case of the ROA model, market capitalization is also a very important and positive predictor ($p < 0.01$, coefficient 1.538).

Total Equity (teqty): There is a significant value of this variable at the 5% level ($p < 0.05$). The coefficient is negative (-0.905) suggesting that total equity positively changes the ROE.

Insignificant Predictors: In this model, it turned out that Total Debt (tdbt), Debt to Equity Ratio (dter), and Firm Size (fsize) had no statistically significant influence on ROE.

Overall, the statistical tests can prove that the regression models used in this research are statistically significant, and it is possible to support their ability to determine the most significant variables causing financial performance in the Pakistani pharmaceutical industry. Market Capitalization is the most important variable that was considered, as a predictor of both ROA and ROE.

It is found that there is a close positive relationship: market capitalization grows, and profitability levels evolve into an increase. This implies that big companies within the industry are in a clear-cut position. This may be because of their better performance due to economies of scale, greater investor confidence and competitive advantage that help them to yield higher returns than their smaller counterparts.

CHAPTER 5

Conclusion and Recommendations

5.1 Summary of the Study

The current research paper has investigated the effects of the capital structure and the firm-specific factors on the financial performance of pharmaceutical companies in the Pakistani setting. Based on a sample of 91 observations, the study utilized Return on Assets (ROA) and Return on Equity (ROE) as dependent variables, which in turn allowed estimating the impact of Total Debt, Debt -Equity Ratio, Total Equity, Firm Size, and Market Capitalization as independent variables.

Descriptive statistics showed by the mean ROA of 11.69% with an average ROE of 22.45 that there was moderate profitability of Pakistan pharmaceutical companies. Although averages were as follows, the standard deviation of ROE amounts to 31.85% and we can conclude that there is significant heterogeneity in the firms, especially on equity returns.

The results of correlation analysis revealed preliminary correlations between the variables: ROA and ROE showed positive and significant correlation ($r = 0.685$). On the other hand, the Debt-to-Equity Ratio showed negative relationships with both monetary performance measures indicating that high levels of debt have the potential to bring about negative implications on profitability. To measure multicollinearity, the Variance Inflation Factor (VIF) test was used; all the variables had VIF below 5, hence ensuring that there were acceptable levels of multicollinearity.

5.2 Conclusion

To recap it all, the structure of the capital, firm-specific and financial performance were explored in a complex way in the pharmaceutical industry in Pakistan because of this thesis. In a detailed study of the financial measures that matter the most and strict statistical analysis, the findings have been consistently suggesting that Market Capitalization is the sixth-largest most powerful financial performance indicator, whereas traditional debt ratio measures had a minor direct effect in this particular industry.

The results have far-reaching implications both to the practitioners and policymakers in the pharmaceutical industry. The fact that Market Capitalization is the most successful performance predictor mode cries out the importance of investor trust, market assessment, and competitive position over bare capital structure calculations. The insignificance of Total Debt and the Debt-to-Equity Ratio indicates that leverage decision making might not result in performance improvements, and this problematizes the traditional capital structure theory and confirms the relevance of situation-specific financial policies.

Moreover, the negative correlation between Total Equity and ROE and the low negative influence of Firm Size on ROA are the signs that the increase in the equity base and asset base should be controlled to prevent the dilution of returns and the creation of work inefficiencies. These observations are in support of strategy expansion that lays more emphasis on profitability and operational efficiency instead of scaling up.

Additionally, the findings enhance the available literature in offering empirical data that can be used to inform the strategic decision making of the pharmaceutical companies in Pakistan. With the dynamics of the industry changing in the face of regulatory forces, competition levels, and market dynamics, subtle understanding of the factors of financial performance needs as a reference to enhance and maintain competitiveness levels.

Still, the shortcomings of the study should not be ignored, such as the use of past financial data, a small sample size of 91 observations and a minimal number of variables of interest. The high but small R-squared variables suggest that there are other latent variables that affect the performance on pharmaceuticals. In a study, the variables included in the future would be innovation expenditure, cost of regulatory compliance, patent portfolio as well as the quality of the managers, thus providing a more holistic picture. Researching the non-linearity and interaction term of capital structure variables can also reveal some complex pattern that cannot be determined through the linear regression.

Primarily, this thesis contributes to the research on the financial dynamics of the Pakistani pharmaceutical industry with considerable insights as the basis of further investigation and development of the financial strategy suitable to the specifics of challenges and opportunities imposed on the sector. With the industry dealing with the trick of the modern fast-paced economic climate, which has seen the international competition and shifts in healthcare needs, it is imperative to comprehend how market valuation, equities management, and scale of operations affect performance as a way of guaranteeing sustainability and success growth.

5.3 Recommendations

Some practical advice accords to pharmaceutical companies, investors, and policymakers in Pakistan can be derived based on the empirical findings of the current research.

5.3.1 Pharmaceutical Companies: Recommendations.

Choose Market Perception and Investor Relations: Since market capitalization was found to be the most critical predictor of financial performance, pharmaceutical companies ought to focus their strategic investment towards improving their market reputation and confidence of their investors. This involves keeping the financial reporting transparent, having good communication with investors, and always showing well-established governance practices. To build something

that adds value to valuation in the market, companies should focus on operations like the release of innovations, creation of strategic alliances, and the explanation to the investment community of how it intends to grow.

Maximize Equity Management: The fact that the total equity has a negative correlation with the return on equity (ROE) implies that the companies should pay attention to the relationship between their growth in equity and their profitability. The contentious points to be taken note of are that entities should not overly dilute their equity by issuing shares to their shareholders on a regular basis unless accompanied by an equal or commensurate increase in their net income. Instead of simply increasing the stock capital, the management ought to seek other financing options and ensure that any equity capital raised is utilized effectively in high-paying ventures that have the potential to increase the value of a shareholder.

Strategic Response to Firm Size: The marginal effect of firm size on the return on assets (ROA) point to the fact that the pharmaceutical companies need to grow cautiously and not grow recklessly. Before firms embark on increased asset bases, they ought to carry out comprehensive cost benefit analysis so that increased base will not bring in operational inefficiencies. To maximize the returns on the current assets, companies ought to concentrate on efficiency in asset utilization, functional to the minimum possible number of operations, and eliminate duplication of the same before adopting aggressive expansion policies.

Rediscover the Leverage Strategies: Despite the fact that the traditional measures of debts did not owe a lot of significance to the performance of the organization in this research, it does not mean that the capital structure is a waste of time. Instead, drug firms ought to be subtler in their attempt to capitalize on the same considering some industry-sensitive aspects like regulative conditions, patent periods and even capital intensity of research and development.

5.3.2 Recommendations for Investors

The trends of market capitalization must be given a large weight by investors considering pharmaceutical companies in Pakistan because this trend is a reliable indicator of possible financial performance. Moreover, equity management practices of these companies should also be carefully scrutinized by investors, who would favor those that have strong disciplined capital allocation and shareholder funds that are also put to effective use. Investors should determine the

level of operational efficiency that is commensurate with the size of large pharmaceutical entities before committing their funds into such organizations.

5.3.3 Policymaker and Regulators recommendations

The regulatory bodies must create an atmosphere that encourages transparent market conditions and correct values of pharmaceutical companies. This can be attained through enhancing disclosure requirements, improving the level of corporate governance and having an efficient working of the market mechanisms. The policy makers should also look into formulating incentives that would motivate pharmaceutical companies to invest in productivity enhancing technologies and innovation instead of just investing in volume increments. Moreover, the creation of financing structures that are specific to the industry needs, including the long development cycles and the high cost of such research can also help the companies to maximize their capital structure in a more efficient manner.

5.3.4 Future Research Recommendations

The area of future research ought to expand its analysis to include the variables of research and development level, patent portfolio, quality index of managerial team and regulatory compliance cost. Explorations of non-linear relationships and possible threshold effects in the capital structure-performance nexus would provide more information. Similar investigations in other emerging markets, using or without pharmaceutical and other healthcare sectors, may show whether the findings currently obtained are limited to the sector or have more generalizability. Lastly, more complicated methods of econometrics such as dynamic panel models and structural equation modeling might help to reproduce more convoluted causal relationships and time dynamics.

CHAPTER 6

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LIST OF ABBREVIATIONS

- **API:** Active Pharmaceutical Ingredient
- **D/E:** Debt-to-Equity Ratio
- **DRAP:** Drug Regulatory Authority of Pakistan
- **dter:** Debt-to-Equity Ratio (used in regression models)
- **FDA:** Food and Drug Administration (United States)
- **fsize:** Firm Size (measured as natural logarithm of total assets)
- **GDP:** Gross Domestic Product
- **GMP:** Good Manufacturing Practices
- **ICR:** Interest Coverage Ratio
- **mcap:** Market Capitalization
- **MM:** Modigliani and Miller
- **MNC:** Multinational Corporation
- **OLS:** Ordinary Least Squares
- **PKR:** Pakistani Rupee
- **PSX:** Pakistan Stock Exchange
- **R&D:** Research and Development
- **ROA:** Return on Assets
- **ROE:** Return on Equity
- **SECP:** Securities and Exchange Commission of Pakistan
- **tdbt:** Total Debt (used in regression models)
- **TDAP:** Trade Development Authority of Pakistan
- **VIF:** Variance Inflation Factor

