Impact of Corporate Tax Mix on Firm Performance and Investment: An Analysis of Listed Non-Financial Firms in Pakistan.

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CERTIFICATE

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LIST OF ABBREVIATIONS

ARV	Annual Rental Value
ATL	Active Taxpayer List
CD	Custom Duty
CGT	Capital Gain Tax
CVT	Capital Value Tax
CTR	Corporate Tax Rate
D/A	Debt to Asset
D/E	Debt to Equity
EBITDA	Earnings Before Interest Tax Depreciation & Amortization
EOB	Employees' Old-Age Benefits
ETR	Effective Tax Rate
FBR	Federal Board of Revenue
FED	Federal Excise Duty
FP	Firm Performance
FS	Firm Size
GIDC	Gas Infrastructure Development Cess
GST	General Sales Tax
ICT	Islamabad Capital Territory
IMF	International Monetary Fund
INT	Interest Rate
INV	Investment
KPRA	Khyber Pakhtunkhwa Board of Revenue Authority
LEV	Leverage
LIQ	Liquidity
MBV	Market Based View
NCA	Non-Current Assets
PRA	Punjab Revenue Authority
PWC	Price Waterhouse Coopers
R/E	Return-on-Equity

RBV	Resource-Based View
RD	Regulatory Duty
RIR	Real Interest Rate
ROA	Return on Assets NP Net Profit
ROE	Return on Equity
SBR	Sindh Board of Revenue
SG	Sales Growth
SNGPL	Sui Northern Gas Pipeline
SSCPL	Sui Southern Gas Pipeline
TA	Total Assets
WB	World Bank
WC	Working Capital
WHT	Withholding Tax
WWF	Worker Welfare Fund
DER	Debt to Equity

ABSTRACT

This study examines the impact of firm-specific taxation on the performance and investment behavior of non-financial firms listed on the Pakistan Stock Exchange (PSE) over the period 2010–2022. Using panel data, the analysis applies both fixed effects and random effects models, with the Hausman test employed to determine the most appropriate specification. The empirical findings reveal a positive association between corporate tax expense and firm performance, as measured by return on assets (ROA). In contrast, the effective tax rate (ETR) exhibits a negative relationship with ROA. Furthermore, the results indicate that both corporate tax mix and ETR negatively affect firms' investment decisions, reflected in reductions in non-current assets and working capital, capturing long-term and short-term investment behavior, respectively. These relationships hold for the overall sample as well as across sectoral analyses. Sector-specific results provide additional insights, showing that ETR positively influences firm performance in the transport, paperboard, and engineering sectors. However, in sectors such as sugar, cement, chemicals, pharmaceuticals, electrical machinery, automobiles, electrical and cables, textiles, leather, fertilizer, food, and power, firm performance demonstrates only modest improvements over time. Overall, the study underscores the complex role of firm-specific tax mix in shaping investment and performance outcomes. The findings highlight the need for targeted policy interventions, including tax incentives, grants, and improved access to capital, to support Pakistani firms in enhancing performance, sustaining investment, and fostering growth and innovation despite rising tax burdens.

CHAPTER 1
INTRODUCTION

1.1 Introduction

Taxation plays a crucial role in shaping business decisions, making it a key concern for both policymakers and corporate leaders. Numerous studies examine how tax policies influence business operations, with one of the most recognized frameworks being the Doing Business/Paying Taxes approach, a joint initiative by the World Bank and PricewaterhouseCoopers (PWC). This methodology evaluates countries based on three primary metrics: the total tax rate, the number of tax payments required, and the time needed for tax compliance. Higher values in these categories indicate greater tax-related burdens, which can negatively impact business growth and efficiency.

The influence of taxation on corporate decision-making, especially concerning firm performance and investment patterns, has been a key area of research in public economics and business strategy. In emerging economies such as Pakistan, tax systems tend to be intricate and vary significantly across industries. A study by Rehman et al. (2020) utilized Autoregressive Distributed Lag (ARDL) models to evaluate the prolonged effects of taxation, revealing that inconsistent tax policies in Pakistan contributed to economic instability, discouraging sustained capital expenditures in critical sectors like energy and infrastructure.

The interplay between corporate taxation and firm performance has long been a focal point of academic inquiry, drawing interest from economists, financial analysts, and business strategists alike. Theoretical frameworks and empirical studies alike confirm that corporate tax policies shape firm-level decision-making and financial outcomes through multiple pathways. Scholars remain engaged in ongoing discussions about the nuanced factors underlying these performance differentials, employing varied conceptual lenses and analytical techniques to unpack this pivotal dimension of corporate operations.

The term "corporate tax-mix" encompasses all fiscal obligations imposed on firms, including profit-based taxes (such as corporate income tax) and non-profit taxes (like property and professional taxes), as well as labor-related contributions (e.g., Worker Welfare Fund and Employees' Old-Age Benefits Institution). Pakistan, as a developing economy, offers a compelling setting to examine how this tax composition influences firm performance. The country’s ongoing efforts to expand its tax base, coupled with frequent reforms in tax policy, create a dynamic

environment where policymakers must weigh revenue needs against the economic burden on businesses. This tension is especially relevant for companies listed on the PSX, which operate under both domestic fiscal pressures and international market demands.

In Pakistan corporate tax policies are not uniform they vary significantly across sectors and often include tax exemptions and concessions based on industry type, geographical & territorial location and export orientation. Despite the prevalence of such differentiated tax policies, there is limited research that systematically investigates how the corporate tax mix influences firm-level outcomes across different sectors. The existing literature on Pakistani firms has primarily focused on overall firm performance or tax compliance behavior, without examining the combined effect of different types of corporate taxes on firm performance and investment (Ali et al., 2021; PIDE, 2023).

Prior studies suggest that a poorly designed tax system can hinder firm growth by creating distortions, increasing compliance costs, and diverting resources from productive investments (Djankov et al., 2010). Conversely, a well calibrated tax mix can promote transparency, enhance efficiency, and stimulate sectoral investment. For example, in Ethiopia and India research has shown that sector-sensitive tax incentives have contributed to higher foreign direct investment and improved firm performance in targeted industries (Mallinguh et al., 2020).

Corporate tax policies are not uniform for all businesses in Pakistan. It varies across different industries and sectors. Some sectors are provided with special exemptions or concessions based on their location or status as export-oriented industries. Still, the impact of these varied tax policies on firm performance and investment decisions within the industries remains poorly documented and understood. Most existing research on Pakistani firms has either looked at general firm performance or tax compliance behavior, without analyzing how the combination of different corporate taxes such as income tax, minimum tax, and turnover tax affects businesses in distinct ways (Ali et al., 2021; PIDE, 2023). This gap in research makes it difficult to fully understand how Pakistan's complex tax system influences corporate growth and investment patterns.

Several studies highlight how an inefficient tax system can negatively affect business growth by creating economic imbalances, raising compliance expenses, and shifting resources away from productive investments (Djankov et al., 2010). On the other hand, a well structured tax policy can improve transparency, boost economic efficiency, and encourage investment in key industries. For instance, research from Ethiopia and India demonstrates that tax incentives tailored to specific

sectors have successfully attracted foreign investment and enhanced firm performance in those industries (Mallinguh et al., 2020).

Pakistan offers an interesting yet puzzling case when it comes to corporate growth. While a few major firms like Engro have successfully expanded and diversified over the years, most of the country listed non-financial companies have struggled to keep pace with their regional competitors. For example top Indian conglomerates have grown to valuations exceeding $300 billion, while Pakistan largest business group was worth just $6 billion in 2020 (PIDE, 2023). This stark difference highlights key concerns about Pakistan's business climate, particularly whether tax policies are helping or hindering firms from reaching their full potential.

A critical issue in the corporate finance literature on Pakistan is the heterogeneous impact of taxation and other financial policies across different sectors, particularly within the non-financial segment of the Pakistan Stock Exchange (PSX). Prior research has shown that firm performance indicators such as profitability and investment behavior vary not only between firms but also across sectors due to differences in risk profiles, market dynamics, and structural characteristics of industries (Iqbal et al., 2023). For instance, sectoral analysis in studies on Pakistani firms has identified that internal and external factors such as liquidity, sector dynamism, and macroeconomic shocks affect firm performance differently across sectors, underscoring the importance of disaggregating data rather than treating all firms as a homogeneous group (Iqbal et al., 2023).

In addition, this study is indirectly linked to the United Nations Sustainable Development Goals (SDGs), adopted in 2015 to promote inclusive economic growth, social development, environmental sustainability, and strong institutions by 2030. The study addresses SDG 9 (Industry, Innovation, and Infrastructure) by demonstrating how improved firm performance enhances industrial competitiveness and supports innovation-led growth. The findings are also aligned with SDG 16 (Peace, Justice, and Strong Institutions), as effective and well-designed tax systems contribute to stronger public institutions by promoting transparency, accountability, and sound fiscal governance. Collectively, these SDGs underscore the broader developmental relevance of the thesis and highlight its contribution to sustainable economic and institutional development.

This study examines how different corporate tax policies influence the performance and investment decisions of non-financial firms listed in Pakistan, with a focus on variations across

sectors. By analyzing sector-specific tax burdens, the research aims to determine how taxes impact firm performance, investment trends, and long-term growth. The findings are valuable for policymakers, as they can guide the design of fair and growth-friendly tax reforms. Additionally, the study fills an important gap in existing research by providing deeper insights into how corporate tax mix shapes business outcomes in emerging markets like Pakistan.

1.2 Research Problem

Pakistan is a case where the government has always faced a fiscal deficit since its independence to cover this gap, various types of taxes firms have to pay annually or monthly, which have been imposed & collected by the federal, provincial, and local government institutions. Notably, Pakistan maintains some of the highest corporate tax rates globally. Non-financial firms face a 29% rate, while financial institutions are taxed at 39%. Additional levies include a 10% super tax on companies earning Rs.500 million or more, plus mandatory contributions of 2% for the Workers' Welfare Fund and 5% for the Workers' Participation Fund (Finance Act, 2022). The tax burden extends to dividends, which are taxed at 15-25%, effectively resulting in double taxation. Paradoxically, despite this extensive taxation framework, Pakistan's tax-to-GDP ratio remains among the lowest when compared to similar economies. This contrast becomes particularly apparent when examining firms that drive innovation, make substantial investments, and serve as indicators of economic vitality.

In Pakistan, investment as a percentage of GDP is very low as compared to other comparator countries. Low investment GDP ratio is indicative of the overall economic environment and policy framework in the country. In Pakistan, the investment rate is low because of various reasons, which include a cumbersome regulatory environment, macroeconomic uncertainty, and incentivizing some sectors or firms at the expense of others. A study by Khan & Sattar (2023) published in the Pakistan Development Review found that firms in high-tax sectors such as cement and steel reduced capital expenditures (CapEx) by 12-15% following increases in corporate tax rates. However, Technology & IT Service benefiting from 10-year tax exemptions under the Digital Pakistan Policy, startups and IT firms have seen 30%+ annual investment growth (PTA, 2023).

Pakistani firms increasingly rely on debt financing rather than equity due to tax-deductible interest expenses (Hussain et al., 2022, PIDE Research Report). This trend has led to higher leverage ratios (avg. debt-to-equity of 60% in 2023) but also increased bankruptcy risks in sectors like construction (State Bank of Pakistan, 2023). Moreover, Frequent tax policy changes in Energy &

Infrastructure such as super tax on high revenues have deterred long-term power projects, causing a 15% drop in private energy investments since 2021 (World Bank, 2023).

In the context of taxation, the effective tax rate (ETR) and corporate tax mix may not uniformly influence all industries because tax burdens interact with sector-specific investment incentives, competitive constraints, and regulatory environments. Empirical evidence from Pakistan indicates that corporate income tax and asset turnover exhibit varying degrees of influence on firm performance when examined at sector-specific levels, which would be obscured in aggregate analyses (Ahmad et al., 2023). Consequently, a sectoral approach allows for a more accurate assessment of how tax structures impact both firm performance and investment behavior in distinct segments of the non-financial corporate sector. This differentiated analysis is crucial for generating policy recommendations tailored to industry characteristics, rather than broad fiscal prescriptions that may be ineffective or counterproductive for certain sectors. Sectoral analysis therefore strengthens the validity and applicability of the study's findings by accounting for the heterogeneity inherent in Pakistan's corporate landscape.

For the context of Pakistan, there is a lack of research that investigates the performance of listed firms and their investment patterns in the presence of a corporate tax mix. The objectives of this research are to examine the correlation between the performance of listed firms, investment decisions with corporate tax mix. This research exclusively examines the firms listed in the PSX. Also, the firms have been categorized sectoral basis to check the sectoral trend to determine which sector is more and less sensitive to tax mix.

1.3 Research Questions

This study is to cover the following research problem:

1- What is the effective tax rate (ETR) for each non-financial sector in Pakistan?

2- How does the corporate tax mix influence firm performance and investment behavior in listed non-financial firms?

1.4 Objectives of the Research

Firms are considered crucial for the economy, just as taxes are considered for the government. Through imposing taxes on companies, governments finance their operations. But lots of taxes on firms can impact their performance, their investment, and the overall economic health of the country. For the context of Pakistan, there is a lack of research on the firm level that investigates

the combined effect of all taxes borne by a listed firm. Thus, the objective of this study is to examine the performance of firms in the presence and payment of all combined taxes, such as corporate income tax, social security, property, and consumption taxes.

The key objectives of this study are:

- To examine how the current corporate tax mix affects firm performance and investment behavior.
- To analyze the panel and sectoral impact of the effective tax rate (ETR) on performance and investment in Pakistan's listed non-financial firms.

1.5 Testable Hypothesis

Table 1.1: Hypothesis Testing

Hypothesis Nature	Description
Null Hypothesis H_0	There is a positive association between corporate tax mix and the performance of firms in Pakistan.
Alternative Hypothesis H_1	There is a negative relationship between corporate tax-mix and the performance of firms in Pakistan.
Null Hypothesis H_0	There is a positive association between corporate tax-mix and investment in Pakistan
Alternative Hypothesis H_1	There is a negative relationship between corporate tax-mix and investment in Pakistan.

1.6 Significance of the study

This study is very crucial from different perspectives, as there are no prior studies that investigate the panel and sectoral correlation of firm performance with corporate tax mix and observe its investment patterns under this scenario. The findings of this research cover the gap in industry-specific analyses of corporate tax-mix and its implications for firm performance. Secondly, the variables we used in our study are very important as well as our study investigates the performance of firms not at the firm level but also at the sectoral level. Thus, our findings offer valuable insights for policymakers in designing effective tax policies and for business leaders in strategizing tax planning and operational adjustments. A sectoral-level analysis is valuable because it reveals how the relationships between variables vary across different sectors, providing insights into what sets a particular industry off from the others. Through spotlighting the differences between industries, the research helps public and private decision-makers make more informed decisions.

1.7 Organization of the study

This study is organized into six chapters. Chapter 1 provides an introduction and overview of the research. Chapter 2 outlines the methodology and describes the variables used in the study. Chapter 3 presents a comprehensive literature review addressing the research objectives. Chapter 4 offers the historical background relevant to the study. Chapter 5 presents the empirical findings and results, while Chapter 6 concludes with a summary of key findings and discusses the policy implications.

CHAPTER 2

RESEARCH METHODOLOGY

The methods used in the research and the data sources, including what is included in each source, are thoroughly explained in this chapter. Additionally, this chapter presents the theoretical background, overviews the main theories and also incorporates facts that challenge them.

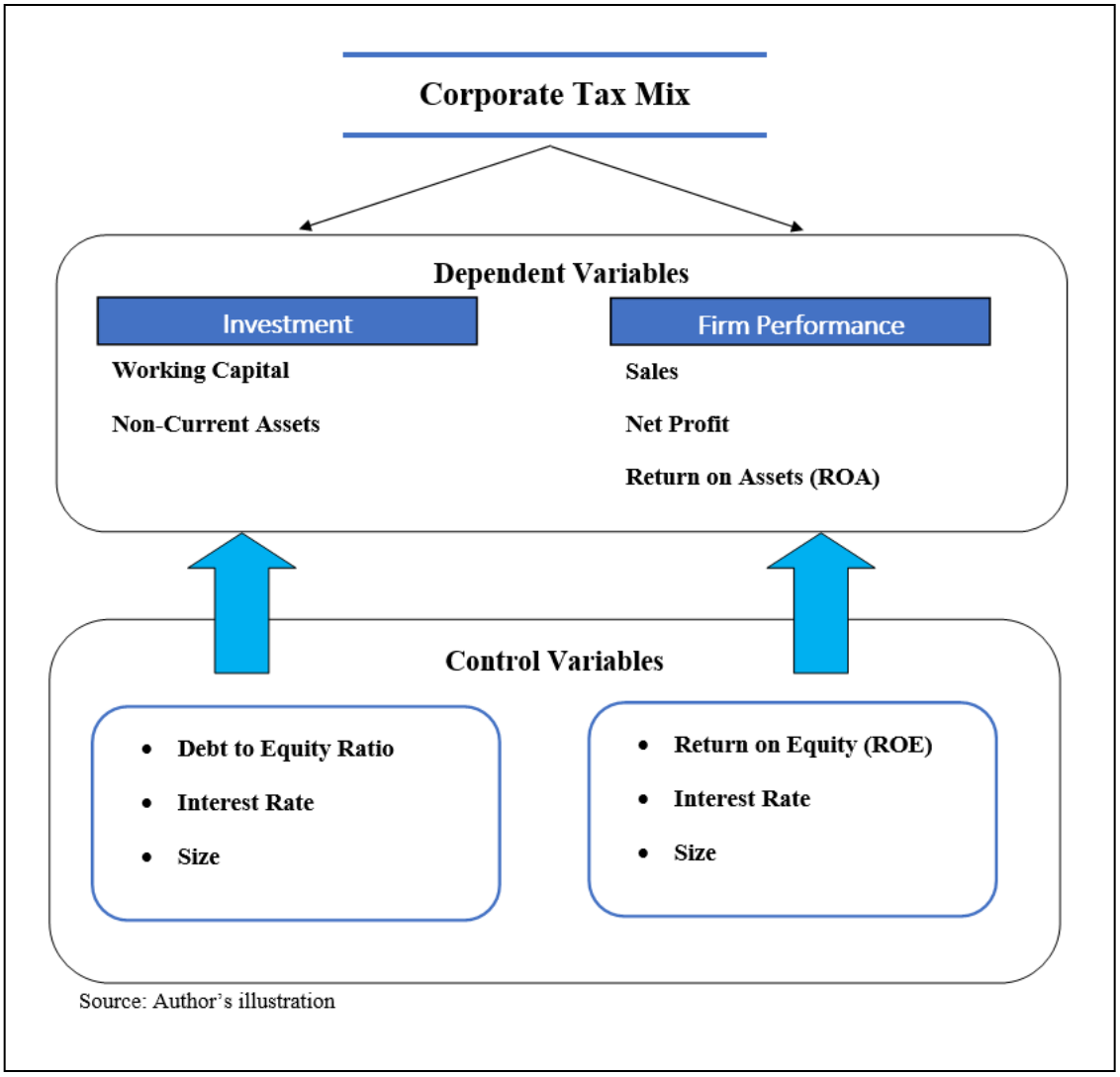


Figure 2.1: Conceptual Framework

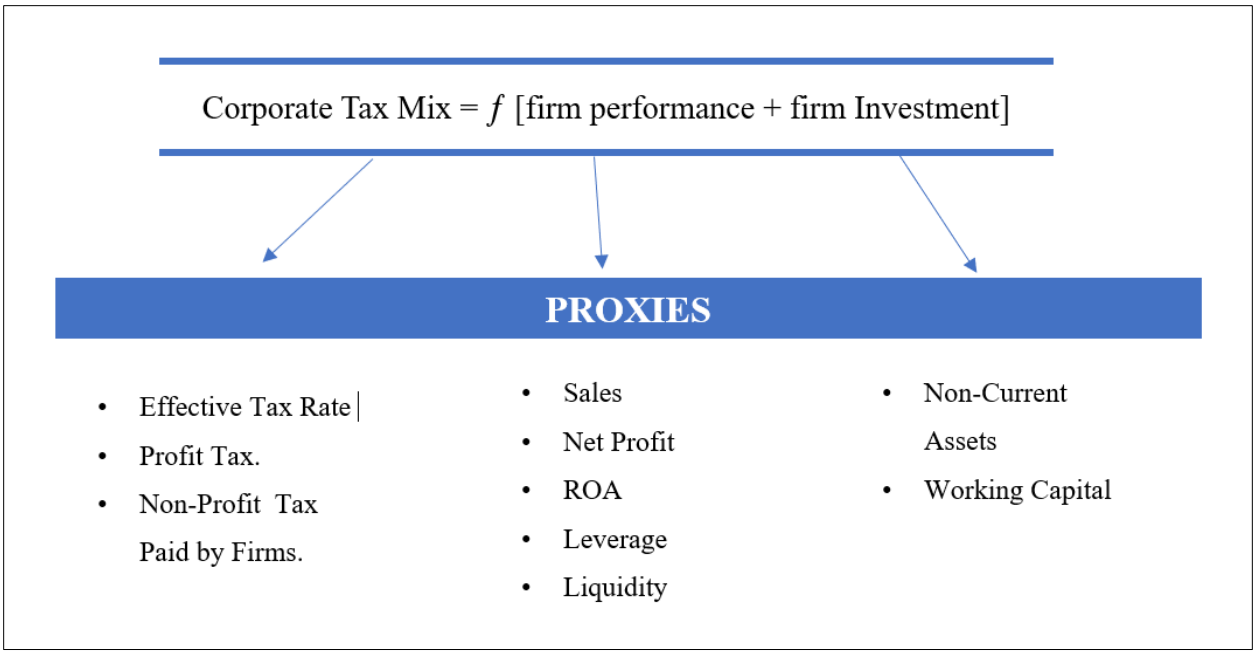


Figure 2.2: General Regression Model

Source: Author's Illustration

2.1 Conceptual Framework

Diagram 2.1 illustrates how the structure of corporate taxation ties together the main elements of financial policy and what it does to company investment and performance. In this framework, Corporate Tax Mix is the independent variable, as it represents the main explanatory factor influencing firms' financial decisions. The dependent variables are divided into two outcome dimensions: Investment and Firm Performance. Investment is measured through working capital and non-current assets, reflecting firms' short-term and long-term investment behavior, while firm performance is captured through sales, net profit, and return on assets (ROA), representing operational efficiency and profitability. The arrows in the diagram indicate that changes in the corporate tax mix directly affect both investment decisions and firm performance. Additionally, control variables including debt-to-equity ratio, interest rate, firm size, and return on equity (ROE) are incorporated to isolate the pure effect of taxation by controlling for financial structure, macroeconomic conditions, and firm-specific characteristics. Therefore, the framework clearly estimates the study's objectives by examining how the corporate tax mix (independent variable) influences investment and firm performance (dependent variables), while controlling for other relevant factors, making the empirical relationships logically aligned and methodologically sound.

Figure 2.3 fully outlines the main regression model applied in our research as well as the variables we used as proxies.

2.2 Theoretical Framework

The theoretical framework for the connection between the corporate tax mix and firm performance and investment is developed in this chapter. This relationship is focused on via two key theories. The first is Optimal Tax Theory, the second stressing that there is a tradeoff between collection of government revenue and minimizing the negative effect on the firm's investment and incentive to innovate. The second is Tax Competition Theory which implies how, in the global economy, governments choose tax policies in a strategic fashion as an enticement for business investment. Together, these theories provide a background for considering what impact changes in the corporate tax mix have on both investment choices and overall firm performance, as we seek to achieve in our own research.

2.2.1 Taxation and Economic Efficiency (Optimal Tax Theory)

The optimal Tax Theory gives a scheme for designing the tax systems in order to achieve the maximum social welfare without inducing wasteful (inefficient or distorting) economic results. The 1971 work of James Mirrlees begins to answer the question by providing an analysis of how income taxes could be designed so that income is redistributed in favor of equity without as much economic activity being thwarted through disincentives.

On this basis, Auerbach and Hine (2002) extended this into considering the ramifications of corporate taxation, particularly these fine lines between raising government revenues on the one hand and reducing investment and innovation on the other. High corporate taxes, they said, could convince firms not to invest in new projects or technologies, killing the prospects of economic growth.

Saez and Stantcheva (2016) further advanced the theory by taking behavioral responses into account form tax policy design. Complex or punitive tax systems were argued, on the other hand, to lead to increased tax avoidance and decreased compliance rendering the equity and efficiency goals of tax policy unattainable.

Regarding corporate taxation, Optimal Tax Theory emphasizes setting rates and structures of taxation that incentivize firm performance whilst fairness is observed. Overly burdensome tax systems tend to derail investment, innovation and generally the dynamism of the economy. As a result, this theory is a very important instrument for assessing the effect of several taxes on the

performance and investment behaviors of listed firms and that tax policy facilitates economic growth without prejudicing against equitable distribution of income.

2.2.2 Tax Competition Theory

Tax Competition Theory studies how governments modify their tax policy in an attempt to attract investment and increase economic activity within a more competitive globalizing world. The foundational model was introduced by Zodrow and Mieszkowski (1986), who show how jurisdictions lower corporate tax rates to compete for tax mobile capital leading potentially to a 'race to the bottom' in tax rates. Wilson (1999) then considers the implications of tax competition for, on the one hand, incentivizing efficiency in public spending and, on the other hand, drawing down the revenue base needed for basic services. Devereux and Loretz (2013) argue more recently that tax incentives and preferential rates are strategically important in attracting foreign direct investment (FDI). This theory is especially relevant in the developing countries like Pakistan, as studies (e.g., Klemm, 2009) show that tax competition usually concentrates on granting that tax holidays and discounted some rates to the certain industries in order to increase the growth and competitiveness in the national and global market. This means that Tax Competition Theory is a key theoretical framework for Pakistan's corporate tax system with which one can measure the impact of tax policies on delivering competition advantage, on the one hand and sustainable economic development, on the other hand.

For this reason, Tax Competition Theory connects with our research by giving us a framework to judge Pakistan’s corporate tax system and how tax policies can help businesses succeed while making investments over time.

2.3 Research Strategy

To comprehensively achieve all research objectives, a quantitative approach is essential. This study, therefore, relies primarily on the analysis of primary data as its main methodological foundation.

2.4 Research Design

The main objective of this research is to notice the connection between corporate tax composition and firm performance as well as investment in Pakistan’s listed firms. It researches to see how various levels of independent variables or the tax mix faced by corporations have an impact on dependent variables including the performance and investment of firms. It also investigates how the structure of corporate taxes relates to how investments and firm results are linked in Pakistan.

2.5 Methods of Data Collection

A dataset created for this research that holds all non-financial companies that have been listed on the Pakistan Stock Exchange (PSX) from 2007 to 2022. This dataset is different because it covers both profits taxes and non-profits like property taxes and social security charges found on company financial statements. Using this approach allows us to see how much tax a company actually faces. We used financial data that was not combined to keep our information consistent with country-specific tax laws over time. The data was collected from freely available company financial reports found on the official websites of the companies, the PSX and the SECP. This approach helps to understand the details of how various taxes affect company performance and what investments they make.

2.6 Sampling

All the data included here is from non-financial companies listed on the Pakistan Stock Exchange (PSX) from 2007 to 2022. We removed some cases from the sample based on the following reasons.

1. Firms listed for less than 10 years were removed, as their inclusion would not provide a long-term view of firm behavior and would result in an unbalanced panel dataset.
2. Firms with missing data for any variable were excluded to avoid potential estimation issues arising from systematic data omissions.
3. Financial firms were excluded due to their distinct dynamics in investment, firm performance, and size, which differ significantly from non-financial listed firms.

The PSX comprises approximately 453 non-financial listed firms. After addressing data availability concerns, a final sample has been drawn from 17 key sectors as classified by the PSX. The selected period of 2010 to 2022, spanning 13 years, was chosen to provide a comprehensive, long-term analysis of firm behavior across sectors, focusing on investment, performance, and size, while accounting for corporate tax mix.

The following below listed tables show the total number of firms listed in each sector of PSX. As the table depicts that a total of 32l listed firms are included in the final sample after excluding the firms that don’t fall under the criteria as mentioned above.

Table 2.1: Number of Firms Included & Excluded

Sr.No	PSX Sectors	Total Listed Firms	No. of Firms Included	No. of Firms Excluded
1	Automobile Assemblers, Parts & Accessories	21	17	4
2	Cable and Electrical Goods	7	6	1
3	Cement	19	16	3
4	Chemical, Synthesis, and Rayon	31	22	9
5	Engineering and Miscellaneous Products	17	11	6
6	Fertilizer	5	3	2
7	Food and Personal Care Product	25	17	8
8	Glass and Ceramics	8	8	0
9	Leather and Tanneries	5	4	1
10	Oil & Gas Exploration, Marketing Companies & Refineries	18	13	5
11	Paperboard and Product	10	6	4
12	Pharmaceuticals	14	8	6
13	Power Generation and Distribution Sector	15	13	2
14	Sugar and Allied Industries	26	26	0
15	Technology and Communication	17	11	6
16	Textile Composite, Spinning and Weaving	152	137	15
17	Tobacco	3	3	0
	Total	**393**	**321**	**72**

The selection of the timeframe from 2010 to 2022 is motivated by the fact that the Financial Crisis of 2007-08 affected the behavior and performance of firms around the world. Therefore, period before 2010 was excluded from the analysis. Another rationale for this timeframe is the predominant availability of data starting from 2011. Given that many firms release their annual reports in June, the research extends data collection until 2022. Information for all variables is gathered from the Pakistan Stock Exchange (PSX) website and the financial statements of the respective firms.

2.7 Econometric Model & Specifications

The following econometric specifications have been utilized in this study

1st Specification: (Utilize Effective Tax Rate $ETR_{i,t}$ as a Primary Independent Variable)

Table 2.2: Independent variables and their expected sign.

Firm-specific overall effective tax rate (ETR)	(Profit tax + all non-profit taxes)/EBITDA before all taxes borne	-

Company growth (GROWTH)	Sales growths	+
Tangibles (TANG)	Non-current assets to total assets ratio	-
Leverage (LEV)	Total debt to total assets ratio	-
Lagged profitability (LPROF)	Profit-to-sales ratio in the previous year.	+
Liquidity (LIQ)	Current assets to Current liabilities	+
Firm size (SIZE)	Logarithm of total assets	+

Source: Sebastian Lazăr and Costel Istrate (2018), modified by the Author.

A synthesis of the independent variables and their expected signs is presented in Table 1. Based on this framework, our multivariate model is as follows:

$$ROA_{i,t} = \alpha_0 + \beta_1 * ETR_{i,t} + \beta_2 * S\_GROWTH_{i,t} + \beta_3 * TANG_{i,t} + \beta_4 * LEV_{i,t} + \beta_5 * LPROF_{i,t} + \beta_6 * LIQ_{i,t} + \beta_7 * SIZE_{i,t} + \varepsilon_{i,t} \quad (2.1)$$

whereas t denoted the year and i the firm.

2nd Specification: (Utilize CORP TAX-MIX$i_{i,t}$ as a Primary Independent Variable)

$$ROA_{i,t} = \alpha + \beta_1 * \text{COR TAX-MIX}_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * ROE_{i,t} + \beta_4 * NP_{i,t} + \beta_5 * INT_{i,t} + \varepsilon_{i,t} \quad (2.2)$$

Source: (Demirgüç-Kunt, A., & Maksimovic, V.1998; Islam & Iqbal, 2022; Mohd & Siddiqui, 2020)

Where, we model $ROA_{i,t}$ is the return on asset as a dependent variable to assess firm performance. The primary independent variable is the CORP TAX-MIX$i_{i,t}$. $SIZE_{i,t}$, $NP_{i,t}$, $and\ ROE_{i,t}$ represent the corporate tax-mix, size of the firm, net profit and return on equity, respectively, as control variables. $\varepsilon_{i,t}$ represents the stochastic error term, capturing the unobserved factors that may affect the dependent variable.

In equation 2.4 we regress ROE on ROA to empirically examine how operational efficiency translates into shareholder returns, despite both being efficiency indicators. Although ROA and ROE both measure aspects of profitability, they capture different dimensions of firm performance: ROA reflects how effectively a company uses its total assets to generate profits (i.e., operational and asset use efficiency), whereas ROE reflects the return generated on shareholders' equity, encompassing both asset performance and the effects of financial leverage. Empirical research supports this theoretical linkage. For example, studies using DuPont-based regression models find that asset turnover (a component of ROA) and financial leverage significantly influence ROE, indicating that operational efficiency and capital structure jointly determine equity returns (Popescu & Toma, 2019). Moreover, Padake et al. (2015) demonstrate that DuPont analysis provides deeper insight into firm efficiency, revealing that ROE correlations with ROA and other variables help distinguish whether improvements in ROE are due to genuine asset performance or

leverage effects. Thus, by regressing ROE on ROA, the thesis investigates not only how efficiently assets generate returns, but also how that efficiency contributes to returns for equity holders through leverage.

3rd Specification: (Working Capital is employed to measure the Tax impact on Investment)

$$INVi,t = \alpha + \beta_1 * \text{ETR}_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * INT_{i,t} + \beta_4 * D/E_{i,t} + \varepsilon_{i,t} \quad (2.3)$$

Where $INV_{i,t}$ denotes investment, which serves as the dependent variable. The explanatory variables include the corporate tax mix ($\text{CORP\_TAX\_MIX}_{i,t}$), firm size ($\text{SIZE}_{i,t}$), debt-to-equity ratio ($\text{D/E}_{i,t}$), and interest rate ($\text{INT}_{i,t}$), respectively. $\varepsilon_{i,t}$ represents the stochastic error term.

To assess corporate investment patterns, we rely on two distinct measures working capital and non-current assets. The investment equation based on these proxies is formulated below:

$$WC_{i,t} = \alpha + \beta_1 * \text{ETR}_{i,t} + \beta_2 * INT_{i,t} + \beta_3 * SIZE_{i,t} + \beta_4 * D/E_{i,t} + \varepsilon_{i,t} \quad (2.4)$$

Source: (Bintara, 2020; Fazzari & Petersen, 1993)

In this model, the dependent variable, working capital, is denoted as $\text{WC}_{i,t}$. The independent variables include Corporate Tax-Mix ($\text{CORP TAX-MIX}_{i,t}$), firm size ($\text{SIZE}_{i,t}$), the debt-to-equity ratio ($\text{D/E}_{i,t}$), and the interest rate ($\text{INT}_{i,t}$). The stochastic error term is represented by $\varepsilon_{i,t}$.

For Non-Current Assets (NCA):

$$NCA_{i,t} = \alpha + \beta_1 * \text{ETR}_{i,t} + \beta_2 * D/E_{i,t} + \beta_3 * SIZE_{i,t} + \beta_4 * INT_{i,t} + \varepsilon_{i,t} \quad (2.5)$$

Source: (Egwu, 2023; Enekwe et al., 2023; Ullah & Ahmad, 2019)

Where $NCA_{i,t}$ represents Non-current assets respectively, which are the dependent variables. The $\varepsilon_{i,t}$ represents the stochastic error term.

2.8 Research Variables and Hypotheses

2.8.1 The dependent variable

Firm's performance and Investment are the dependent variables in this study. Return on Assets R.O.A. is used to measure the firm's performance, computed as the net income to total assets. However, to measure investment, Non-Current Assets (NCA) and Working Capital (WC) are used as a proxy.

Return on Assets (ROA): ROA is a monetary measure that assesses a firm's profitability relative to its overall assets. It is computed by dividing the firm's net income by its average total assets. This provides useful insights into the company's ability to properly utilize its resources for

generating profits. After (Islam & Iqbal, 2022; Mohd & Siddiqui, 2020) in Pakistan we employ the ROA as a proxy of the company performance.

$$ROA = \text{Net Income} / \text{Total Assets} \quad (2.6)$$

Working Capital (WC): WC is the financial indicator used to gauge a firm's liquidity from operations by deducting current liabilities from current assets. Working capital indicates the amount available for daily business operations and is vital to ensuring efficient day-to-day operations. Adhering to (Bintara, 2020; Fazzari & Petersen, 1993) we utilize the working capital as an investment proxy.

$$\text{Working Capital (WC)} = \text{Current Assets (CA)} - \text{Current Liabilities (CL)} \quad (2.7)$$

Non-Current Assets (NCA): NCA are long-term resources possessed by the company for continuous use in its operation, including properties, equipment, and intangible assets. These assets assist in the continuity of the operations of the company and are not for immediate sale. In accordance with (Egwu, 2023; Enekwe et al., 2023; Ullah & Ahmad, 2019) we employ the non-current assets as the proxy of the investment.

2.8.2 The independent variables and research hypotheses

This study utilizes the two distinct models in order to assess the listed firm performance & investment, where the key independent variables of our study are Effective Tax Rate (ETR) and Corporate Tax-Mix (COR TM).

Corporate Tax Mix (CORP TM) is about the composition and structure of a firm's tax obligations, encompassing both profit and non-profit based taxes. It reflects the proportion of different taxes a company pays relative to its total tax burden, providing insights into its tax strategy, fiscal efficiency, and financial flexibility. The Corporate Tax-Mix is a crucial variable in assessing how tax policies influence firm performance, investment decisions, and profitability. Corporate Tax Mix is often used as a variable in research and analysis to understand its potential impact on various aspects of a company's performance, behavior, and strategies. A well-balanced tax mix can enhance a company's competitiveness, while an unfavorable mix may constrain growth and operational efficiency. Following Dyreng et al. (2017), who examined the impact of tax composition on corporate financial outcomes, we use Corporate Tax-Mix as an independent variable to evaluate its effect on firm performance.

Effective Tax Rate (ETR) Designing the independent variable of interest namely, the firm-specific overall tax burden as a key determinant of firm performance brings some inherent problems. Drawing on the established approach proposed by Reister, Spengel, Heckemeyer, and Finke (2009), this study adopts the concept of the tax wedge to construct a firm-specific effective tax rate by isolating the effect of tax. The tax wedge is explained as the difference between a target variable's before-tax and after-tax values, plotted against its before-tax value. Using this approach, the full tax burden a firm faces is calculated which is more accurate than studying corporate profit taxes alone.

$$ETR = \frac{Target\ variable_{before\ tax} - Target\ variable_{after\ tax}}{Target\ variable_{before\ tax}} = \frac{Tax\ wedge}{Target\ variable_{before\ tax}}$$

For an accurate assessment of firms' taxes, this study chooses a metric that is not affected appreciably by financing and accounting matters. In some cases, net income can vary greatly due to interest and depreciation charges which do not always represent how the firm is operating. As a result, when we rely on net income to figure out effective tax rates, we may draw wrong conclusions.

Researchers usually choose to use Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) to make pre-tax earnings easier to compare and more stable. Because EBITDA eliminates the impact of financial decisions and how expenses are recorded, it gives a better idea of the profits from operations. Lazăr and Istrate (2018) and similar studies agree that choosing suitable financial indicators is important for understanding how changes in taxation affect firm results.

But, to look at the full tax load, including corporate income taxes, non-profit taxes and employment taxes, EBITDA must be adjusted. Adding the EBITDA taxes back to the number pulls the result back to the firm's earnings before taxes. After that, the amount of corporate income tax you must pay is subtracted to know the final EBITDA.

By selecting these adjustments, researchers Sebastian Lazăr and Costel Istrate, were able to calculate a complete firm-specific effective tax rate that accounts for all tax obligations in the Reister, Spengel, Heckemeyer and Finke (2009) model. With this metric, we can measure the effects of taxes on a company's performance with greater precision which helps us better compare companies that have differences in their financial systems and books.

With this framework in mind, the study argues that enterprises with a greater effective tax rate tend to do less well as a result of paying higher taxes and having reduced funds for growth.

2.8.3 The Control Variables

Like previous research, we used firm size (FS), leverage (LEV), liquidity (LIQ), tangibles (TAN), growth (GROWTH), debt-to-equity (D/E), return on equity (R/E), net profit (NP), and lagged profitability (LAG_PROF) as controlling variables.

Firm Size: The related literature presents two opposing views regarding the relationship between firm size and performance. One perspective suggests that larger firms tend to perform better due to their ability to capitalize on economies of scale, better access to financing (Titman & Wessels, 1988), and their capacity to create barriers to market entry (Maçãs Nunes et al., 2009). Conversely, another viewpoint argues that larger firms may experience poorer performance due to weaker managerial oversight and excessive diversification (Pi & Timme, 1993). In the context of Pakistan, it is challenging to predict which of these effects predominates. However, considering the transitional nature of the Pakistani economy, larger firms often include state-owned enterprises (SOEs), previously privatized public firms, and military-affiliated entities. These firms typically benefit from strong political connections, which may contribute to superior performance. Accordingly, the expected relationship between firm size and performance in this study is positive.

Leverage: The impact of leverage on firm performance is subject to two contrasting perspectives in the literature. On one hand, studies such as Goddard et al. (2005), Asimakopoulos et al. (2009), and Maçãs Nunes et al. (2009) suggest that a high debt burden limits a firm's capacity to invest in profitable opportunities, thereby negatively affecting profitability. On the other hand, researchers like Jensen (1986) and Adams (1996) argue that debt can improve performance by inducing financial discipline, compelling firms to allocate resources more efficiently, and deterring unnecessary investments. For the context of Pakistan, where firms face high interest rates on borrowing, this leads to an increase in the cost of debt and limits the investment potential of businesses. Therefore, in this research, the expected relationship between leverage and firm performance will be considered as negative**.**

Liquidity: Liquidity is typically expected to be positively related to firm performance. As per the (Goddard et al. 2005) state that more liquid firms are likely to be profitable since firms with greater liquidity have an easier ability to take advantage of investment opportunities, react well to market

shocks, and position themselves to capitalize on investment opportunities. In Pakistan's situation, where economic reform has been coupled with persistent liquidity pressures and market volatility, more liquid companies are more likely to do better. Hence, in this research, the predicted sign for the association of liquidity with coDiagnosticmpany performance is positive.

Lagged Profitability: Lagged profitability is expected to positively influence current firm performance, primarily due to the persistence effect. Profits from the previous year provide more resources for reinvestment, improving liquidity, enhancing prospects, and signaling positive market conditions.

Tangible Assets: The role of asset mix as a determinant of firm performance has been less extensively studied. Generally, research suggests that companies with a higher proportion of tangible assets, such as those benefiting from modern equipment and plant, and large property, tend to be more profitable (Maçãs Nunes et al., 2009; Crespo & Clark, 2012). However, for Pakistan's listed companies, tangible assets represent a small fraction of total assets, while tangible assets account for over 50%. As a result, we expect a positive relationship between tangible assets and firm performance. This expectation is further supported by the frequent revaluation of land and buildings, which inflates total assets without leading to a corresponding increase in profits, thereby reducing return on assets (ROA).

Return on Equity: ROE measures a company's profitability by comparing net income to shareholders' equity, showing how effectively management uses invested capital to generate earnings. As a key financial ratio, ROE helps evaluate a firm's ability to deliver returns to shareholders while maintaining sustainable growth. In corporate performance studies, researchers often include ROE as a control variable to isolate its influence from other factors affecting firm outcomes. Muhammad and Shah (2014) highlight ROE's role as a critical accounting metric that reflects value creation, specifically measuring the returns produced from shareholders' equity investments. This ratio offers valuable insights into a firm's operational efficiency and financial health, making it a useful tool for assessing how well a company converts equity financing into profits. We incorporate ROE in our analysis because it provides a standardized benchmark for comparing profitability across firms, regardless of their size or capital structure.

Debt-Equity Ratio: D/E Ratio is calculated by dividing total debt by shareholders' equity, and reflects a firm's capital structure and financial leverage. A higher ratio often signals increased financial risk, as noted by Muhammad and Shah (2014). Given its influence on investment

decisions and access to capital, this study incorporates the debt-to-equity ratio as a control variable. The ratio serves as a key measure of financial stability, highlighting the trade-off between debt and equity financing and its implications for future investment capacity.

Growth: commonly measured by the annual increase in sales revenue, is widely considered a key driver of improved financial performance. This positive association stems from the fact that higher sales growth expands revenue streams, enhancing profitability and overall firm value. Prior empirical studies, including research by Asimakopoulos et al. (2009), Maçãs Nunes et al. (2009), and Yazdanfar (2013), support this relationship, demonstrating that growing firms tend to achieve better performance outcomes. Accordingly, we anticipate a positive link between company growth and performance in our analysis.

Net Profit: Net profit is the remaining income of a firm after adjusting for every expense, and it's a measure of the firm's profitability. In empirical research analyzing firm performance, controlling for net profit as an independent variable is useful in accounting for differences in financial performance that can affect the result of interest. By using net profit as a control variable along with other pertinent indicators, researchers are able to dissociate its impact and attain a better estimate of firm performance. This method gives better insight into the financial condition and operating performance of a company. In line with Masyhuri (2024), in this research, net profit is used as a control variable since it represents a firm's profitability and general financial condition.

Interest Rate: An interest rate is a percentage that signifies the cost of borrowing or the gain from lending. Higher rates increase borrowing costs, which raises interest expenses and erodes profitability. Simultaneously, they act as an investment barrier by increasing the cost of capital, making new projects and asset purchases more expensive and potentially stifling a firm's growth initiatives.

2.9 Units of Data Collection

Data collection for this study involves multiple sources. Macro-level data has been sourced from the State Bank. Information regarding firm characteristics extracted from annual financial reports of firms and non-financial firm analyses conducted by the State Bank. Detailed formulas for variable calculations are provided in Table 2.3.

Table 2.3: Unit of Data Collection

Variables	Formula/Description	Year	Source

Dependent Variables			
ROA	Net Income/Total Assets	2010-22	PSX & Firms Annual Report
Non-Current Assets	Those are the long-term assets held by companies for use in operations, consisting of property, plant & equipment.	2010-22	PSX & Firms Annual Report
Working Capital	Current Assets - Current Liabilities	2010-22	PSX & Firms Annual Report
Independent Variables			
Effective Tax Rate	Corporate Tax Expense/Earnings Before Interest, Tax, Depreciation & Amortization (EBITDA)	2010-22	PSX & Firms Annual Report
Corporate Tax	Profit + Non-Profit Tax	2010-22	PSX & Firms Annual Report
Control Variables			
Sales Growth	(Current Year Sales - Previous Year Sales)/Previous Year Sales	2010-22	PSX & Firms Annual Report
Tangibility	Non-Current Assets / Total Assets	2010-22	PSX & Firms Annual Report
Leverage	Total Debt / Total Assets	2010-22	PSX & Firms Annual Report
Lagged Profitability	Profit to Sales Ratio in the Previous Year	2010-22	PSX & Firms Annual Report
Liquidity	Current Assets / Current Liabilities	2010-22	PSX & Firms Annual Report
Firm Size	Logarithm of Total Assets	2010-22	PSX & Firms Annual Report
ROE	Net Profit / Total Owners Equity	2010-22	PSX & Firms Annual Report
Net Profit	Total Revenue - Total Expense	2010-22	PSX & Firms Annual Report
Debt-to-Equity	Total Debt / Total Equity	2010-22	PSX & Firms Annual Report
Interest Rate	Return on Principal amount	2010-22	SBP

2.10 Econometric Techniques

This research utilizes panel data econometric techniques, namely fixed effects and random effects models to examine the impact of corporate tax composition on firm investment and performance. These models are most appropriate for panel data analysis since they address unobserved heterogeneity and assist in separating time-invariant and time-varying determinants of the dependent variable. The results illuminate how companies modify their investment plans to

accommodate changes in corporate tax regimes, and how the overall implications for company performance are evaluated. Our findings provide policymakers with useful guidance in crafting sensible tax systems in changing market conditions.

2.10.1 Fixed Effect Model

The fixed-effects estimator offers a key advantage by accounting for unobserved firm-specific factors that may influence the dependent variable. Since these factors, though unmeasurable, are often correlated with the explanatory variables, the fixed-effects approach helps mitigate endogeneity and omitted variable bias. However, a limitation of this model is that its estimates are sample-specific and cannot be generalized beyond the observed data. In our study, this constraint is less concerning, as our analysis focuses exclusively on non-financial firms listed on the Pakistan Stock Exchange, making the findings relevant to this specific group. Our decision to use the fixed-effects model was driven by both theoretical considerations and empirical validation. Statistical tests, including the Hausman test, confirmed that the fixed-effects estimator is more appropriate than the random-effects alternative for our dataset.

The fixed-effects general specification is:.

$$Yi,t = \alpha + \beta Xi,t + \text{ui} + \varepsilon i,t \qquad (2.8)$$

Where $Y_{i,t}$ represents the dependent variable for firm i at time t, while $X_{i,t}$ denotes a 1×k matrix of time-varying regressors. The intercept is captured by α, and u_i accounts for unobserved, time-invariant firm-specific effects. Unlike $X_{i,t}$, u_i reflects persistent differences across firms such as ownership structure, management practices, or corporate culture that are often unmeasurable but may still correlate with the explanatory variables. The fixed-effects estimator eliminates u_i, effectively controlling for these unobserved firm characteristics that could otherwise bias the results.

To account for time-specific shocks, such as tax reforms or broader economic shifts that uniformly impact all firms, we employ a two-way fixed-effects model. This approach helps isolate firm-level variations by controlling for both entity-specific and period-specific unobserved heterogeneity:

$$Y_{i,t} = \alpha + \beta X_{i,t} + \text{u}_\text{i} + \text{v}_\text{t} + \varepsilon_{i,t} \qquad (2.9)$$

The term v_t captures time-specific effects, accounting for annual shocks that influence all firms uniformly. Additionally, to address industry-specific temporal variations such as shifts in sectoral risks or financial conditions, we incorporated industry-year fixed effects in our model:

$$Y_{i,t} = \alpha + \beta X_{i,t} + u_i + v_t\, i_j + \varepsilon_{i,t} \qquad (2.10)$$

Whereas, i and j stand for a rough classification of sectors such as manufacturing, energy and textiles, petroleum, and cements etc.

2.10.2 Random Effect Model

The random effects model is a standard empirical methodology in statistics, assuming that individual-specific effects are random and not correlated with the explanatory variables. In our analysis, we view entity-specific variations as random shocks and use the method of moments for their estimation. With this setup, we allow us to the estimation of cross-sectional heterogeneity, measuring the average effect of unobserved individual differences. Through the use of this model, we achieve variation across entities while keeping the parameter estimates efficient.

$$Y_{i,t} = \alpha + \beta X_{i,t} + Di + \mu_{i,t} \qquad (2.11)$$

Whereas, it is assumed that Di is the random effect and is not associated with the independent variable $X_{i,t}$ across all time periods.

2.10.3 Limitations of Random & Fixed Effect Models

The fixed effects model is very useful for examining variables that change over time within entities, as it controls for time-invariant characteristics. This cannot estimate the impact when significant time-variant factors are left unobserved and may suffer from omitted variable bias. On the other hand, the random effects model is more efficient with data that shows little heterogeneity and can estimate time-invariant effects, but no correlation between independent variables and individual-specific effects is assumed, which, if violated, can cause biased results. The selection between these models typically depends on the specific data structure and the robustness of model assumptions, as assessed by specification tests like the Hausman test.

CHAPTER 3
REVIEW OF LITERATURE

3.1 Review of Literature

Firm performance has been widely investigated by academics, guided mainly by the Market-Based View (MBV) and the Resource-Based View (RBV). The MBV sees distinctive firm performance as mostly the result of market conditions and industry setup, underlining the effects of competition and a company's market place (Porter, 1979; Geroski & Mason, 1987; Cano, Carrillat, & Jaramillo, 2004; Grinstein, 2008). That being said, the RBV looks at certain internal features of a company special resources, skills and strategic assets as the key factors behind its success (Day, 2011; Peteraf, 1993; Barney, 1991). The usefulness of these frameworks is linked to the specific economic situation. Because markets in transition economies tend to change often and are not well-developed, the RBV is thought to be useful there. Due to factors outside the company bringing uncertainty, market positioning matters less; therefore, internal resources are more key to sustained success (according to the estimates of Grant, 1991 and Makhija, 2003). According to Hawawini, Subramanian and Verdin (2003), a firm's own attributes are more important for major companies than factors present in the market as a whole.

This study adds to previous research by investigating how the mix of taxes firms must pay affects their outcomes. This area of interest is supported by both domestic and international surveys revealing that the mix of corporate taxes affects business performance. As the Resource-Based View (RBV) explains, the firm-specific tax rate comes from how the company mixes its assets, humans and methods. So, this study looks past just the level of profit tax burden. The analysis also explores the interactions between taxes and performance in firms.

Not much is written about how tax mix policies affect companies in Pakistan. Many studies have considered how taxation impacts certain success metrics, but there hasn't been many investigating these factors as a whole. The major scientific research on this issue comes from developed nations and there is hardly any strong data from developing countries. Due to the small amount of literature related to Pakistan, international studies are mainly referred to in this review to identify lessons that can apply to Pakistan.

3.1 Corporate Tax Mix and Firm Performance

Ionescu et al. (2018) analyze the links between different taxes and firm performance. This examination included Romanian non-financial firms trading on the Bucharest Stock Exchange in the years from 2000 to 2011, making use of a special data set that added both corporate and non-profit taxes, including property taxes, to social security payments made by firms. To show how much tax firms face in total, the authors combined all these tax liabilities into a firm-specific effective tax rate. Applying a fixed-effects regression model, the researchers found that each one percentage point rise in the particular firm's average tax rate led to a 0.15 percent point fall in its ROA. In addition, the analysis concluded that having a large amount of debt and being a small firm generally decreased performance, but being liquid, posting growth and showing prior earnings helped. It shows that even though corporate income taxes in Romania are fairly low, other taxes may severely impair firm performance, making it necessary to review all the taxes together when setting corporate tax policies.

Desai and Hines (2022) also examine the effects of corporate income tax, capital gains tax and other direct taxes on profits, spending and market estimates of firm worth. Using information from thousands of publicly listed companies from 30 countries over the decade between 2011 and 2021, the authors examine taxation and the financial outcomes of these firms through their financial statements, tax levels and economic indicators. The researchers measured profitability by looking at Return on Assets (ROA) and Return on Equity (ROE), studied investment activities through capital expenditure and assessed market valuation with Price-to-Earnings (P/E) ratios. This study considers corporate income tax rates, capital gains tax rates, taxes on dividends and interest income and includes firm size, industry group, leverage, GDP growth and inflation as control factors. The authors model heterogeneity using panel data regression, both with fixed and random effects and the fixed effects variation helps manage unchanging features of a company over time. The findings are further checked by examining multicollinearity and heteroskedasticity in the data. The study shows that corporate profits decrease as income tax rates rise, measured by ROA and ROE and that capital gains tax cuts encourage firms to spend more on investment. The authors conclude that the right structure for corporate taxes improves the performance of different sectors, helping firms achieve profits as well as growth.

In addition, Kim and Lee (2023) found results that reinforce the findings from Desai and Hines (2022). They studied organizations operating in the Asia-Pacific region, gathering data from 2015 to 2022. The results suggest that companies in countries where corporate income taxes and capital

gains tax are balanced and lower showed better performance. In other words, tax policy helps decide how much companies invest and how competitive the market becomes.

Dharmapala and Riedel (2013) investigate the causal relationship between corporate taxes and firm-level investment by exploiting a natural experiment arising from a 2001 German tax reform that significantly reduced the statutory corporate tax rate. Using a large panel dataset of German multinational firms and employing a difference-in-differences methodology, the study examines how affiliates' investments respond to changes in parent companies' tax burdens. Their sample consists of 2,500 firms from 1996 to 2007, covering both domestic and foreign affiliates, enabling a robust analysis of cross-border investment dynamics. The results reveal that a reduction in the parent company's tax rate leads to a statistically significant and economically meaningful increase in investment by foreign affiliates, suggesting that lower home-country corporate taxes enhance the competitiveness and capital allocation of multinational enterprises. The study provides strong evidence that corporate tax policies have substantial spillover effects beyond domestic borders, influencing global investment patterns, and it highlights the importance of considering international dimensions when designing tax policy.

Gordon and Lee (2007) conducted an extensive empirical investigation into the relationship between corporate tax rates and firm performance, focusing on a sample of 4,300 U.S. firms over a 25-year period from 1980 to 2005. Using panel regression models to control for firm-specific and time-specific effects, the study provided robust evidence that higher corporate taxes have a detrimental impact on firms' profitability. Specifically, their findings revealed that a 1% increase in the corporate tax rate corresponded to a 0.3 percentage point decrease in return on assets (ROA), highlighting the sensitivity of firm performance to tax policy changes. The authors argued that higher taxes reduce after-tax earnings, discourage investment, and limit the resources available for innovation and expansion, thereby diminishing overall operational efficiency. This research underscores the broader economic implications of tax policy, suggesting that even marginal increases in corporate taxation can meaningfully erode firm-level returns and potentially hinder long-term growth.

Amran et al. (2020) conducted an empirical investigation into the relationship between corporate tax rates and the financial performance of Malaysian listed firms over the period 2010 to 2018, utilizing a sample of 420 companies from Bursa Malaysia. Employing panel regression analysis, the study measured firm performance using return on assets (ROA) and return on equity (ROE),

while corporate tax burden was captured through the effective tax rate (ETR). The findings revealed a statistically significant negative relationship between ETR and firm profitability, indicating that higher tax burdens directly erode net earnings and reduce overall financial performance. Notably, the study further identified that firms with robust corporate governance structures such as independent boards, active audit committees, and higher transparency were more resilient in mitigating the adverse effects of high taxation, suggesting that governance quality can act as a moderating factor in the tax–performance nexus. This underscores the dual role of tax policy and governance practices in shaping firm outcomes in emerging markets like Malaysia.

Liu and Cao (2019) conducted an empirical study to examine the impact of corporate taxation on firm performance, focusing on how tax burdens influence profitability, investment decisions, and overall operational efficiency. Using a panel dataset of 1,224 listed manufacturing firms in China over the period 2008–2016, they employed a fixed-effects regression model to control for firm-specific and time-specific variations. The study measured firm performance primarily through Return on Assets (ROA) and Tobin's Q, while tax burden was proxied by the effective tax rate. Their findings revealed a significant negative relationship between corporate tax burden and firm performance, indicating that higher taxes tend to reduce profitability and market valuation. Moreover, the adverse impact was more pronounced in capital-intensive firms and those operating in competitive industries, suggesting that tax policies could disproportionately affect certain sectors. Liu and Cao concluded that tax incentives and targeted reductions could enhance corporate efficiency, stimulate investment, and promote sustainable firm growth, thereby highlighting the importance of a balanced tax policy in fostering economic development.

Similarly, Khan et al. (2016) conducted an extensive empirical investigation on the impact of corporate tax on firm performance by analyzing a panel dataset of 200 firms listed on the Pakistan Stock Exchange over the period 2005 to 2014. Employing both fixed-effects and random-effects regression models, the study revealed a significant negative relationship between corporate tax rates and firm performance, with the adverse impact being more pronounced in manufacturing sectors due to their higher operational and compliance costs. The findings further indicated that tax incentives, particularly exemptions and rebates granted to export-oriented firms, played a crucial role in moderating this negative effect by enhancing profitability and competitiveness in international markets. The study underscores the importance of designing sector-specific tax

policies that balance revenue generation with sustainable business growth, thereby contributing to both economic development and fiscal stability.

Ocharo and Muthama (2020) conducted an empirical investigation into the effect of the Effective Tax Rate (ETR) on the financial performance of 40 firms listed on the Nairobi Securities Exchange (NSE) over the period 2013 to 2017. Employing panel regression analysis, the study examined the relationship between ETR and firm performance, with performance measured using Return on Assets (ROA) as the key metric. The findings revealed a significant negative association between ETR and ROA, indicating that higher tax burdens adversely impact profitability. This reduction in profitability was interpreted as a constraint on firms' capacity to reinvest in expansion and strategic growth opportunities, ultimately hampering long-term value creation and competitiveness. The study's results underscore the role of tax policy in influencing firm-level financial outcomes, suggesting that excessive taxation can diminish a firm's operational efficiency and investment potential.

The majority of studies indicate that higher corporate taxes reduce firm profitability, particularly for small and medium-sized enterprises (SMEs). A meta-analysis by Feld et al. (2013), which reviewed 48 studies across OECD countries, concluded that a 1% increase in corporate tax rates reduces firm profitability by approximately 0.3% to 0.5%. However, the effect varies by industry, with capital-intensive firms being more sensitive to tax changes (Goh et al., 2016).

3.2 Corporate Tax Mix and Investment

A company's tax mix can affect how much they invest. The framework including the cost of capital declares that higher corporate income taxes raise both the cost of equity and debt, making it less likely for companies to make long-term investments (Auerbach, 2006). Djankov et al. (2010) demonstrate from their findings that nations with lower corporate tax levels get more investment into sectors highly dependent on foreign direct investment (FDI). Though prominent in determining profits, indirect taxes are also able to affect the demand for goods, affecting the way companies decide to grow.

A thorough review by Bénassy-Quéré et al. (2020) called "Corporate Tax and Location Choice for Multinational Firms" focusing on the connection between taxes and MNEs' choices of where to locate in Europe has been completed. A large database covering 2005 to 2012 new firms in 26 European nations was used to study the effect of corporate tax rates on where MNEs set up

operations, taking firm size and industry into account. Using a non-linear method, the authors show that firms react less to higher tax rates. He notes that companies are less likely to choose an area when its corporate tax rates are too high, but as the rates continue to rise, they choose that location less. The results suggest that manufacturing organizations and large companies experience tax rate fluctuations more often than service-focused firms, since the latter clients are unlikely to be concerned with where they are situated for tax reasons. The study points out that there are detailed relationships among corporate taxation, firm decisions and their locations, so tax policy makers should pay attention to both industry-specific and small firm limits to attract international investment.

To analyze the effect of corporate taxes on business actions, De Mooij and Ederveen (2021) studied 40 studies focusing largely on foreign investment decisions. The study tries to improve their earlier findings by bringing together a mix of studies and analyzing tax effects in several countries with flexible meta-regression. They compute semi-elasticities to quantify the responsiveness of the corporate tax base to changes in tax rates, providing a standardized measure to compare findings across studies. Their analysis reveals that corporate taxes significantly affect business decisions, with variations in effect sizes attributed to factors such as the type of capital data used, the specific tax measures considered, and the methodological approaches of the primary studies. Their study underscores the emphasizes the need to take these factors when designing tax policies to understand their potential impact on business behavior accurately.

A study by Shah and Sattar (2014) conducted an empirical study to investigate the impact of corporate tax on the profitability of 100 non-financial firms listed on the Pakistan Stock Exchange (PSX) over the period 2008 to 2012. Employing panel data regression analysis, the researchers measured firm profitability using Return on Assets (ROA) and Return on Equity (ROE), revealing a significant negative relationship between corporate tax rates and firm performance. Their findings indicated that higher corporate tax burdens diminish the capacity of firms to reinvest retained earnings, thereby constraining their potential for expansion and overall growth. The study underscored the adverse effect of elevated taxation on business profitability, suggesting that tax policy reforms aimed at lowering the corporate tax rate could enhance firms' reinvestment capacity and improve long-term performance within the non-financial sector of Pakistan.

Devereux, Griffith, and Klemm (2002) conducted an influential study examining the effect of corporate taxation on investment by analyzing a large panel dataset of 1,200 UK firms spanning

the period from 1984 to 1996. Using a dynamic investment model, the researchers rigorously investigated how changes in the effective tax rate (ETR) influenced corporate investment behavior. Their empirical analysis revealed that a 1 percentage point increase in the ETR led to an estimated 0.5% reduction in investment, indicating a significant and economically meaningful negative relationship between corporate taxation and investment activity. By incorporating firm-specific characteristics, such as size, profitability, and industry classification, along with broader macroeconomic conditions, the study ensured that the observed effects were not confounded by other variables. This comprehensive methodological approach reinforced the robustness of their findings, providing strong evidence that higher corporate tax burdens can deter investment, with implications for policy design aimed at fostering business growth and economic development.

Gupta and Chatterjee (2020) conducted an empirical investigation into the relationship between effective tax rates (ETR) and corporate investment decisions using a dynamic Generalized Method of Moments (GMM) approach on a panel dataset comprising 850 manufacturing firms over the period 2005–2019. Their findings revealed a non-linear relationship between ETR and investment, indicating that moderate tax rates exert minimal influence on investment behavior, whereas excessively high ETR significantly discourage capital formation. The study further underscored the presence of sectoral heterogeneity, with capital-intensive industries exhibiting a higher degree of sensitivity to tax policy changes compared to less capital-intensive sectors. This nuanced outcome emphasizes the importance of tailoring tax policies to the structural characteristics of different industries to optimize investment responses.

Sari and Nugroho (2021) conducted an empirical investigation on 210 manufacturing firms covering the period from 2010 to 2019, employing the Generalized Method of Moments (GMM) to mitigate potential endogeneity issues. Their analysis revealed that firms with lower Effective Tax Rates (ETRs) tend to allocate more resources towards investment activities, as the resultant tax savings increase the availability of internal funds that can be utilized for expansion and growth opportunities. Furthermore, the study identified that tax incentives, particularly accelerated depreciation schemes, play a significant moderating role in strengthening this relationship, enabling firms to further enhance capital expenditure by reducing the cost of acquiring and utilizing productive assets. These findings suggest that well-structured tax policies can act as catalysts for corporate investment, supporting broader economic development objectives.

Panteghini et al. (2019) conducted an empirical investigation on a sample of 220 Italian-listed firms covering the period 2005 to 2016, utilizing a dynamic Generalized Method of Moments (GMM) estimator to mitigate potential endogeneity issues. Their findings revealed a significant negative relationship between higher effective tax rates (ETRs) and capital expenditures, with the adverse effect being more pronounced among firms possessing lower liquidity buffers, indicating that tax burdens can disproportionately constrain investment capacity in financially less resilient companies.

Okafor et al. (2021) conducted a cross-country analysis involving 210 firms listed on five major African stock exchanges Nigeria, South Africa, Egypt, Morocco, and Kenya covering the period from 2005 to 2018, to examine the relationship between effective tax rates (ETR) and firm investment behavior. Employing a fixed-effects model to control for unobserved heterogeneity across firms and countries, the researchers found that higher ETRs were generally associated with reduced investment levels, reflecting the conventional view that corporate taxation can constrain capital accumulation. However, the study's nuanced findings revealed that the negative effect of ETR on investment was significantly weaker in countries with stronger institutional frameworks and better access to financing, suggesting that the broader business environment can mitigate some of the adverse impacts of taxation. This indicates that while tax policy is an important lever for influencing corporate investment, its effectiveness is contingent upon complementary factors such as governance quality, financial market development, and institutional stability. The results imply that in contexts characterized by weak governance or credit market imperfections, lowering tax rates alone may not be sufficient to spur investment, thereby emphasizing the need for integrated economic reforms that address multiple structural constraints simultaneously.

Al-Najjar (2021) conducted an empirical investigation into the heterogeneous impact of corporate taxation on firm investment behavior, focusing on a sample of 150 energy and industrial firms operating in the Gulf Cooperation Council (GCC) region over the period 2012–2019. Using quantile regression, the study examined how firms across different levels of effective tax rates (ETRs) responded to taxation, providing insights beyond average effects typically captured by mean-based models. The results revealed that firms with higher ETRs experienced a significantly greater reduction in investment compared to their lower-ETR counterparts, underscoring the distortionary role of taxation in capital allocation decisions. Moreover, the findings indicated that firms with stronger cash flows exhibited less sensitivity to tax changes, suggesting that liquidity buffers can mitigate the adverse impact of corporate taxes on investment.

In line with the existing body of research, we conducted a comprehensive literature review and adopted the model and methodology applied by Lazăr and Istrate (2018) in their study on corporate tax-mix and firm performance. They employed a fixed-effects panel regression framework, which has been widely used in prior empirical research when unobserved firm-specific characteristics are expected to correlate with explanatory variables (Wooldridge, 2010; Baltagi, 2008). The fixed-effects estimator ensures consistent results by controlling for such heterogeneity, whereas pooled OLS and random-effects models are likely to produce biased estimates under these circumstances, as they rely on the restrictive assumption that unobserved effects are uncorrelated with regressors. Similar applications of the fixed-effects model can be found in studies examining corporate taxation and firm performance, Desai et al. (2009 and Atwood et al. (2012), which reinforces the appropriateness of our methodological choice. Consequently, we followed this approach as it is well-grounded in econometric literature and has been consistently validated by previous research.

3.3 Literature gap

As explained above, this study differs from others with a number of unique aspects. A major gap exists in research when it comes to linking the whole tax mix faced by corporations and their performance, including investment decisions. Instead of considering how the sum or combination of taxes influence a business, most previous analyses have concentrated on one aspect of the tax structure at a time. Recently, Ahmad et al. (2023) analyzed the relationships between corporate income tax, asset turnover and firm performance, measuring this by Tobin's Q. Data showed that corporate income tax had a minor positive connection to how companies performed, whereas asset turnover turned out to be a clear negative factor. Yet, the link between different types of corporate taxation, not just income tax and firm-level outcomes has not been well studied in previous research.

The role of in-house factors, such as resource distribution and how firms are structured in deciding the link to performance is largely unexamined in the research. One goal of this study is to better understand the consequences of various corporate tax policies on firms in Pakistan. Using this method is key to making sure tax policy reforms support and help companies grow and work more efficiently.

3.4 Literature Summary

We are examining the influence of corporate tax-mix on investment and firm performance within the context of Pakistan. The extant literature on this specific relationship is sparse, as the variable of corporate tax-mix has not been extensively explored in prior research. Nonetheless, we have identified literature that elucidates various other factors contributing to the fluctuation in investment levels and performance metrics of firms in Pakistan. In our study, we have check the impact of corporate tax-mix on investment, firm performance. We have incorporated this existing literature to provide a comprehensive backdrop for our analysis, while specifically elucidating the unique impact of corporate tax-mix on these dimensions.

Table 3.1: Summary of Literature Review

Author(s)	Country	Sector / Sample	Impact	Findings / Outcomes
Ionescu et al. (2018)	Romania	Non-financial	Significant	Results are positive due to taxes severely impairing firm performance.
Desai and Hines (2022)	Global (30 Countries)	Different	Significant	Corporate profits decrease as income tax rates rise, so the results are significant.
Al-Najjar (2021)	GCC) region	150 energy and industrial firms	Significant	Firms with higher ETRs experienced a significantly greater reduction in investment.
Dharmapala and Riedel (2013)	Germany	Multinational	Insignificant	Corporate tax policies have substantial spillover effects beyond domestic borders.
Gordon and Lee (2007)	U.S.	4,300 U.S. firms over a 25-year period.	Negative	Outcomes are negative due to 1% increase in the corporate tax rate corresponded to a 0.3 percentage point decrease in ROA.
Amran et al. (2020)	Malaysia	Multi-Sector	Significant	The findings revealed a statistically significant negative relationship between ETR and firm profitability.
Liu and Cao (2019)	China	Manufacturing	Negative	The adverse impact was more pronounced in capital-intensive firms.
Khan et al. (2016)	Pakistan	Manufacturing	Negative	The adverse impact is more pronounced in manufacturing sectors
Ocharo and Muthama (2020)	Kenya	40 Listed Firms	Negative	Higher tax burdens adversely impact profitability.

Bénassy-Quéré et al. (2020)	Europe	MNEs	Mix	Manufacturing organizations and large companies experience tax rate fluctuations more often than service-focused firms.
Griffith, and Klemm (2002)	UK	1,200 listed Firms	Significant	1 percentage point increase in the ETR led to an estimated 0.5% reduction in investment.
Gupta and Chatterjee (2020)	India	850 manufacturing firms	Non-linear	High ETR significantly discourage capital formation.
Sari and Nugroho (2021)	Indonesia	210 manufacturing firms	Negative	ETR tend to allocate more resources towards investment activities.
Panteghini et al. (2019)	Italy	220 listed firms	Significant	Adverse effect is more pronounced among firms possessing lower liquidity buffers.
Okafor et al. (2021)	Nigeria, South Africa, Egypt, Morocco, and Kenya	210 firms listed on five major African stock exchanges	Negative	Negative effect of ETR on investment was significantly weaker in countries with stronger institutional frameworks.

CHAPTER 4

HISTORICAL BACKGROUND OF CORPORATE & NON-CORPORATE TAXATION IN PAKISTAN

This chapter provides a comprehensive overview of the corporate taxation system in Pakistan from its inception to the present period. It systematically examines the evolution of taxes applicable to both profit-oriented and non-profit companies listed on the stock market, highlighting key historical patterns, policy shifts, and structural changes over time. By documenting the development of corporate tax policies and their application across different phases, the chapter builds a strong contextual foundation for the empirical analysis that follows. A clear understanding of the historical and institutional framework of taxation in Pakistan is essential for interpreting how tax policies influence firm performance, investment behavior, and strategic decision-making. Therefore, this chapter is presented separately to enable readers to fully grasp the underlying structure and progression of the Pakistani taxation system, which in turn facilitates a more informed and meaningful analysis of the empirical results.

4.1 Historical Background of Corporate Taxes in Pakistan

Pakistan's tax policies for listed firms have evolved greatly since the nation gained independence in 1947. The deep impression of this transformation on firm performance has come from a series of changing political, economic and world economic rules that affected various sectors.

4.1.1 Early Years (1947-1960s)

After gaining independence, Pakistan took over a British colonial tax system with the Income Tax Ordinance of 1922 as its main law. At the time, companies paid very little in taxes since most of the funds were needed for the state's foundation. According to Khan and Hameed (2015), stabilizing the economy was a main concern, but failure to manage taxes well and compliance held back revenue which hurt the performance of companies in the private sector.

4.1.2 Nationalization and Economic Policies (1970s)

The decade of the 1970s saw a massive upheaval in the economic scenario of Pakistan as Prime Minister Zulfikar Ali Bhutto instituted nationalization policies. Key sectors, such as banking, manufacturing, and utilities, were nationalized, which led to a re-mapping of the system of taxation. Ahmed and Raza (2016) observe that, despite the government having instituted several tax incentives to attract investments in state-owned companies, corporate taxation went up overall. This change led to a drop in private sector investment, which harmed firms' performance since

many enterprises experienced operational inefficiencies and decreased competitiveness. Non-corporate taxes, such as various levies, property taxes, and sales taxes, also increased during this time, putting further strain on firms' financial health.

4.1.3 Liberalization and Tax Reforms (1980s-1990s)

Motivated by a wish to renew the economy, the 1980s and 1990s saw the government adopt economic policies of liberalization and privatization. The administration undertook activities to increase revenue and at the same time, make people more likely to pay their taxes by measuring a range of taxes. Yet, the government enticed more private investment with persistent reductions in corporate tax rates. Thanks to Khan. (2018), the company's performance improved. Their changes to the corporate tax system made it easier for companies to thrive by adding the Income Tax Ordinance of 1979 and then improving it. In addition, these reforms were partly restricted by the fact that taxes were rarely paid and only a narrow number of people were supported by them Hussain & Shah. (2019). Changes to non-corporate taxes, most importantly sales tax, affected the way markups and other costs for firms in different sectors were set up.

4.1.4 Structural Adjustments and Reforms (2000s)

Between the years 2000 and 2005, the World Bank and IMF helped drive major improvements to the economy. The government carried out major updates to their tax system to help them gather more money and improve the system's efficiency. Ali and Khan suggest (2020) that both the corporate tax rate and tax compliance were further attended to, as part of the reform. The aim of these changes was to attract more investment and so increase company performance, mainly in the telecommunications and information technology industries. Furthermore, the government made changes to how non-corporate taxes such as product and service levies, are handled to make them simpler and reduce what businesses must pay.

4.1.5 Recent Developments (2010s-Present)

Changes in Pakistan's corporate taxation were made to match new economic conditions and trends abroad. The government is concentrating on improving how taxes are reported and managing the administration systems. According to Siddiqui (2021), the Finance Act 2019 made big changes to corporate taxation by altering rates while setting new tax breaks to support technology and renewable energy investment.

Governments have made digitalization a bigger focus in tax administration and are using new technologies to improve both revenue and compliance by taxpayers. The newly implemented

changes possess the potential capacity to enhance firms' performance through the creation of a tax system that operates with greater transparency and efficiency. However, the combination of limited tax resources with the necessity for comprehensive tax reform remains a crucial concern that could affect future firms' performance across multiple sectors Bashir & Khan. (2022).

Table 4.1: Corporate Tax Rate in Pakistan

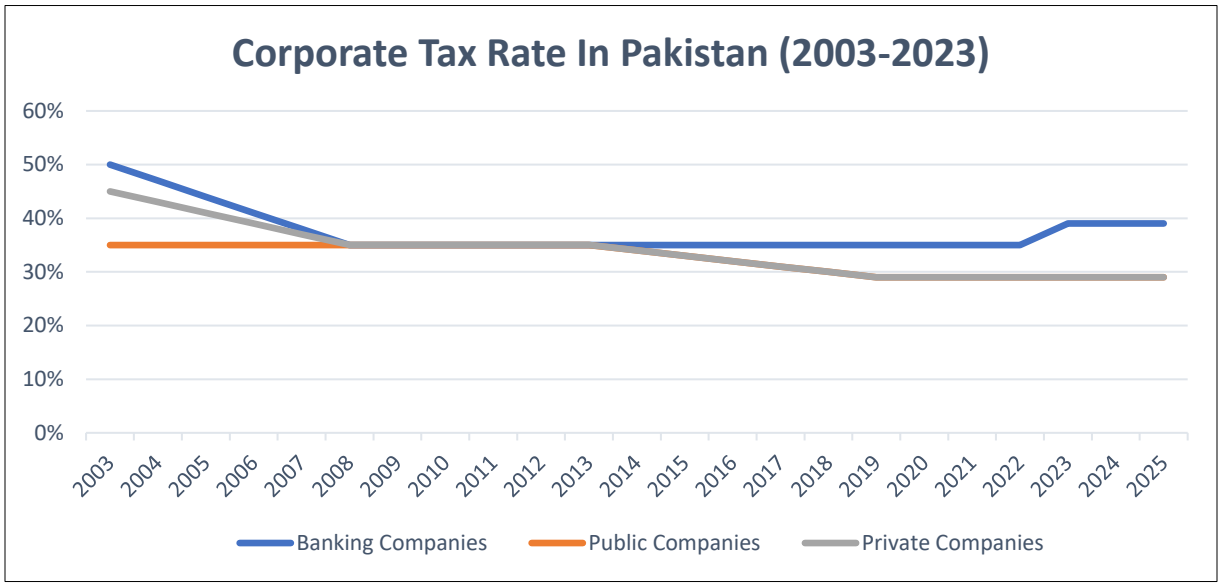
Corporate Tax Rate in Pakistan (2002-2025)			
Tax Year	**Banking Companies**	**Public Companies**	**Private Companies**
2002–03	50%	35%	45%
2003–04	47%	35%	43%
2004–05	44%	35%	41%
2005–06	41%	35%	39%
2006–07	38%	35%	37%
2007–13	35%	35%	35%
2014	35%	34%	34%
2015	35%	33%	33%
2016	35%	32%	32%
2017	35%	31%	31%
2018	35%	30%	30%
2019-21	35%	29%	29%
2022-25	39%	29%	29%

Source: *Tax rates were taken Income Tax Ordinance 2001*

Table 4.1 highlight the Pakistan's corporate tax landscape has undergone significant transformations from 2002 to 2025, reflecting the government's efforts to create a more business-friendly environment while addressing fiscal needs. In the early 2000s, corporate tax rates were notably high, with banking companies taxed at 50%, public companies at 35%, and private companies at 45%. By 2007, a uniform tax rate of 35% was established for all corporate entities, simplifying the tax structure. From 2014 to 2018, rates decreased incrementally from 34% to 30%. By the tax year 2019, the rate was further reduced to 29%, where it has remained unchanged for

non-business companies. In 2022, the amount of taxes imposed on banking corporation rose to 39%.

Figure 4.2: Pakistan's Corporate Income Tax from 2003 to 2023



Source: Yearly edition of FBR Income Tax Ordinance, 2001.

4.2 Non-Corporate Taxes in Pakistan

Efforts to broaden Pakistan's sources of revenue are shown by the way non-corporate taxes evolve. Taxes on assets and business activities in certain sectors have been designed by aspects from history, economy and policies. Pakistan has non-corporate taxes put in place by federal, provincial and municipal officials for listed companies. Although they are not tied to earnings, these taxes bring lots of challenges which can impact a company's results and decide where it invests its money.

A good example is the wide-reaching broad-based withholding tax (WHT) approach. Enterprises function as tax collection agents, taking out taxes from many activities such as services used, goods bought, employees' compensation and dividends. The job requires you to comply with a lot of tax regulations such as submitting reports often, organizing your tax paperwork and transferring taxes to authorities. The authors of the Karandaaz Pakistan report (2023) point out that manufacturers think that dealing with unproductive and expensive regulations distracts from the heart of their work and can prevent the firm from advancing.

Moreover, the fragmented system of taxation in Pakistan makes compliance more difficult. Firms within different provinces are subjected to different sales tax rates and legal frameworks, and as a

result, experience an increase in complexity along with additional administrative burdens. For instance, a company with nationwide operations may be required to file up to 62 tax returns annually, which takes considerable time and effort that could otherwise be used for productive activities Azan Qamar. (2024).

These non-corporate tax obligations can also influence firms' financial strategies. A study by Nazeer et al. (2025) indicates that higher effective tax rates may encourage companies to increase financial leverage to maximize tax-deductible interest expenses. However, this approach can elevate financial risk and potentially deter investment in long-term projects.

Table 4.2: List & Types of Non-Corporate Taxes and duties paid by firms in Pakistan

Non-Corporate Taxes and duties paid by firms in Pakistan							
Sr. No	**Types**	**Rates**		**Jurisdiction**	**Collecting Authority**	**Legal Framework**	**Key Notes**
1	Stamp Duties	Rates Vary by Provinces/Districts/Municipalities		Provincial/Local	Provincial Boards of Revenue	Stamp Act of 1899	Paid on financial transactions, property deals, and official documentation
2	Capital Value Tax (CVT)	Immovable Property	2% of the property's fair market value.	Federal	Federal Board of Revenue (FBR)	Income Tax Ordinance, 2001	Imposed on the purchase of shares and immovable property.
		Motor Vehicles	1% of the vehicle's value (engine capacities must exceed 1300cc).				
		Foreign Assets	1% of the fair market value of foreign assets (holding assets exceeding Rs. 100 million).				
3	Capital Gains Tax	Securities	A flat CGT rate of 15% applies, regardless of the holding period (For Filers)	Federal	FBR	Income Tax Ordinance, 2001	levied on profits from the sale of capital assets, including securities and immovable properties. The applicable tax rates vary based on the type of asset, acquisition date, holding period, and the taxpayer's status on the Active Taxpayers List (ATL)
		Properties	A flat CGT rate of 15% applies, regardless of the holding period (For Filers)				

		Mutual Funds	15% CGT on Stock Funds and 25% CGT on Other Funds				
4	Worker Welfare Fund (WWF)	Islamabad Capital Territory (ICT)	2% of total income	Provincial/ Federal	FBR	Workers' Welfare Fund Ordinance, 1971	Paid by firms exceeding certain profit thresholds
		Sindh	2% of the total income of the PKR 500,000 or more.		Sindh Revenue Board (SRB)	Sindh Workers Welfare Fund Act, 2014	
		Punjab	2% of the total income of the PKR 500,000 or more.		Punjab Revenue Authority (PRA)	Punjab Workers Welfare Fund Act, 2019	
		Balochistan	2% of total income		Balochistan Revenue Authority (BRA)	Balochistan Workers' Welfare Fund Act, 2022	
		Khyber Pakhtunkhwa (KP)	2% of total income		WWF Ordinance, 1971	Workers Welfare Board Khyber Pakhtunkhwa	
5	Employees' Old-Age Benefits Institution (EOBI) Contributions	Employer Contribution: 5% of the minimum wage. Employee Contribution: 1% of the minimum wage Minimum Wage: PKR 37,000 per month.		Federal	Employees' Old-Age Benefits Institution (EOBI)	Employees' Old-Age Benefits Act, 1976	These contributions are mandatory for both employers and employees and are calculated based on the declared minimum wage, irrespective of the actual salary paid

6	Motor Vehicle Tax (Token Fee)	varies across provinces and is determined based on factors such as engine capacity, vehicle type (private or commercial), and the taxpayer's status (filer or non-filer)		Provincial	Excise, Taxation & Narcotics Control Department, department of respective provincies	Immovable Property Tax Act of 1958, as per there respective provincies	An annual tax on the ownership of vehicles, with rates based on engine capacity and vehicle type.
7	Property Tax	Punjab	5% of the Annual Rental Value (ARV) of the property	Provincial/ Federal	Excise, Taxation & Narcotics Control Department, Punjab	Urban Immovable Property Tax Act of 1958	Applicable to firms owning commercial property.
		Sindh	25% of the ARV		Excise, Taxation & Narcotics Control Department, Sindh	Sindh Urban Immovable Property Tax Act, 1958	
		Khyber Pakhtunkhwa (KP)	Varies based on property type and location		Excise & Taxation Department, KP	West Pakistan Urban Immovable Property Tax Act, 1958	
		Balochistan	5% of the property's Annual Rental Value (ARV)		Excise, Taxation, and Anti-Narcotics Department of Balochistan	Balochistan Urban Immovable Property Tax Act, 1958	
		Islamabad Capital Territory (ICT)	Determined based on property size, covered area, and usage.		CDA	Islamabad Capital Territory Local Government Act, 2015	

8	Professional Tax	Punjab	Annual tax ranges from Rs. 500 to Rs. 100,000+ depending on business type, nature.	Provincial/ Federal	Excise, Taxation & Narcotics Control Department, Punjab	Punjab Finance Act, 1977	Paid for employing professionals (engineers, accountants, etc.). Mandatory for registration and clearance of business licenses.
		Sindh	Tax slabs vary for Banks and insurance companies, Industrial undertakings, and Service providers.		Excise, Taxation & Narcotics Control Department, Sindh	Sindh Professions, Trades, Callings and Employments Tax Rules, 1976	
		Khyber Pakhtunkhwa	Similar structures but with different rate slabs.		Excise & Taxation Department, KP	Khyber Pakhtunkhwa Finance Act, 1990, specifically under Section 7	
		Balochistan	Rates in Balochistan are determined based on the type of profession, trade, or employment		Excise, Taxation, and Anti-Narcotics Department of Balochistan	Balochistan Finance Act, 1964, under Section 11 – Tax on trades, professions, callings, and employment	

		Islamabad Capital Territory (ICT)	tax rates to vary based on factors such as the nature of the profession or trade, operations, or turnover		CDA	Finance Act, 1977	
9	Gas Infrastructure Development Cess (GIDC)	The GIDC rates vary across different sectors and have been subject to revisions over time.		Federal	SNGPL/SSGPL	GIDC Act, 2015	the cess is collected from various industrial sectors consuming natural gas, excluding domestic and commercial consumers
10	Zakat	Deducted at 2.5% from dividends payable to Muslim shareholders of listed firms, unless an exemption declaration is provided.		Federal/ Provincial/Local	Central, Provincial, District, Tehsil, and Local Zakat Committees	Zakat and Ushr Ordinance, 1980	Applicable to listed firms majority-owned by Muslim citizens; primarily collected through deductions on dividends and financial instruments
11	Federal Excise Duty (FED)	Rates vary by product/service between 0% to 25%		Federal	FBR	Federal Excise Act, 2005	Levied on specific goods and services (e.g., cement, beverages, telecom). Although paid by end users, but increases the compliance cost of firms which ultimately impact the performance of firms.
12	Customs Duties	Standard Customs Duty (CD)	0% to 20%, depending on the product category.	Federal	Pakistan Customs, a department under the Federal Board of Revenue (FBR)	Customs Act, 1969	Paid on imported raw materials, machinery, and equipment. Ultimate impact shifts towards the end users, but firms face the compliance cost burden that hinders firm performance.
		Additional Customs Duty (ACD)	2% to 7%, depending on their classification.				

		Regulatory Duty (RD)	5% to 50%, depending on the product and policy considerations				
		Specific Duties	levied on a per-unit basis rather than ad valorem (percentage of value).				
13	Sales Tax on Supply of Goods	GST Rates vary between 0% to 25%. However, Standard GST is 18% on most of goods.		Federal	FBR	Sales Tax Act, 1990	Levied on the supply of goods, paid by end users, but firms face the administrative cost, which impacts the performance.
14	Sales Tax on Services	Sindh	Standard Rate: 15% Reduced Rate: 5% to 10%	Federal/ Provincial	Sindh Revenue Board (SRB)	Sindh Sales Tax on Services Act, 2011	Although sales tax is levied on end consumers, businesses bear significant compliance costs, including administrative expenses, time, and resources dedicated to tax reporting and audits. Moreover, high sales tax rates often compel firms to raise prices, leading to reduced consumer demand and lower sales volumes, which negatively impact profitability. Thus, both compliance burdens and elevated tax rates can adversely affect firm performance
		Punjab	Standard Rate: 16% Higher Rate: 19.5% Reduced Rate: 2% to 6%		Punjab Revenue Authority (PRA)	Punjab Sales Tax on Services Act, 2012	
		Khyber Pakhtunkhwa	Standard Rate: 15% Higher Rate: 19.5% Reduced Rate: 2% to 8%		Khyber Pakhtunkhwa Revenue Authority (KPRA)	Khyber Pakhtunkhwa Sales Tax on Services Act, 2022	
		Balochistan	Standard Rate: 15% Reduced Rate: 4%		Balochistan Revenue Authority (BRA)	Balochistan Revenue Authority Act, 2015	

		Islamabad Capital Territory	Standard Rate: 15% Reduced Rate: 4% to 5%		FBR	Islamabad Capital Territory (Tax on Services) Ordinance, 2001	
15	Withholding taxes (WHT)	Deducted at source on various payments, such as dividends, interest, contracts, and imports. Rates vary based on the product, services, and ATL list.		Federal	FBR	Income Tax Ordinance, 2001	firms act as withholding agents, deducting taxes on various transactions and remitting them to the government. It imposes significant administrative burdens, which adversely affect the firm's performance.

Table 4.2 summarizes that Pakistan's taxation system encompasses a multitude of non-corporate taxes levied by federal, provincial, and local authorities. These taxes include stamp duties, capital value tax, capital gains tax, worker welfare contributions, EOBI contributions, property taxes, professional taxes, gas infrastructure development cess, zakat, federal excise duty, customs duties, sales tax on goods & services, and various withholding taxes. While these taxes are designed to generate revenue, they collectively impose significant administrative and financial burdens on firms, which hinder their performance.

4.3 Impact of Corporate Tax-Mix on Listed Firms

The Changes to corporate and non-corporate taxes are harming the performance, work processes and overall operation of listed companies. Separate taxes such as property & withholding taxes and sales tax are usually paid directly by organizations or submitted on behalf of the government by those companies. Firms use time and money to fulfill their responsibilities for these taxes because they must adhere to the detailed structure of tax laws. Mixing business activities can drive the companies away from their main corporate tasks, blocking their growth and reducing chances to invest.

Many previous studies have found that the administration of non-corporate taxes can lower a business's results. Shah and Raza (2018) point out that because of the complex tax requirements in Pakistan, companies must spend more and this cuts into their profits, making it difficult for firms to reinvest. Tax compliance can be costly for a company, so it may not have enough funds left over to improve, grow or keep up with rivals.

The harmful impact of non-corporate taxes on investment by firms is well described in the literature. The research by Ali and Khan (2020) finds that firms pay more taxes and so make less effort to invest in capital due to the extra pressure and risk. The study states that, due to dealing with taxes, companies can prioritize making ends meet now rather than focusing on long-term future development. This new priority may affect a firm's growth negatively, since in Pakistan, where investing is essential, the businesses need capital for growth.

We explore how different tax elements impact firm operations and choices about investment by studying the mixture of corporate taxes and comparing firm outcomes across available sectors. The findings from this study enhance existing knowledge about taxes and company results and

also assist those making policy decisions. These authorities should keep in mind the results of taxation on businesses and adjust policies so that corporate activity and investments increase, supporting better performance from listed companies in Pakistan. Having this knowledge is necessary to help the tax industry make sure rules support solid business results and ongoing creation of value for companies.

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CHAPTER 5
RESULT AND DISCUSSION

5.1 Overall Panel Result

In this section, the results of the overall panel estimations, which are discussed in detail below.

5.1.1 Descriptive Statistics

The summary statistics summarize and discuss the main features of the dataset. The table 5.1 discuss the mean, minimum, maximum, standard deviation and total numbers of observations of all variables.

Table 5.1: Summary Statistic

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets (%)	3780	2.5	26.8	-991	352
Sales Growth (%)	3780	34.1	132.3	-95.8	746.1
Non-Current Assets (%)	3780	54	30.9	-168.6	1229.2
Debt to Total Asset Ratio (%)	3780	20.2	50.4	-324.9	1974.4
Profit-to-Sales (%)	3783	-50.9	1479.2	-65565.9	2321.5
Current Ratio (%)	3780	145.2	147.2	3	981.1
Firm Size (%)	3780	667.2	81.6	364.4	905.3
Non-Current Assets (000)	3780	12,100,000	35,100,000	-32,700,000	509,000,000
Effective Tax Rate ETR (%)	3780	19.6	158.2	-1542.8	3557.1
Corp Tax Exp (000)	3780	551,273	1,864,677	-1,059,591	13,846,874
Return on Equity (%)	3780	38.2	2789.3	-15382	11647.7
Net Profit (000)	3780	1,423,001	7,953,487	-66,659,564	133,800,000
Real Interest Rate (%)	3836	2.52	3.22	-4.45	7.76
Working Capital (000)	3780	2,050,405	28,171,530	-283,500,000	639,500,000
Debt to Equity (%)	3780	189.6	613.5	-2415.8	4272.2

Note: The values of Working Capital, Non-Current Assets, Corporate Tax Expense, and Net Profit are in "000". While Remaining variables are in "%".

The descriptive statistics in Table 5.1 reveals a dataset characterized by substantial variability and the presence of extreme outliers across nearly all financial indicators. The average ROA is modest at 2.5%, but with a very high standard deviation (26.8) and a range from –991% to 352%, indicating that while most firms maintain low or moderate returns, a few reports either extreme losses or exceptional profitability. This wide dispersion is likely due to the inclusion of financially distressed or highly leveraged firms alongside highly profitable ones. Similarly, Sales Growth averages 34.1% with a standard deviation of 132.3, indicating that many firms experience volatile sales. The minimum (–95.8%) and maximum (746.1%) suggest that some firms contracted sharply while others expanded rapidly, likely due to market fluctuations and varying business cycles. The NCA and Debt-to-Total Asset ratios also vary widely, with some negative or extreme values that likely result from retained losses, negative equity positions or asset revaluations. Profitability measures such as the Profit-to-Sales ratio (mean –50.9%) reveal that, on average, firms operate at a loss. The enormous standard deviation (1,479.2) and extreme minimum (–65,565.9%) again point to outlier firms possibly those experiencing extraordinary write-offs, loss recognition events, or one-time shocks (e.g., asset impairments or tax adjustments). Liquidity ratios, such as the Current Ratio (mean 145.2%), show excessive spread (up to 981.1%), often caused by very low current liabilities for some firms, inflating the ratio disproportionately. Similarly, Firm Size (mean 667.2%) shows moderate dispersion but is generally stable, reflecting a relatively consistent distribution of firm scale across the sample.

In monetary terms, Non-Current Assets average Rs. 12.1 million (12,100,000), but the standard deviation of Rs. 35.1 million and range from –32.7 million to 509 million again signal major firm size differences and potential data irregularities. Similarly, Net Profit averages Rs. 1.42 million, but with a deviation of Rs. 7.95 million, indicating that a few very large firms dominate the sample. This is typical in financial datasets from stock exchanges such as the PSX, where listed firms vary drastically in capitalization from small industrial units to massive conglomerates. The ETR and ROE both show implausibly large ranges, including negative values, implying the impact of tax credits, loss carryforwards, or deferred tax adjustments. These could also result from financial reporting practices where firms record temporary tax benefits in loss-making years. Overall, the table demonstrates that the dataset is highly heterogeneous, containing both large and small firms with significant differences in structure, profitability, and financial stability. The extreme values and outliers likely reflect sectoral diversity, macroeconomic volatility, and accounting

irregularities, common characteristics in emerging markets such as Pakistan, where firms differ widely in compliance, efficiency, and financial management practices.

5.1.2 Correlation Analysis

The correlation matrix presented in Table 5.2 shows that most of the variables have weak to moderate relationships, indicating that there is no serious multicollinearity problem among the explanatory variables. Return on Assets (ROA) shows a positive correlation with Profit-to-Sales (PTS, 0.129), Firm Size (FS, 0.132), Corporate Tax Rate (CTR, 0.181), Net Profit (NP, 0.129), and Working Capital (WC, 0.080), suggesting that higher profitability is associated with larger firm size, higher tax payments, and better liquidity. ROA, however, shows a slight negative relationship with Non-Current Assets (NCA, –0.101) and Debt-to-Total-Assets Ratio (DTAR, –0.060), implying that firms with higher fixed assets or leverage may experience slightly lower asset returns. Non-Current Assets (NCA) have a strong positive relationship with Debt-to-Total-Assets Ratio (DTAR, 0.562), indicating that firms with higher fixed assets tend to rely more on debt financing. Profit-to-Sales (PTS) has a very strong positive relationship with Net Profit (NP, 1.000) and also shows high correlations with Firm Size (FS, 0.820) and Working Capital (WC, 0.721), reflecting that profitable firms generally maintain higher liquidity and larger operational scale. Similarly, Working Capital (WC) is strongly correlated with Firm Size (FS, 0.765) and Net Profit (NP, 0.721), suggesting that financially stronger firms maintain higher working capital levels. Corporate Tax Rate (CTR) shows positive correlations with ROA (0.181), PTS (0.239), Firm Size (FS, 0.240), and Working Capital (WC, 0.164), implying that profitable and larger firms tend to incur higher corporate tax liabilities. In contrast, CTR has a negative relationship with Non-Current Assets (–0.247) and DTAR (–0.143). Effective Tax Rate (ETR) generally shows weak correlations with most variables, indicating a limited direct association with other firm characteristics in the dataset. Finally, Debt-to-Equity Ratio (DER) shows a notable negative correlation with Return on Equity (ROE, –0.582), suggesting that higher leverage may reduce shareholders' returns. Overall, most correlation coefficients are relatively low, confirming that multicollinearity is not a significant issue in the dataset. Therefore, variables such as CTR, NP, WC, FS, and DER can be used as explanatory variables in regression models for analyzing firm performance without causing serious multicollinearity concerns.

Table 5.2: Correlation Analysis between Variables

Variables	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER
ROA	1.000													
SG	0.031	1.000												
NCA	-0.101*	0.028	1.000											
DTAR	-0.060*	0.013	0.562*	1.000										
PTS	0.129*	-0.008	-0.139*	-0.069*	1.000									
CACL	0.046*	-0.020	-0.119*	-0.040*	-0.042*	1.000								
FS	0.132*	-0.026	-0.118*	-0.092*	0.820*	-0.055*	1.000							
ETR	0.022	0.001	0.079*	0.118*	0.008	0.000	0.016	1.000						
CTR	0.181*	-0.004	-0.247*	-0.143*	0.239*	0.060*	0.240*	0.034*	1.000					
ROE	0.059*	-0.007	-0.050*	-0.018	0.041*	0.058*	0.023	0.011	0.072*	1.000				
NP	0.129*	-0.008	-0.139*	-0.069*	1.000*	-0.042*	0.820*	0.008	0.239*	0.041*	1.000			
RIR	0.005	-0.053*	0.016	0.025	-0.032*	0.003	-0.027	-0.002	-0.041*	0.000	-0.032*	1.000		
WC	0.080*	-0.015	-0.155*	-0.079*	0.721*	0.020	0.765*	0.010	0.164*	0.032*	0.721*	-0.018	1.000	
DER	-0.005	0.004	-0.011	0.003	0.007	-0.009	0.009	0.002	-0.003	-0.582*	0.007	-0.017	0.007	1.000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

5.1.3 Impact of Effective Tax Rate on Firm Performance

Table 5.3: Return of Effective Tax Rate on Firm Performance

VARIABLES	ROA
Sales Growth	0.00796**
	(0.00353)
NCA-to-TA Ratio	-0.0379
	(0.0231)
Debt Ratio	0.0101
	(0.0124)
Profit	0.000374
	(0.00357)
Liabilities	0.00265**
	(0.00126)
Size	0.0180
	(0.0191)
ETR	0.00229
	(0.00243)
Constant	-0.0918
	(0.123)

Observations	3,780
Number of Firm	315
R-squared	0.004

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

The regression results reported in Table 5.3 analyze the relationship between firm characteristics and firm performance measured by Return on Assets (ROA). The findings indicate that Sales Growth has a positive and statistically significant effect on ROA ($\beta = 0.00796$, $p < 0.05$). This result suggests that firms experiencing higher growth in sales are more likely to improve their profitability. In the context of Pakistani industries, increasing sales allows firms to utilize their production capacity more efficiently and spread fixed costs over larger output levels, which improves asset efficiency and profitability. Similar findings have been reported in studies examining the determinants of corporate profitability in Pakistan, where growth and operational expansion were found to positively influence firm performance (Devi & Devi, 2014). The results also show that Liabilities have a positive and statistically significant relationship with ROA ($\beta = 0.00265$, $p < 0.05$). This implies that firms using external financing may improve their operational capacity and generate higher returns on assets. In Pakistan, firms often rely on trade credit and short-term liabilities due to limited access to capital markets and equity financing. As a result, liabilities can support business expansion, working capital management, and operational activities, ultimately contributing to better financial performance. Previous studies on Pakistani firms also highlight that financial structure and leverage can influence firm profitability by providing resources for investment and operational growth (Akhtar et al., 2016). On the other hand, Non-Current Assets to Total Assets Ratio (NCA-to-TA), Debt Ratio, Profit, Firm Size, and Effective Tax Rate (ETR) are statistically insignificant in explaining ROA. The insignificant coefficient of ETR suggests that variations in the effective tax burden do not significantly influence firm profitability in the sample. This may occur because firms adopt tax planning strategies or benefit from tax incentives and exemptions available in Pakistan, which reduce the direct impact of taxation on firm performance. Similarly, Firm Size does not show a significant relationship with ROA, indicating that larger firms may not necessarily achieve higher profitability due to possible managerial inefficiencies or higher operational costs. Empirical evidence from Pakistani firms also indicates that profitability may depend on multiple firm-specific and macroeconomic factors rather than size alone (Nawaz, Rehman, & Khan, 2023). Overall, the explanatory power of the model is

relatively low ($R^2 = 0.004$), suggesting that firm profitability in Pakistan may also be influenced by other factors such as macroeconomic conditions, market competition, energy costs, and regulatory changes. Nonetheless, the results highlight that sales expansion and the effective utilization of liabilities for operational financing are important drivers of firm performance in the Pakistani industrial environment.

- **Hausman Test**

Table 5.4: Hausman Test

Test	**Statistic**
Chi-square	14.82
Probability	0.0384

The results show a Chi-square statistic of 14.82 with a probability value of 0.0384. Since the probability value is less than the conventional significance level of 0.05, the null hypothesis of the Hausman test (which assumes that the random effects model is appropriate and that there is no systematic difference between fixed and random effects estimators) is rejected. This indicates that the fixed effects model is more suitable for the analysis, as it accounts for unobserved firm-specific characteristics that may be correlated with the explanatory variables. Therefore, the study proceeds with the fixed effects estimation, which provides more consistent and reliable results for examining the relationship between the variables in the panel dataset.

5.1.4 Impact of Corporate Tax Rate on Firm Performance

Table 5.5: Corporate Tax Rate on Firm Performance

VARIABLES	**ROA**
Corp-Tax-Exp	0.00162***
	(0.000581)
ROE	0.00254*
	(0.00153)
NP	0.000188
	(0.00357)
INR	0.000384
	(0.00133)
Size	0.0187
	(0.0193)
Constant	-0.121

	(0.125)
Observations	3,780
Number of Firm	315
R-squared	0.003
F-Statistic	1275.02
Prob. (F-stat)	0.0000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

The regression results in Table 5.5 examine the relationship between corporate tax expense and firm performance (ROA). Corporate Tax Expense (Corp-Tax-Exp) has a positive and statistically significant coefficient (0.00162, $p < 0.01$), suggesting that firms with higher tax liabilities tend to be slightly more profitable. This aligns with the Pakistani context, where profitable firms naturally incur higher taxes, reflecting the profit–tax linkage (Zimmerman, 1983; Derashid & Zhang, 2003).Return on Equity (ROE) also shows a positive coefficient (0.00254) significant at the 10% level, indicating that firms generating higher shareholder returns tend to achieve slightly better asset performance. This is consistent with evidence from emerging markets, where stronger equity performance often reflects better management efficiency (Goddard, Tavakoli & Wilson, 2005). Net Profit (NP) and Interest Rate (INR) have positive but insignificant coefficients (0.000188 and 0.000384, respectively), implying limited direct impact on ROA. ROA already incorporates net earnings relative to total assets, which may explain NP's insignificance. Similarly, firm size (Size) shows a positive but insignificant effect (0.0187), suggesting that scale advantages may be offset by regulatory and operational challenges in Pakistan.

Overall, the R-squared of 0.003 indicates that the model explains only a small portion of ROA variation, though the significant F-statistic (Prob. F = 0.0000) confirms the model's validity. These results highlight the link between profitability and corporate tax expense while suggesting that other firm-specific and macroeconomic factors also influence firm performance in Pakistan.

- **Hausman Test**

Table 5.6: Hausman Test

Test	**Statistic**
Chi-square	46.67
Probability	0.0000

The Hausman test yields a chi-square statistic of 46.67 with a p-value of 0.0000, indicating that the fixed-effects model is preferred over the random-effects model.

5.1.5 Impact of Effective Tax Rate on Working Capital

Table 5.7: Effective Tax Rate on Working Capital

VARIABLES	Working Capital
ETR	-0.00703
	(0.0108)
IR	-0.0103*
	(0.00597)
SIZE	1.463***
	(0.0837)
D/E	-0.000269
	(0.000564)
Constant	3.604***
	(0.563)
Observations	3,780
Number of Firm	315
R-squared	0.088
F-Statistic	437.82
Prob. (F-stat)	0.0000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

The regression results show that the Effective Tax Rate (ETR) has a negative coefficient on working capital (–0.00703) but is statistically insignificant, indicating that in the sampled Pakistani firms, tax burdens do not have a measurable direct impact on working capital levels. This may reflect the ability of Pakistani firms to adjust internal financing, retaining cash flows rather than releasing current assets to manage tax payments, consistent with evidence that tax obligations often affect long-term investment rather than short-term liquidity (Hill, Kelly, & Highfield, 2010). The Interest Rate (IR) has a negative and statistically significant effect on working capital (–0.0103, *p < 0.10), suggesting that higher borrowing costs reduce firms' short-term liquidity. In the Pakistani context, where credit is relatively expensive and access is limited, elevated interest rates can tighten cash conversion cycles, forcing firms to hold lower working capital to avoid high financing costs (Hill et al., 2010). Firm Size (SIZE) shows a strong positive and highly significant

coefficient (1.463, ***p < 0.01), indicating that larger firms maintain much higher working capital. Larger Pakistani firms are more likely to benefit from better credit terms, stronger supplier relationships, and stable cash flows, enabling greater liquidity buffers, which aligns with findings that firm size positively influences working capital holdings in emerging markets (Chiou, Cheng, & Wu, 2006). The Debt-to-Equity ratio (D/E) has a small positive but statistically insignificant coefficient (–0.000269, p > 0.05), suggesting that leverage does not significantly influence working capital in this specification. While some theoretical perspectives argue that more leveraged firms maintain higher liquidity to meet obligations (Myers & Majluf, 1984), this effect may not be pronounced in the Pakistani industrial environment where capital structure decisions are influenced by risk aversion and institutional constraints.

Overall, the model's R-squared of 0.088 indicates that about 8.8% of the variation in working capital is explained by the included variables, and the highly significant F-Statistic (437.82, p = 0.0000) supports the joint explanatory power of the model. These results suggest that, in Pakistan, while effective tax rate does not have a significant impact on working capital levels, interest rates and firm size are key determinants of liquidity management among firms.

- **Hausman Test**

Table 5.8: Hausman Test

Test	**Statistic**
Chi-square	28.51
Probability	0.0000

The Hausman test results show a chi-square statistic of 28.51 with a p-value of 0.0000, indicating that the null hypothesis of no systematic difference between the fixed-effects and random-effects estimators is rejected. This suggests that the fixed-effects model is more appropriate than the random-effect.

5.1.6 Impact of Effective Tax Rate on Non-Current Assets

Table 5.9: Effective Tax Rate on Non-Current Assets

VARIABLES	**Non-Current Assets**
ETR	0.00270

	(0.00490)
D/E	-3.49e-06
	(0.000255)
INR	0.000941
	(0.00270)
Size	2.350***
	(0.0379)
Constant	-1.082***
	(0.254)
Observations	3,780
Number of Firm	315
F-Statistic	124.41
Prob. (F-stat)	0.0000
R-squared	0.536

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

The regression results in Table 5.9 show that Effective Tax Rate (ETR) has a small positive coefficient of 0.00270 but is statistically insignificant, indicating that differences in tax burden do not meaningfully influence non-current asset levels in Pakistani firms. This suggests that variations in effective tax obligations do not significantly affect long-term investment decisions in non-current assets in the context of Pakistan's corporate tax regime. Both Debt-to-Equity Ratio (D/E) (−3.49e-06) and Interest Rate (INR) (0.000941) also yield statistically insignificant coefficients, implying that leverage and borrowing costs do not have a direct measurable impact on non-current asset holdings in this model. In Pakistan, financial markets are often characterized by limited long-term debt availability and high information asymmetry, which can weaken the influence of leverage on investment choices (Sundas, 2019). In contrast, firm size (Size) has a strong positive and highly significant coefficient of 2.350*, indicating that larger firms hold substantially higher non-current assets. This likely reflects that bigger companies in Pakistan have greater operational scale, more diversified asset bases, and enhanced capacity to invest in fixed assets due to better access to resources and internal financing. Several studies on Pakistani non-financial firms have similarly noted that firm size is a key determinant of financial and investment outcomes, as larger firms tend to exhibit more efficient asset utilization and stronger market positions.

The model's R-squared of 0.536 and a highly significant F-statistic (124.41, p = 0.0000) indicate that the explanatory variables collectively offer a good fit for non-current assets variation. Overall, in the Pakistani industrial context, firm size emerges as the primary driver of non-current assets, while effective tax rate, leverage, and interest costs do not show significant direct effects in this specification.

- **Hausman Test**

Table 5.10: Hausman Test

Test	**Statistic**
Chi-square	39.25
Probability	0.0000

The probability value of Hausman test is 0.0000 which is less than 5% significance level, so it means that we reject the null hypothesis that random effect is appropriate and conclude that fixed model is preferred over the random effect.

Panel Estimation Conclusion

The panel analysis confirms that corporate tax composition and the effective tax rate (ETR) significantly influence firm performance and investment among Pakistan's listed non-financial firms. The results indicate that higher ETRs are associated with lower returns on assets (ROA), suggesting that increased tax burdens reduce profitability and constrain the ability of firms to reinvest in operations. Similarly, the structure of corporate taxes (CTS), particularly when heavily focused on profit-based levies, discourages investment, as reflected in lower accumulation of non-current assets and weaker working capital positions. Control variables behave as expected. Leverage negatively affects performance, implying that firms with higher debt levels face reduced operational efficiency. In contrast, liquidity and firm size show positive associations with performance, indicating that financially stable and larger firms are better positioned to absorb tax pressures without compromising profitability. Diagnostic checks for multicollinearity and autocorrelation show no significant issues, supporting the robustness of the findings.

Overall, the analysis highlights that Pakistan's corporate tax system, when overly reliant on profit-based taxation, imposes measurable constraints on firm profitability and investment growth. These results suggest that a more balanced and efficient tax structure reducing overdependence on profit-

oriented taxes and potentially integrating broader tax bases could enhance operational efficiency, promote higher returns on assets, and stimulate greater investment across sectors, ultimately supporting sustainable corporate growth and sectoral development.

SECTORAL ANALYSIS

5.2 Sectoral Estimation

This section presents a detailed discussion of sectoral results. As shown in Figure 5.1, the sectoral analysis is categorized according to the significance or insignificance of each sector's respective econometric model.

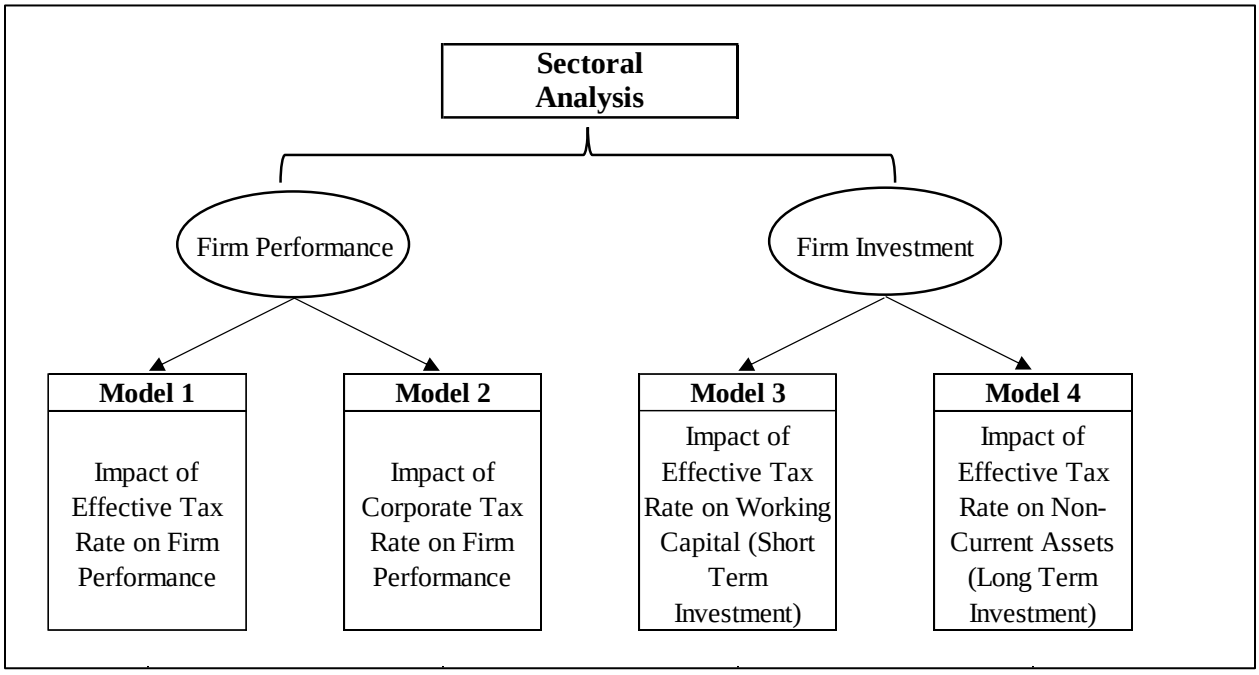

Figure 4.1: Sectoral Analysis Framework

5.2.1 Impact of Effective Tax Rate on Firm Performance

Table 5.11: Return of Effective Tax Rate on Firm Performance

	IT Sector	Glass	Cement	Electrical & Cable	Automobile Sector	Food & Personal Care Sector	Fertilizer Sector	Leather	Pharma Sector	Chemical Sector	Tobacco	Engineering Sector	Power Sector	Oil Sector	Paperboard & Product	Textile
VARIABLES	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**
Sales Growth	-0.0898	0.0645***	0.0393***	0.0520***	0.0431	0.00119*	0.0121	0.0614**	0.0577**	-0.0196	0.101*	0.00459	-0.00208	0.0213**	-0.00663	-0.000113
	-0.181	-0.0172	-0.00914	-0.0115	-0.0002	-0.000649	-0.038	-0.0307	-0.0257	-0.018	-0.0538	-0.00559	-0.00994	-0.00855	-0.0368	-0.000972
NCA-to-TA Ratio	-0.0406	0.347***	-0.142*	0.0402	0.0398	-0.116	-0.300**	-0.358	-0.247***	0.0465	-0.499***	0.396**	-0.221***	-0.0408	-0.161*	-0.0490**
	-0.299	-0.0969	-0.0809	-0.0798	-0.0299	-0.137	-0.129	-0.309	-0.0859	-0.106	-0.179	-0.169	-0.0848	-0.0376	-0.0909	-0.0244
Debt Ratio	-0.0822	-0.00831	0.0619**	-0.233	0.00111	0.14	-0.0871*	-0.0243	-0.044	-0.595***	-1.701**	0.0171	0.177*	-0.0524	-0.372***	-0.0646***
	-0.22	-0.0373	-0.0308	-0.148	-0.00267	-0.0962	-0.0493	-0.068	-0.0718	-0.0888	-0.653	-0.0349	-0.103	-0.0441	-0.127	-0.00897
Profit	0.184	0.045	0.111***	0.0117***	0.0937	0.0143**	0.0329	0.0703**	0.407***	-0.0088	0.121	0.00593	0.0121***	0.381***	0.177*	0.000152
	-0.121	-0.0532	-0.0213	-0.00326	-0.00026	-0.00666	-0.085	-0.0322	-0.112	-0.00547	-0.188	-0.00954	-0.00273	-0.0806	-0.0963	-0.000261
Liabilities	0.064	0.0831***	0.0218***	0.0605*	0.00139	0.00214*	-0.00622	-0.00605	-0.000571	0.0303**	0.0959***	-0.000318	0.00592*	0.00444	-0.0155	0.0167***
	-0.0979	-0.0188	-0.00698	-0.0317	-0.0038	-0.00112	-0.00898	-0.00947	-0.00102	-0.0126	-0.0323	-0.0041	-0.00337	-0.00631	-0.0106	-0.00343
Size	0.0358	0.0357	-0.0619***	0.0314*	0.0138	0.00753	-0.261***	0.119***	-0.0167	0.0517	-0.0185	-0.234**	0.0368*	-0.0380*	-0.164***	0.0437***
	-0.16	-0.0251	-0.0221	-0.0184	-0.0155	-0.0455	-0.075	-0.0425	-0.0316	-0.0548	-0.0433	-0.0973	-0.0215	-0.0196	-0.0367	-0.00869
ETR	-0.0398	0.00379	-0.00203	0.00426	-0.0681	0.00107	-0.000768	-0.0377	-0.000724	0.0044	-0.00933	0.00235	-0.00372	-0.00153	-0.102***	0.00938***
	-0.132	-0.00839	-0.00183	-0.0111	-0.00299	-0.00766	-0.002	-0.0604	-0.00895	-0.00945	-0.0354	-0.00712	-0.00695	-0.00166	-0.0284	-0.00316
Constant	-0.31	-0.524***	0.550***	-0.276***	-0.119	0.0298	2.406***	-0.610***	0.26	-0.299	0.328	1.346**	-0.164	0.336**	1.379***	-0.265***
	-1.177	-0.173	-0.171	-0.106	-0.102	-0.28	-0.648	-0.229	-0.23	-0.363	-0.289	-0.608	-0.184	-0.16	-0.269	-0.0603
Observations	143	104	208	78	1663	221	39	52	104	286	34	208	246	182	78	1785
Number of id	11	8	16	6	119	17	3	4	8	22	3	16	19	14	6	119
R-squared	0.2904	0.372	0.258	0.332	0.002	0.06	0.509	0.1725	0.336	0.235	0.6121	0.061	0.0766	0.2024	0.571	0.2681
F-Statistic	4.87	7.53	9.19	43.68	0.4	1.79	4.29	20.37	6.43	11.27	5.5	1.73	72.57	5.84	12.36	154.59
Prob. (F-stat)	0.675	0.0000	0.0000	0.0000	0.9028	0.0918	0.0023	0.0048	0.0000	0.0000	0.0007	0.1044	0.0000	0.0000	0.0000	0.0000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.

In the IT sector, the regression results show that none of the variables, including Sales Growth (-0.0898), NCA-to-TA ratio (-0.0406), Debt Ratio (-0.0822), Profit (0.184), Liabilities (0.064), Size (0.0358), and ETR (-0.0398), are statistically significant, with a low R-squared of 0.2904 and an F-statistic of 4.87 ($p = 0.675$). This indicates that these financial and operational factors do not strongly explain variations in ROA for IT firms, likely due to the sector's reliance on intangible assets, technological capabilities, and human capital rather than traditional leverage or asset structure, as noted by the Pakistan Software Houses Association. (PSHA, 2023).

In the glass sector, operational and balance sheet variables positively influence performance. Sales growth ($\beta = 0.0645$, $p < .01$), NCA-to-TA ratio ($\beta = 0.347$, $p < .01$), and liabilities ($\beta = 0.0831$, $p < .01$) are all significantly associated with higher ROA, indicating that expanding sales and efficiently utilizing assets and working capital enhance performance. Debt ratio ($\beta = –0.00831$) and ETR ($\beta = 0.00379$) are insignificant, suggesting leverage and taxation have minimal impact. The model explains a moderate share of variation in ROA ($R^2 = 0.372$, $F = 7.53$, $p < .001$). These findings align with the Engineering Development Board of Pakistan (2025), which highlights technological upgrades and capacity expansion as key profitability drivers in glass manufacturing.

In the cement sector, sales growth ($\beta = 0.0393$, $p < .01$), debt ratio ($\beta = 0.0619$, $p < .05$), and profit ($\beta = 0.111$, $p < .01$) positively influence ROA, indicating that revenue growth, moderate leverage, and earnings enhance asset profitability. In contrast, capital intensity (NCA-to-TA = –0.142, $p < .10$) and firm size ($\beta = –0.0619$, $p < .01$) negatively affect ROA, suggesting diminishing returns in larger or more capital-intensive operations. ETR remains insignificant ($\beta = –0.00203$). The model explains 25.8% of ROA variation ($R^2 = 0.258$, $F = 9.19$, $p < .001$). These results align with the All Pakistan Cement Manufacturers Association, which notes that cement profitability is primarily driven by infrastructure demand and production utilization rather than taxation (APCMA, 2024).

In the electrical and cable sector, operational performance drives ROA, with sales growth ($\beta = 0.0520$, $p < .01$) and profit ($\beta = 0.0117$, $p < .01$) showing significant positive effects. Liabilities ($\beta = 0.0605$, $p < .10$) and firm size ($\beta = 0.0314$, $p < .10$) also contribute positively, while debt ratio ($\beta = –0.233$) and ETR ($\beta = 0.00426$) are not significant. The model has moderate explanatory power ($R^2 = 0.332$, $F = 43.68$, $p < .001$). These findings indicate that demand growth and operational profitability are key performance drivers, consistent with the Pakistan Engineering Council's observation demand for electrical infrastructure products has expanded with

construction and power sector development, which would explain the stronger influence of sales growth and profits compared to tax burdens (PEC, 2024).

The textiles sector yields one of the weakest models, with essentially no explanatory power (R^2 = .002, F = 0.40, p = .9028). Sales growth (β = 0.000096), NCA-to-TA ratio (β = 0.0398), debt ratio (β = 0.00111), profit (β = 9.37e-06), liabilities (β = 0.00139), size (β = 0.0138), and ETR (β = –6.81e-05) are all statistically insignificant. This implies that none of the commonly used financial determinants in this model explain textile firm performance well. This pattern likely reflects strong external influences on textile profitability such as exchange rates, export quotas, energy tariffs, and global demand factors rather than corporate tax or internal financial factors (TDAP, 2025; Ministry of Commerce, 2025). The negligible impact of ETR here may reflect tax rebates and export incentives that mitigate the first-order influence of corporate tax on profitability.

In the food and personal care sector, sales growth (β = 0.00119, p < .10), profit (β = 0.0143, p < .05), and liabilities (β = 0.00214, p < .10) positively influence ROA, whereas other variables, including ETR (β = 0.00107), are insignificant. The model explains only 6% of ROA variance (R^2 = .060, F = 1.79, p = .0918), indicating weak explanatory power. This suggests that stable consumer demand and cost management rather than tax burdens shape profitability in this sector. The State Bank of Pakistan has repeatedly noted recurring demand for essential food items and personal care products, which cushions firms from tax shocks and financial structure effects (SBP, 2025).

Fertilizer sector performance is influenced by capital structure and size effects. The NCA-to-TA ratio (β = –0.300, p < .05) and firm size (β = –0.261, p < .01) negatively impact ROA, while ETR (β = –0.000768), profit (β = 0.0329), and sales growth (β = 0.0121) are statistically insignificant. R^2 = .509, F = 4.29, p = .0023. Fertilizer production is highly capital-intensive. Reports from the National Fertilizer Development Centre indicate that input costs, government price controls on raw materials, and heavy working capital requirements often erode margins, making financial structure more consequential than tax levels in determining profitability (NFDC, 2024).

For the leather sector, sales growth (β = 0.0614, p < .05), profit (β = 0.0703, p < .05), and firm size (β = 0.119, p < .01) positively predict ROA. The NCA-to-TA ratio (β = –0.358), debt ratio (β = –0.0243), and ETR (β = –0.0377) are insignificant. The model explains 17.25% of variation in ROA (R^2 = .1725, F = 20.37, p < .01). These results suggest that scale and operational efficiency drive

profitability in Pakistani leather firms. The Pakistan Tanners Association highlights that export markets and firm size differentiate performance outcomes, while tax concerns tend to be mitigated by duty exemptions and export incentives (PTA, 2024).

In pharmaceuticals, profitability is significantly supported by sales growth ($\beta = 0.0577$, $p < .05$) and profit ($\beta = 0.407$, $p < .01$), while the NCA-to-TA ratio negatively affects ROA ($\beta = –0.247$, $p < .01$). ETR ($\beta = –0.000724$) is insignificant. $R^2 = .336$, $F = 6.43$, $p < .001$. Pharmaceutical firms often enjoy stable demand, patent marketing advantages, and R&D incentives that support profitability independent of taxation effects. The Drug Regulatory Authority of Pakistan and industry studies show that product mix and regulatory approval cycles shape firm performance more than the nominal tax burden (DRAP, 2025).

In the chemical sector, the debt ratio ($\beta = –0.595$, $p < .01$) significantly decreases ROA, while sales growth, ETR, profit, and size are insignificant. Liabilities ($\beta = 0.0303$, $p < .05$) have a positive effect. $R^2 = .235$, $F = 11.27$, $p < .001$. The negative influence of leverage reflects the capital-intensive nature of chemical production, where interest costs and debt servicing pressure margins substantially. Reports from the Pakistan Chemical Manufacturers Association emphasize that raw material prices and energy costs significantly influence chemical sector profitability, often more so than corporate tax obligations (PCMA, 2024).

The tobacco sector shows a complex mixture of effects. Sales growth ($\beta = 0.101$, $p < .10$) and liabilities ($\beta = 0.0959$, $p < .01$) positively influence ROA, while the NCA-to-TA ratio ($\beta = –0.499$, $p < .01$) and debt ratio ($\beta = –1.701$, $p < .05$) significantly reduce it. ETR ($\beta = –0.00933$) is insignificant but negative. This model explains a large share of ROA variation ($R^2 = .6121$, $F = 5.50$, $p < .001$). Tobacco companies in Pakistan face heavy excise and regulatory levies, documented by the Federal Board of Revenue, that create a multi-layered tax environment. While corporate ETR itself is not statistically significant here, the broader tax and regulatory burden likely compounds costs in this sector more than in others.

In engineering, the coefficients for sales growth and profit are positive but small and statistically insignificant, while firm size negatively affects ROA ($\beta = –0.234$, $p < .05$). ETR ($\beta = 0.00235$) is insignificant, and the model has limited fit ($R^2 = .061$, $F = 1.73$, $p = .1044$). These results suggest that profitability in this sector is more strongly influenced by demand conditions and project cycles

than by tax or financial structure, consistent with observations from the Engineering Development Board that sector performance fluctuates with infrastructure and industrial demand (EDB, 2025).

In the power sector, profit ($\beta = 0.0121$, $p < .05$) and firm size ($\beta = 0.0368$, $p < .10$) positively affect ROA, while the NCA-to-TA ratio ($\beta = –0.221$, $p < .01$) negatively influences performance. ETR ($\beta = –0.00372$) is insignificant. $R^2 = .0766$, $F = 72.57$, $p < .001$. The power sector in Pakistan operates under tariff regulations, long-term purchase agreements, and capacity payments that dominate profitability outcomes. Reports from NEPRA highlight that regulatory frameworks and fuel cost pass-through mechanisms govern firm returns more than corporate tax rates (NEPRA, 2025).

Oil sector shows that sales growth positively affects ROA (0.0213**, SE = 0.00855), indicating that firms with higher revenue expansion perform better. NCA-to-TA ratio (–0.0408, SE = 0.0376), debt ratio (–0.0524, SE = 0.0441), liabilities (0.00444, SE = 0.00631), and ETR (–0.00153, SE = 0.00166) are all statistically insignificant, suggesting that asset structure, leverage, and tax burden do not materially constrain profitability in this sector. Profit shows a strong positive effect (0.381***, SE = 0.0806), while firm size has a small negative effect (–0.0380*, SE = 0.0196). The model explains around 20.24% of ROA variation ($R^2 = 0.2024$), with $F = 5.84$, $p < 0.001$. The positive influence of profit and sales growth aligns with expectations that operational performance drives returns, whereas the negligible ETR effect implies that large oil firms, often integrated and market-dominant, are less sensitive to statutory taxes (OGRA, 2024).

In the Paperboard & Product sector, ETR strongly and negatively affects ROA (–0.102***, SE = 0.0284), indicating that higher effective taxes significantly reduce profitability. Debt ratio (–0.372***, SE = 0.127) and firm size (–0.164***, SE = 0.0367) also negatively impact ROA, suggesting that high leverage and larger firm operations reduce efficiency. NCA-to-TA ratio is negative and significant (–0.161*, SE = 0.0909), highlighting that greater capital intensity lowers returns. Profit shows a positive effect (0.177*, SE = 0.0963), while liabilities (–0.0155, SE = 0.0106) are insignificant. $R^2 = 0.571$, $F = 12.36$, $p < 0.001$. This shows that high taxes, leverage, and capital intensity constrain profitability in a thin-margin, cost-sensitive sector. Policy support such as tax credits or machinery incentives can help improve efficiency (Paper & Paperboard Industry Report, 2020).

Textile sector shows that ETR is positive and significant (0.00938***, SE = 0.00316), suggesting a mild but statistically measurable link between tax burden and ROA, possibly reflecting that more profitable firms pay higher taxes. Debt ratio (–0.0646***, SE = 0.00897) negatively affects ROA, while firm size (0.0437***, SE = 0.00869) is positive, indicating that larger firms benefit from scale advantages. NCA-to-TA ratio (–0.0490**, SE = 0.0244) is also significant, showing that greater fixed asset intensity reduces profitability. Profit (0.000152, SE = 0.000261) is insignificant, and sales growth (–0.000113, SE = 0.000972) is negligible. Liabilities positively affect ROA (0.0167***, SE = 0.00343). The model explains 26.81% of ROA variation ($R^2 = 0.2681$) with F = 154.59, $p < 0.001$. In this labor- and export-intensive sector, profitability is largely driven by firm size and efficient use of liabilities, while taxes have a modest effect due to government incentives and export rebates (TDAP, 2025).

- **Hausman Test**

Table 5.12: Hausman Test

Test	Oil and Gas Sector	Textile Sector	Paperboard & Product	IT Sector	Automobile	Cement	Electrical	Textiles Sector	Food Sector	Fertilizer	Leather Sector	Glass	Pharma	Chemical	Tobacco	Engineering Sector	Power Sector
Chi-square	79.760	9.210	13.400	1.420	11.160	21.680	4.800	3.550	39.990	22.130	0.600	22.920	38.510	182.910	30.340	73.110	4.580
Probability	0.000	0.238	0.063	0.985	0.132	0.003	0.685	0.056	0.000	0.002	0.999	0.002	0.000	0.000	0.000	0.000	0.712

The Hausman test results indicate that the suitability of fixed or random effects varies across sectors. Sectors such as Oil & Gas ($\chi^2 = 79.76$, $p = 0.000$), Cement ($\chi^2 = 21.68$, $p = 0.003$), Food ($\chi^2 = 39.99$, $p = 0.000$), Fertilizer ($\chi^2 = 22.13$, $p = 0.002$), Pharma ($\chi^2 = 22.92$, $p = 0.002$), Chemical ($\chi^2 = 38.51$, $p = 0.000$), Tobacco ($\chi^2 = 182.91$, $p = 0.000$), Engineering ($\chi^2 = 30.34$, $p = 0.000$), and Power ($\chi^2 = 73.11$, $p = 0.000$) show significant p-values, indicating that a fixed effects model is appropriate. Conversely, sectors such as Textile ($p = 0.238$), Paperboard & Products ($p = 0.063$), IT ($p = 0.985$), Automobile ($p = 0.132$), Electrical & Cable ($p = 0.685$), Leather ($p = 0.999$), and Glass ($p = 0.712$) show insignificant results, suggesting that random effects are suitable. These findings imply that sectoral characteristics and firm-level heterogeneity are key in determining the appropriate econometric model for analyzing corporate tax effects in Pakistan. The Hausman test results indicate that the suitability of fixed or random effects varies across sectors. For instance, sectors such as sugar ($\chi^2 = 22.04$, $p = 0.0024$), food ($\chi^2 = 40.58$, $p = 0.0000$), fertilizer ($\chi^2 = 14.17$,

p = 0.0278), chemical (χ^2 = 21.01, p = 0.0038), tobacco (χ^2 = 182.91, p = 0.0000), and oil & gas (χ^2 = 27.93, p = 0.0002) sectors show significant p-values, indicating that a fixed effects model is appropriate. Conversely, sectors such as automobile (p = 0.1316), cement (p = 0.1316), cable & electrical (p = 0.8807), leather (p = 0.9938), pharma (p = 0.4101), and power (p = 0.8807) show insignificant results, suggesting that random effects are appropriate.

5.2.2 Impact of Corporate Tax Rate on Firm Performance (Significant Sectors Results)

Table 5.12: Corporate Tax Rate on Firm Performance for Significant Sectors

	Automobile	Fertilizer	Pharma Sector	Chemical Sector	Oil and Gas	Leather	IT Sector	Paper Sector	Cement	Sugar Sector	Electrical	Engineering	Glass	Tobacco	Food	Power	Textile
VARIABLES	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**	**ROA**
Corp-Tax-Exp	0.0735***	0.0198***	0.00324*	-0.00382*	-0.000983**	-0.0172**	-0.0104	-0.000235	-0.00019	0.000473	0.00145	-0.00112	-0.000788	0.00118	-0.00144	-0.000464	-0.000143
	-0.0266	-0.0045	-0.00195	-0.00199	-0.000456	-0.00676	-0.00111	-0.000925	-0.000478	-0.000305	-0.00287	-0.00315	-0.00065	-0.00244	-0.00208	-0.00172	-0.000585
ROE	2.070***	0.200***	0.00614	0.000827	-0.00110*	0.307***	0.0254	0.270***	0.139***	0.00293	0.00147	0.0104	0.0223	0.123***	0.0348***	0.00145	-0.000103
	-0.0422	-0.0363	-0.00759	-0.003	-0.000623	-0.0705	-0.0212	-0.0217	-0.0155	-0.00223	-0.00604	-0.0086	-0.0323	-0.0286	-0.0108	-0.00302	-0.00114
NP	-0.0044***	-0.00149	0.00482***	0.00951***	0.00355***	0.0186***	0.0116***	0.000158	0.00340***	0.00404***	0.00613***	0.0108***	0.00343***	0.00344*	0.0105***	0.00593***	0.00788***
	-0.00114	-0.00111	-0.000962	-0.00138	-0.000378	-0.00322	-0.000237	-0.00102	-0.000434	-0.000274	-0.00143	-0.00219	-0.000664	-0.00197	-0.00129	-0.00141	-0.000404
INR	-0.00360***	-0.000908	-0.000546	0.000796	-0.000904	0.00613	-0.0023	-0.00443**	0.00491***	-0.00102	-0.00704	0.00547	-0.00441**	-0.00058	0.00396	-0.00424	0.00124
	-0.00138	-0.00201	-0.00176	-0.00413	-0.00131	-0.00817	-0.00483	-0.00178	-0.00127	-0.000917	-0.00483	-0.00749	-0.00192	-0.00478	-0.00368	-0.00537	-0.00111
Size	0.0307*	-0.101**	0.00632	0.0528**	-0.0369**	-0.0303	0.142**	-0.0353**	-0.0324**	-0.0167	0.00526	-0.164***	0.0469*	0.0601	0.0379	0.0581***	0.0697***
	-0.0175	-0.0414	-0.0214	-0.0229	-0.0172	-0.0282	-0.071	-0.0171	-0.0158	-0.0132	-0.024	-0.0567	-0.0247	-0.0525	-0.0235	-0.019	-0.0131
Constant	-0.226**	0.585*	-0.0432	-0.333**	0.334**	0.198	-0.950*	0.296**	0.232**	0.111	-0.044	1.063***	-0.279*	-0.372	-0.276*	-0.438***	-0.474***
	-0.114	-0.325	-0.146	-0.147	-0.138	-0.17	-0.504	-0.117	-0.115	-0.0884	-0.154	-0.366	-0.162	-0.371	-0.154	-0.14	-0.0841
Observations	142	39	104	286	182	52	142	78	208	338	78	208	104	39	221	247	1,785
Number of id	11	3	8	22	14	4	11	6	16	26	6	16	8	3	17	19	119
R-squared	0.953	0.872	0.384	0.1259	0.393	0.6076	0.188	0.492	0.658	0.461	0.284	0.1568	0.355	0.5798	0.2771	0.6963	0.216
F-Statistic	2545.75	42.38	14.35	59.37	21.09	89.93	5.85	251.49	22.90	52.53	33.5	46.08	21.08	8.55	110.24	44.48	636.57
Prob. (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0333	0.0092	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

In the Automobile Sector, the regression results indicate that Corporate Tax Expense (Corp-Tax-Exp) has a positive and highly significant impact on ROA (0.0735***, SE = 0.0266), suggesting that more profitable firms contribute higher taxes while maintaining strong returns. ROE is also strongly positive (2.070***, SE = 0.0422), reflecting that firms with higher equity efficiency generate better profitability. Net Profit (NP) shows a small but significant negative coefficient (–0.0044***, SE = 0.00114), while Interest Rate (INR) negatively affects ROA (–0.00360***, SE = 0.00138), highlighting the dampening effect of borrowing costs. Firm Size has a marginally positive effect (0.0307*, SE = 0.0175), and the model constant is negative (–0.226**, SE = 0.114). The model demonstrates a very high explanatory power with $R^2 = 0.953$, F-Statistic = 2545.75, and a statistically significant overall model (Prob. F-stat = 0.0000) based on 142 observations across 11 firms. These results imply that profitability, equity efficiency, and tax contributions are closely interlinked in the automobile sector, while interest expenses can slightly suppress returns, consistent with findings from Pakistan Automotive Manufacturers Association (PAMA, 2024) regarding financing and operational costs.

In the Fertilizer Sector, Corp-Tax-Exp (0.0198***), ROE (0.200***), and firm size (–0.101**) significantly affect ROA. Net Profit and Interest Rate are insignificant. $R^2 = 0.872$, $F = 42.38$, $p < 0.001$, indicating high explanatory power. Positive tax–profit effects indicate that larger, profitable firms contribute more taxes, while the negative size effect reflects potential diseconomies in large fertilizer firms. The sector relies heavily on government subsidies and regulated input costs; National Fertilizer Development Centre (NFDC, 2024) notes that efficiency gains and profitability are sensitive to policy-driven support rather than tax incentives alone.

The Pharma Sector shows that Corp-Tax-Exp (0.00324*, SE = 0.00195) and Net Profit (0.00482***) significantly enhance ROA. Other variables, including ROE, size, and interest rate, are insignificant. $R^2 = 0.384$, $F = 14.35$, $p < 0.001$. This suggests that profitability and tax contributions are positively linked, consistent with the sector's growth being demand- and innovation-driven. Pakistan Pharma Bureau (2023) indicates that pharmaceutical firms benefit from patent protections, regulatory support, and R&D tax incentives, which reduce the direct burden of taxes while boosting ROA.

In the chemical Sector, Net Profit (0.00951***) is a strong positive driver of ROA, while Corp-Tax-Exp (–0.00382*) has a small negative effect. Size positively influences ROA (0.0528**),

while ROE and interest rate are insignificant. $R^2 = 0.1259$, $F = 59.37$, $p < 0.001$. The modest negative effect of taxes and positive leverage of size reflects capital-intensive operations, where large plant and machinery investments raise fixed costs but also support efficiency gains. Reports by the Competition Commission of Pakistan (2025) highlight that energy prices and regulatory compliance costs further affect profitability.

In Oil & Gas Sector, Corp-Tax-Exp (–0.000983**) and ROE (–0.00110*) negatively affect ROA, while Net Profit is positive (0.00355***). Size is negative (–0.0369**), and interest rate is insignificant. $R^2 = 0.393$, $F = 21.09$, $p < 0.001$. This shows that taxation slightly reduces profitability for capital-intensive oil firms, consistent with integrated operations where efficiency and scale dominate. Pakistan Oil & Gas Regulatory Authority (OGRA, 2024) reports confirm that firm performance is driven more by long-term contracts, government-backed projects, and operational efficiency than by marginal tax fluctuations.

In Leather Sector, Corp-Tax-Exp (–0.0172**) and ROE (0.307***) are significant, while Net Profit (0.0186***) is also positive. Size and interest rate are not significant. $R^2 = 0.6076$, $F = 89.93$, $p < 0.001$. This indicates that profitable leather firms contribute more taxes, but higher tax obligations slightly reduce ROA. Smaller firms dominate the sector, benefiting from lower taxable income thresholds and occasional exemptions, as reported by the Pakistan Leather Industry Development Board (PLIDB, 2023). The strong positive link of ROE and Net Profit with ROA highlights the importance of operational efficiency and margin management in the leather industry.

Pakistan's IT industry has been rapidly expanding export revenues and contributing to service-led growth, with cumulative IT exports rising year-on-year and helping strengthen firm operational performance (as captured by ROA). In this context, larger and more profitable IT firms tend to show higher ROA, as indicated by the significant positive effects of firm size ($\beta = 0.142$, $p < 0.05$) and net profit ($\beta = 0.0116$, $p < 0.01$). Corporate tax and interest rates are not significant drivers in this sector's asset performance. The model's moderate explanatory power ($R^2 = 0.188$, $F = 5.85$, $p < 0.01$) suggests that IT value creation is influenced by global demand and export expansion supported by regulatory reforms such as enhanced foreign exchange retention frameworks. (PSEB, 2025).

The paper sector is part of Pakistan's large-scale manufacturing (LSM), which showed mixed production trends but overall positive activity in segments such as paper and board (PBS, 2023).

Here, ROE ($\beta = 0.270$, $p < 0.01$) significantly influences ROA, highlighting that shareholder returns are critical for firm performance. The negative size effect ($\beta = -0.0353$, $p < 0.05$) may reflect scale inefficiencies in a traditionally slower-growing LSM segment. Interest rates also have a significant negative influence, possibly due to capital cost sensitivities in manufacturing. With strong explanatory power ($R^2 = 0.492$, $F = 251.49$, $p < 0.001$), these results align with the sector's reliance on both internal performance metrics and financing costs.

Pakistan's cement industry is a major contributor to construction and infrastructure development, consistently reporting capacity expansions and robust dispatch levels (Ministry of Industries & Production, 2024). In this sector, ROE ($\beta = 0.139$, $p < 0.01$) and net profit ($\beta = 0.00340$, $p < 0.01$) significantly affect ROA, whereas firm size shows a modest negative effect ($\beta = -0.0324$, $p < 0.05$). The high explanatory power ($R^2 = 0.658$, $F = 22.90$, $p < 0.001$) indicating that profitability and operational efficiency are the main drivers of performance in Pakistan's cement sector (All Pakistan Cement Manufacturers Association, 2024).

The regression results of sugar sectors show that net profit ($\beta = 0.00404$, $p < 0.01$) is the only statistically significant driver of ROA in the sugar sector, indicating that operational profitability strongly determines asset efficiency. Other variables including corporate tax expense ($\beta = 0.000473$), ROE ($\beta = 0.00293$), interest rate ($\beta = -0.00102$), and firm size ($\beta = -0.0167$) are statistically insignificant. The model explains a substantial portion of the variation in firm performance ($R^2 = 0.461$, $F = 52.53$, $p < 0.001$). These findings suggest that, in Pakistan's sugar industry, profitability primarily depends on production efficiency, sugarcane procurement costs, and market conditions rather than taxation or firm scale. This aligns with PSMA reports emphasizing that rising sugarcane prices, surplus stocks, and regulatory export decisions largely shape industry profitability and financial outcomes (Pakistan Sugar Mills Association, 2024).

In the cables and electrical goods sector, net profit ($\beta = 0.00613$, $p < 0.01$) shows a positive and statistically significant impact on ROA, indicating that firms with higher profitability achieve better asset utilization. Other variables, including corporate tax expense ($\beta = 0.00145$), ROE ($\beta = 0.00147$), interest rate ($\beta = -0.00704$), and firm size ($\beta = 0.00526$), are statistically insignificant, suggesting that taxation, financing conditions, and scale do not directly influence asset returns in this sector. The model has moderate explanatory power ($R^2 = 0.284$) and is statistically significant ($F = 33.50$, $p < 0.001$), indicating that the variables jointly explain a meaningful portion of

performance variation. This result is consistent with industry reports showing that Pakistan's electrical goods and cable manufacturers are primarily driven by construction activity and infrastructure demand, where operational profitability and production efficiency are key determinants of firm performance (Pakistan Engineering Council, 2023; State Bank of Pakistan, 2024).

The regression results for the engineering sector indicate that net profit ($\beta = 0.0108$, $p < 0.01$) has a positive and statistically significant impact on ROA, suggesting that firms with higher profitability achieve better asset utilization. In contrast, firm size ($\beta = –0.164$, $p < 0.01$) shows a significant negative relationship with ROA, implying that larger firms may experience higher operational costs or inefficiencies. Other variables corporate tax expense ($\beta = –0.00112$), ROE ($\beta = 0.0104$), and interest rate ($\beta = 0.00547$) are statistically insignificant, indicating limited influence on firm performance in this sector. The model explains 15.7% of the variation in ROA ($R^2 = 0.1568$) and is statistically significant overall ($F = 46.08$, $p < 0.001$). This pattern aligns with sector reports highlighting that Pakistan's engineering industry faces cost pressures and energy constraints, making operational efficiency and profitability key drivers of performance rather than firm scale or tax factors (Engineering Development Board, 2023; PBS, 2023).

The regression results indicate that net profit ($\beta = 0.00343$, $p < 0.01$) and firm size ($\beta = 0.0469$, $p < 0.10$) positively influence ROA, suggesting that operational profitability and scale advantages support performance. In contrast, corporate tax expense ($\beta = –0.000788$) and interest rate ($\beta = –0.00441$, $p < 0.05$) show negative or insignificant effects, indicating limited impact of taxation and financing costs on asset efficiency. The model explains a moderate portion of variation in ROA ($R^2 = 0.355$) and is statistically significant ($F = 21.08$, $p < 0.001$). This aligns with reports highlighting that Pakistan's glass and ceramics industry relies on operational efficiency and cost management to remain competitive amid high energy costs and capacity constraints (Pakistan Council of Scientific and Industrial Research [PCSIR], 2024; National Bank of Pakistan, 2023).

In the tobacco sector, ROE ($\beta = 0.123$, $p < 0.01$) and net profit ($\beta = 0.00344$, $p < 0.10$) significantly drive ROA, indicating that firms with higher shareholder returns and profitability achieve better asset performance. Corporate tax expense ($\beta = 0.00118$), interest rate ($\beta = –0.000577$), and firm size ($\beta = 0.0601$) are not significant, suggesting that operational efficiency rather than tax or scale determines performance. The model explains a substantial portion of variation ($R^2 = 0.5798$) and

is statistically valid ($F = 8.55$, $p < 0.001$). These results align with Pakistan's tobacco sector reports, which highlight profitability and market efficiency as key drivers of firm performance (Pakistan Bureau of Statistics, 2023).

In the food and personal care sector, ROE ($\beta = 0.0348$, $p < 0.01$) and net profit ($\beta = 0.0105$, $p < 0.01$) significantly enhance ROA, indicating that both shareholder returns and operational profitability drive firm performance. Corporate tax expense ($\beta = –0.00144$), interest rate ($\beta = 0.00396$), and firm size ($\beta = 0.0379$) are not significant. The model explains a moderate portion of ROA variation ($R^2 = 0.2771$) and is statistically valid ($F = 110.24$, $p < 0.001$). These results align with sector reports highlighting that performance in food and personal care firms in Pakistan is primarily determined by efficient operations and profit generation rather than tax or financing factors (Pakistan Bureau of Statistics, 2023).

Power Sector. In the power sector, net profit ($\beta = 0.00593$, $p < 0.01$) and firm size ($\beta = 0.0581$, $p < 0.01$) significantly enhance ROA, indicating that operational efficiency and scale are key drivers of performance. Corporate tax expense, ROE, and interest rate are not significant, suggesting that taxation and financing costs have limited short-term impact on asset profitability. The model explains a substantial portion of variation in ROA ($R^2 = 0.6963$) and is statistically significant ($F = 44.48$, $p < 0.001$). These results align with reports highlighting that Pakistan's power sector performance is driven by efficient generation, capacity expansion, and large-scale operations (NEPRA, 2024).

In the Textile sector, the regression results reveal that net profit (NP) has a positive and statistically significant effect on ROA ($\beta = 0.00788$, $p < 0.01$), indicating that firms with stronger profitability generate better returns on assets. This aligns with Pakistan's textile industry performance, where export growth especially in value-added segments like knitwear and ready-made garments has supported earnings despite broader economic challenges (Pakistan Bureau of Statistics, 2025). Additionally, firm size (Size) is also positively significant ($\beta = 0.0697$, $p < 0.01$), suggesting that larger textile firms benefit from economies of scale, better production capacity, and market access, which enhances operational performance. This is consistent with reports that the textile sector accounts for a significant share of manufacturing output, contributes to GDP, and captures large export markets, reinforcing the advantage of scale (Punjab Board of Investment & Trade, 2025; Pakistan Textile Council, 2025).

- **Hausman Test**

Table 5.13: Hausman Test

Test	Oil and Gas Sector	Paperboard & Product	IT Sector	Automobile	Sugar	Cement	Cables & Electrical	Textiles Sector	Food Sector	Fertilizer	Leather Sector	Glass	Pharma	Chemical	Tobacco	Engineering Sector	Power Sector
Chi-square	0.410	4.120	6.680	11.160	32.380	21.680	1.020	29.590	9.050	22.130	5.100	148.210	24.100	182.910	13.950	0.016	1.880
Probability	0.982	0.532	0.083	0.132	0.000	0.003	0.961	0.000	0.107	0.002	0.164	0.000	0.000	0.000	0.016	0.998	0.866

The Hausman test results show that the Chi-square (χ^2) statistic varies across sectors, indicating different model suitability for panel estimation. The Sugar sector ($\chi^2 = 32.38$, $p = 0.000$), Cement sector ($\chi^2 = 21.68$, $p = 0.003$), Textiles sector ($\chi^2 = 29.59$, $p = 0.000$), Fertilizer sector ($\chi^2 = 22.13$, $p = 0.002$), Glass sector ($\chi^2 = 148.21$, $p = 0.000$), Pharma sector ($\chi^2 = 24.10$, $p = 0.000$), Chemical sector ($\chi^2 = 182.91$, $p = 0.000$), and Tobacco sector ($\chi^2 = 13.95$, $p = 0.016$) show statistically significant results, leading to rejection of the null hypothesis and suggesting that the fixed effects model is more appropriate for these sectors.

In contrast, the Oil and Gas sector ($\chi^2 = 0.41$, $p = 0.982$), Paperboard & Product sector ($\chi^2 = 4.12$, $p = 0.532$), IT sector ($\chi^2 = 6.68$, $p = 0.083$), Automobile sector ($\chi^2 = 11.16$, $p = 0.132$), Cables & Electrical sector ($\chi^2 = 1.02$, $p = 0.961$), Food sector ($\chi^2 = 9.05$, $p = 0.107$), Leather sector ($\chi^2 = 5.10$, $p = 0.164$), Engineering sector ($\chi^2 = 0.016$, $p = 0.998$), and Power sector ($\chi^2 = 1.88$, $p = 0.866$) do not reject the null hypothesis, indicating that the random effects model is more suitable. Economically, this suggests that firm-specific effects are correlated with explanatory variables in some sectors, while in others the random effects assumption remains valid.

5.2.3 Impact of Effective Tax Rate on Non-Current Assets

Table 5.14: Effective Tax Rate on Non-Current Assets

VARIABLES	Sugar	Pharma Sector	Oil	IT Sector	Glass & Ceramics	Paperboard & Product	Automobile Sectors	Cement	Cables and Electrical Goods Sector	Textile composite sector	Food and personal care product sector	Engineering	Tobacco	Fertilizer	Leather	Chemical	Power
	Non-CA	**Non-CA**	**Non-CA**	Non-CA	Non-CA	Non-CA	Non-CA	Non-CA	Non-CA	Non-CA	Non-Ca	Non-CA	Non-CA	Non-CA	Non-CA	Non-CA	Non-CA
ETR	0.126***	-0.231***	-0.0312**	-0.0108	-0.000945	-0.117	-0.0621	0.000607	0.0023	0.0068	0.00425	0.00409	0.0199	0.0027	-0.00527	0.0104	-0.101
	-0.0109	-0.0763	-0.0136	-0.048	-0.0174	-0.0759	-0.0435	-0.00303	-0.0518	-0.0103	-0.0416	-0.0112	-0.136	-0.00388	-0.151	-0.0216	-0.0955
D/E	-0.00098	0.00353	-0.000199	0.032	0.0162	0.0368**	-0.00935	0.0229***	0.000982	-0.000377*	0.00289	0.00316	-0.058**	-0.000147	0.479***	0.000311	-0.0251*
	-0.00108	-0.00649	-0.000505	-0.088	-0.0123	-0.017	-0.0175	-0.00611	-0.00341	-0.000216	-0.0126	-0.00332	-0.0292	-0.012	-0.122	-0.000623	-0.0139
INR	0.00412	0.00772	0.0203*	-0.018	-0.00625	0.0255***	0.0189	-0.00798***	-0.0164	0.00408	-0.0621***	-0.00854	0.0407**	0.0233***	0.00336	0.0222**	3.106***
	-0.00418	-0.0176	-0.0123	-0.087	-0.00413	-0.00682	-0.106	-0.00303	-0.0228	-0.00391	-0.0225	-0.0124	-0.0194	-0.00695	-0.0268	-0.00908	-0.243
Size	2.277***	1.779***	2.066***	2.53***	2.257***	2.467***	-0.00184	2.312***	2.336***	2.458***	2.896***	2.318***	2.567***	1.831***	2.094***	2.470***	-0.337***
	-0.0578	-0.262	-0.135	-0.084	-0.0495	-0.0625	-0.0157	-0.0322	-0.198	-0.0466	-0.218	-0.132	-0.0779	-0.122	-0.344	-0.0932	-0.0436
Constant	-0.364	2.326	0.762	-2.32***	-0.182	-1.821***	17.17***	-0.400*	-1.376	-1.564***	-5.035***	-1.11	-2.922***	3.170***	-0.662	-1.845***	-7.20***
	-0.389	-1.792	-1.092	-0.606	-0.335	-0.435	-0.733	-0.237	-1.336	-0.299	-1.484	-0.863	-0.56	-0.976	-2.071	-0.605	-1.836
Observations	338	104	182	143	104	78	221	208	78	1,785	221	208	39	39	52	286	170
Number of id	26	8	14	11	8	6	17	16	6	119	17	16	3	3	4	22	16
F-Statistic	0.8076	0.3841	0.5092	0.7225	0.958	0.9334	0.0097	0.9586	0.5368	0.6331	0.4618	0.5764	0.902	0.894	0.593	0.6076	0.635
Prob. (F-stat)	1592.84	14.35	245.84	912.28	2271.96	1610.23	2.5	5520.79	148.9	716.84	198.23	316.98	1165.3	67.51	16.06	708.8	65.28
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6438	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

In the Sugar sector, the Effective Tax Rate (ETR) has a positive and highly significant effect on Non-CA (0.126***), indicating that firms with higher tax obligations tend to maintain larger non-current asset bases. This reflects the capital-intensive nature of the sugar industry, where investments in mills, machinery, and storage facilities are necessary for production expansion. Industry reports from the Pakistan Sugar Mills Association indicate that sugar mills regularly invest in plant modernization and processing capacity, which increases long-term asset holdings. Firm size also shows a strong positive and significant relationship (2.277***), suggesting that larger firms maintain greater fixed assets, while leverage (D/E) and interest rate (INR) remain statistically insignificant. (Pakistan Sugar Mills Association, 2023).

In the Pharma sector, ETR shows a negative and significant relationship with Non-CA (-0.231***), suggesting that higher tax burdens may discourage long-term capital investment. Pharmaceutical firms often face high regulatory and compliance costs, which may reduce their capacity to expand physical assets when tax liabilities increase. According to industry insights from the Pakistan Pharmaceutical Manufacturers Association, pharmaceutical companies allocate substantial resources toward regulatory approvals, quality assurance, and research activities, which may limit additional capital expenditures under higher tax pressure. Firm size remains positively significant (1.779***), indicating that larger firms are better able to sustain investment in production plants and research facilities. (Pakistan Pharmaceutical Manufacturers Association, 2022).

For the Oil sector, ETR also shows a negative and significant effect (-0.0312**), implying that higher effective taxation slightly reduces firms' non-current asset accumulation. This aligns with the operational environment of the oil industry, where taxation and regulatory pricing structures can influence investment decisions. Reports from the Oil Companies Advisory Council highlight that taxes, levies, and regulatory charges significantly affect investments in refining capacity, storage infrastructure, and distribution networks. Additionally, the interest rate (INR) variable shows a positive and weakly significant impact (0.0203*), suggesting that financing conditions influence long-term asset investment decisions. Firm size again remains strongly positive and significant (2.066***), confirming that larger oil companies maintain extensive infrastructure assets due to the sector's capital-intensive nature. (Oil Companies Advisory Council, 2023).

In the IT sector, firm size (2.53***) shows a strong positive and highly significant effect on non-current assets, indicating that larger IT firms utilize assets more efficiently due to economies of scale and better access to technology and financing. The ETR (-0.0108) and D/E (0.032) coefficients are insignificant, suggesting that taxation and leverage have minimal impact on asset investment. Interest rates (INR = -0.018) also show no significant effect, reflecting the sector's resilience to macroeconomic fluctuations. These results align with findings from the Pakistan Software Houses Association, which emphasize that large IT firms benefit from technological capacity, skilled workforce, and export opportunities, enabling consistent asset utilization regardless of tax or debt levels. (Pakistan Software Houses Association, 2023).

In the Glass & Ceramics sector, firm size (2.257***) has a strong positive and highly significant impact on non-current assets, indicating that larger firms achieve greater asset efficiency and productivity due to economies of scale and better access to capital. The Effective Tax Rate (ETR = -0.000945) and Debt-to-Equity ratio (D/E = 0.0162) are statistically insignificant, suggesting that taxation and leverage have little influence on asset investment decisions in this sector. Interest rates (INR = -0.00625) also show no significant effect, reflecting the sector's limited sensitivity to macroeconomic financing conditions. These findings are consistent with reports from the Pakistan Bureau of Statistics, which indicate that large glass manufacturing firms in Pakistan rely primarily on internal resources and scale efficiencies to maintain production and invest in capital assets, while external debt and taxation play minor roles in operational decisions. (PBS, 2022).

In the Paperboard & Product sector, firm size (2.467***) and Debt-to-Equity ratio (0.0368**) have positive and significant effects on non-current assets, indicating that larger firms with moderate leverage efficiently expand capital investments. The Effective Tax Rate (ETR = -0.117) negatively affects asset investment, suggesting that higher taxes constrain reinvestment in machinery and plant. Interest rates (INR = 0.0255***) show a positive impact, reflecting that firms in this sector can absorb financing costs due to stable demand and pricing. These results are consistent with the All Pakistan Paperboard Mills Association, which notes that large, well-capitalized paperboard firms rely on both internal funds and external financing to support continuous expansion and modernization while tax burdens can reduce available capital. (APPMA, 2023).

In the Automobile sector, the Effective Tax Rate (ETR = -0.0621) and Debt-to-Equity ratio (D/E = -0.00935) are not statistically significant, indicating that taxation and leverage have minimal

impact on investment in non-current assets. Interest rates (INR = 0.0189) also show no significant effect, suggesting that financing costs do not strongly influence asset decisions. Firm size, while showing a negligible coefficient (-0.00184), implies that scale effects are limited in this sector. These results reflect industry characteristics noted by the Pakistan Automotive Manufacturers Association, where capital investments are largely driven by market demand and production capacity rather than taxation or debt levels. (PAMA, 2023).

In the Cement sector, firm size (2.312***) and debt-to-equity ratio (0.0229***) show significant positive effects on non-current assets, indicating that larger firms and those with higher leverage can invest more effectively in capital-intensive projects. In contrast, ETR (0.000607) and interest rates (INR = -0.00798***) are largely insignificant or slightly negative, suggesting that taxation has minimal impact, while higher borrowing costs can slightly constrain investment. These results align with the All Pakistan Cement Manufacturers Association, which notes that cement firms rely on debt financing for expansion and benefit from economies of scale, while investment is moderately sensitive to interest rate fluctuations. (APCMA, 2023).

In the Cables and Electrical Goods sector, firm size (2.336***) has a strong positive and highly significant effect on non-current assets, indicating that larger firms achieve better asset utilization through economies of scale and stronger operational capacity. In contrast, ETR (0.00230), D/E (0.000982), and INR (-0.0164) are all insignificant, suggesting that taxation, leverage, and interest rates have minimal impact on investment in non-current assets. The model's R-squared of 0.5368 and significant F-statistic (148.90, p = 0.0000) indicate that the explanatory variables provide a moderate fit, highlighting that firm size is the key determinant of asset performance in this sector. (Pakistan Electrical & Electronics Merchents Association, 2023).

In the Textile Composite sector, the regression results indicate that firm size has a strong and highly significant positive impact on non-current assets (Size = 2.458***), suggesting that larger textile firms utilize assets more efficiently due to economies of scale, better access to financing, and more advanced production capabilities. The Debt-to-Equity ratio shows a small but significant negative effect (-0.000377*), implying that higher leverage may slightly reduce asset efficiency, likely because excessive debt increases financial costs and operational risk, consistent with observations from the All Pakistan Textile Mills Association. The Effective Tax Rate (ETR = 0.00680) and interest rate (INR = 0.00408) are statistically insignificant, indicating that taxation

and borrowing costs have minimal influence on non-current asset investment in this sector. The high R-squared (0.6331) and significant F-statistic (716.84, p = 0.0000) suggest that the model explains a substantial portion of variation in asset performance, reflecting that firm-specific characteristics like size and financial structure are key drivers of investment behavior in Pakistan's textile industry. (All Pakistan Textile Mills Association, 2022).

In the Food and Personal Care Products sector, firm size (2.896***) has a strong positive and highly significant impact on non-current assets, indicating that larger firms efficiently utilize assets due to economies of scale and better operational capacity. Interest rates (INR = -0.0621***) show a significant negative effect, suggesting that higher borrowing costs reduce investment in long-term assets. ETR (0.00425) and D/E (0.00289) are insignificant, implying that taxation and leverage have minimal influence on asset accumulation. These results reflect sector characteristics highlighted by the Pakistan Bureau of Statistics, where large food firms benefit from scale and operational efficiency, while investment remains sensitive to financing costs. (Pakistan Bureau of Statistics, 2022).

In the Engineering sector, firm size (2.318***) has a strong and highly significant positive effect on non-current assets, indicating that larger firms efficiently utilize resources due to economies of scale and better operational capacity. The ETR (0.00409), D/E (0.00316), and INR (-0.00854) coefficients are all insignificant, suggesting that taxation, leverage, and interest rates have minimal impact on asset investment in this sector. The high R-squared (0.5764) and significant F-statistic (316.98, p = 0.0000) indicate that the model explains a substantial portion of variation in asset performance, consistent with sector reports highlighting that operational efficiency and scale are primary drivers of investment outcomes in Pakistani engineering firms. (Pakistan Engineering Council, 2023).

In the Tobacco and Fertilizer sectors, firm size shows a strong positive and highly significant effect on non-current assets (Tobacco: 2.567***; Fertilizer: 1.831***), indicating that larger firms utilize assets more efficiently due to scale advantages and stronger capital bases. The Effective Tax Rate (ETR) is insignificant in both sectors, suggesting taxation does not strongly affect investment in fixed assets. Debt-to-equity has a negative significant effect in Tobacco (-0.058**), implying that higher leverage may reduce asset efficiency, while it is insignificant in Fertilizer. Interest rates positively affect both sectors (Tobacco: 0.0407**; Fertilizer: 0.0233***), indicating firms can

maintain investment despite rising borrowing costs. High R-squared values (Tobacco: 0.902; Fertilizer: 0.894) and significant F-statistics confirm model robustness. These findings align with industry insights from the Fertilizer Manufacturers of Pakistan Advisory Council and Pakistan Tobacco Board, emphasizing that firm size and stable market demand drive asset investment more than taxes or leverage. (Fertilizer Manufacturers of Pakistan Advisory Council, 2022; Pakistan Tobacco Board, 2023).

In the Leather sector, leverage (D/E = 0.479***) and firm size (2.094***) have strong positive and significant effects on non-current assets, indicating that larger firms and those with higher debt efficiently invest in long-term assets. ETR (-0.00527) and interest rates (INR = 0.00336) are insignificant, suggesting that taxation and financing costs have minimal impact. The constant is also insignificant (-0.662). The model explains 59.3% of the variation in non-current assets (R^2 = 0.593) with a significant overall F-statistic (16.06, p = 0.000), highlighting that firm-specific characteristics like size and leverage drive asset performance in this sector.

In the Chemical sector, firm size (2.470***) and interest rate (INR = 0.0222**) positively affect non-current assets, while ETR (0.0104) and D/E (0.000311) are insignificant, showing that investment is largely influenced by scale and sensitivity to borrowing costs rather than taxes or capital structure. The constant (-1.845***) is significant and negative, reflecting baseline sectoral constraints. The model explains 60.8% of asset variation (R^2 = 0.6076) with a highly significant F-statistic (708.80, p = 0.000), indicating robust sectoral determinants of asset investment.

In the Power sector, the regression results indicate that firm size has a significant negative impact on non-current assets (-0.337***), suggesting that larger power firms may face operational inefficiencies, regulatory constraints, or higher administrative costs that reduce effective asset utilization. The Debt-to-Equity ratio also shows a small negative effect (-0.0251*), indicating that higher leverage slightly constrains investment or asset productivity, possibly due to the sector's capital-intensive nature and sensitivity to financing costs. In contrast, the Interest Rate (INR = 3.106***) exhibits a strong positive and highly significant impact, implying that power firms are able to pass financing costs to consumers through regulated tariffs, allowing continued investment in assets despite macroeconomic fluctuations. The Effective Tax Rate (ETR = -0.101) is not statistically significant, suggesting that taxation does not strongly influence asset allocation decisions in this sector. Overall, these results highlight that regulatory frameworks, firm size, and

financing structures play critical roles in shaping asset performance in Pakistan's power industry. (NEPRA, 2023).

- **Hausman Test (Insignificant Sectors)**

Table 5.15: Hausman Test

Test	Sugar Sector	Pharma Sector	Oil Sector	IT Sector	Product	Automobile	Cement	Cables & Electrical	Textile	Glass & Ceramics	Food & Personal Care Product	Engineering	Fertilizer	Leather	Chemical	Tobacco
Chi-square	1.87	24.1	0.41	2.99	0.05	3.21	4.22	0.66	35.46	0.43	0.58	1.47	130.71	14.24	0.28	7.71
Probability	0.760	0.000	0.982	0.560	0.999	0.522	0.378	0.956	0.000	0.958	0.965	0.831	0.000	0.006	0.991	0.103

The Hausman test results indicate that the suitability of panel data models varies across sectors. For most sectors, including Sugar ($\chi^2 = 1.87$, $p = 0.760$), Oil ($\chi^2 = 0.41$, $p = 0.982$), IT ($\chi^2 = 2.99$, $p = 0.560$), Paperboard ($\chi^2 = 0.05$, $p = 0.999$), Automobile ($\chi^2 = 3.21$, $p = 0.522$), Cement ($\chi^2 = 4.22$, $p = 0.378$), Cables & Electrical ($\chi^2 = 0.66$, $p = 0.956$), Glass & Ceramics ($\chi^2 = 0.43$, $p = 0.958$), Food & Personal Care Product ($\chi^2 = 0.58$, $p = 0.965$), Engineering ($\chi^2 = 1.47$, $p = 0.831$), Leather ($\chi^2 = 14.24$, $p = 0.006$), Chemical ($\chi^2 = 0.28$, $p = 0.991$), and Tobacco ($\chi^2 = 7.71$, $p = 0.103$), the p-values exceed 0.05. This indicates failure to reject the null hypothesis, suggesting that unobserved firm-specific effects are not correlated with the regressors, and the random effects model is appropriate for these sectors.

In contrast, the Pharma sector ($\chi^2 = 24.1$, $p = 0.000$), Textile sector ($\chi^2 = 35.46$, $p = 0.000$), and Fertilizer sector ($\chi^2 = 130.71$, $p = 0.000$) show highly significant Chi-square statistics, leading to rejection of the null hypothesis.

5.2.4 Impact of Effective Tax Rate on Working Capital

Table 5.16: Effective Tax Rate on Working Capital

VARIABLES	IT Sector Working Capital	Paperboard Sector Working Capital	Automobiles Working Capital	Sugar Sector Working Capital	Cement Sector Working Capital	Cable Sector Working Capital	Textiles Sectors Working Capital	Food Sectors Working Capital	Engineering Sectors Working Capital	Fertilizer Sector Working Capital	Leather Sector Working Capital	Pharma Sector Working Capital	Chemical Sector Working Capital	Tobacco Sector Working Capital	Oil & Gas Working Capital	Power Working Capital
ETR	1.109	7.192***	0.00625	-0.321	0.114	-0.14	-0.00198	-0.514	-0.058	-0.575	0.615	-0.124	-0.029	1.499	-0.164	-0.135
	-1.216	-2.694	-0.0643	-0.504	-0.309	-0.814	-0.0045	-0.335	-0.177	-0.452	-1.711	-0.656	-0.404	-4.616	-0.261	-0.222
IR	0.0278	-0.0361	0.0403	-0.118	0.944***	0.685*	-0.00758***	-0.154	-0.0238	-3.028***	0.530*	-0.235	-0.214	0.21	0.101	0.239
	-2.195	-0.245	-0.0256	-0.192	-0.308	-0.354	-0.00178	-0.181	-0.195	-0.804	-0.303	-0.152	-0.17	-0.659	-0.236	-0.166
SIZE	4.109	1.940**	0.722**	-7.26**	5.627**	8.209***	0.00994	-4.349***	1.58	3.569	-7.923**	-0.578	1.003	-2.059	-2.716	3.473*
	-2.855	-0.963	-0.298	-2.917	-2.72	-1.37	-0.0171	-1.653	-1.958	-10.39	-3.891	-2.254	-1.759	-2.643	-2.618	-1.831
D/E	-0.193	-3.539***	-0.0349	0.00934	-1.867***	-0.0124	-7.19E-05	-0.438***	-0.042	2.689**	-2.12	-0.321***	-0.00173	-3.482***	-0.00143	0.00255
	-2.203	-0.403	-0.0261	-0.0495	-0.619	-0.0521	-9.90E-05	-0.101	-0.0523	-1.049	-1.384	-0.0557	-0.0116	-0.991	-0.00969	-0.00842
Constant	-27.25	1.793	10.62***	45.42**	-40.49**	-47.63***	16.28***	35.87***	-5.48	-25.63	53.61**	17.88	-3.677	26.49	23.87	-20.62
	-20.65	-6.82	-2.036	-19.54	-19.85	-9.281	-0.111	-11.04	-12.74	-84.36	-23.42	-15.4	-11.41	-18.99	-21.12	-14.04
Observations	143	78	221	338	208	78	1,785	221	208	39	52	104	286	39	182	247
Number of Firms	11	6	17	26	16	6	119	17	16	3	4	8	22	3	14	19
R-squared	0.1264	0.9735	0.049	0.0203	0.1249	0.1229	0.0227	0.1078	0.0049	0.3435	0.206	0.298	0.0102	0.274	0.0283	0.0317
F-Statistic	3.15	98.02	2.57	1.59	25.15	39.83	61.5	28.29	1.5	23.86	2.85	9.76	2.29	12.88	1.9	5.36
Prob. (F-stat)	0.5328	0	0.0395	0.1763	0	0	0	0	0.8275	0.0001	0.0348	0	0.6831	0.0119	0.7549	0.2524

Note: The astarik *** indicates p<0.01, ** indicates p<0.05, * indicates p<0.1

In the IT sector, the regression results for working capital show that none of the variables ETR (1.109), Interest Rate (0.0278), Size (4.109), or D/E ratio (-0.193) are statistically significant, and the overall model has low explanatory power ($R^2 = 0.1264$, $F = 3.15$, $p = 0.5328$). This suggests that taxation, firm size, leverage, and interest rates do not meaningfully influence working capital in IT firms, likely due to the sector's reliance on intangible assets, flexible financing, and technology-driven operations rather than large-scale physical capital investment. (Pakistan Software Houses Association, 2023).

In the Paperboard & Product sector, working capital is strongly influenced by the Effective Tax Rate (ETR = 7.192***) and firm size (SIZE = 1.940**), both showing positive and significant effects, indicating that higher taxes and larger firm size are associated with increased working capital, likely due to retained earnings and greater operational capacity. The Debt-to-Equity ratio (D/E = -3.539***) has a significant negative impact, suggesting that higher leverage reduces available working capital, consistent with the sector's reliance on internal funds for liquidity management. Interest rates (IR = -0.0361) and the constant term are insignificant, implying minimal effect from borrowing costs or baseline factors. Overall, the high R-squared (0.9735) and significant F-statistic (98.02, $p = 0.000$) confirm the model's strong explanatory power for working capital in this sector.

In the Automobile sector, working capital is significantly influenced by firm size (0.722**), indicating that larger firms manage current assets more efficiently, likely due to better operational control and resource allocation. The ETR (0.00625), interest rate (0.0403), and D/E (-0.0349) coefficients are insignificant, suggesting that taxation, financing costs, and leverage have minimal impact on short-term asset management. The model shows low explanatory power ($R^2 = 0.049$), but the F-statistic (2.57, $p = 0.0395$) indicates overall significance, implying that firm size is the primary driver of working capital performance in this sector.

In the Sugar sector, working capital is significantly affected by firm size (-7.26**, $p < 0.05$), indicating that larger firms tend to hold lower relative working capital, possibly due to more efficient inventory and receivables management. ETR (-0.321), interest rate (-0.118), and D/E (0.00934) are insignificant, suggesting that taxation, financing costs, and leverage have minimal impact on short-term asset management in this sector. The low R-squared (0.0203) and non-significant F-statistic (1.59, $p = 0.1763$) indicate that other unobserved factors may drive working

capital decisions in sugar firms, consistent with industry observations that operational cycles and commodity price fluctuations play a larger role than financial structure or taxation in managing liquidity. (All Pakistan Sugar Mills Association, 2023).

In the Cement sector, the regression results for working capital show that interest rate (IR = 0.944***) and firm size (SIZE = 5.627**) have a positive and significant impact, indicating that larger firms and those facing higher financing costs tend to maintain higher working capital, likely to ensure operational liquidity and buffer against market fluctuations. The Effective Tax Rate (ETR = 0.114) is not statistically significant, suggesting that taxation does not materially influence short-term asset management in this sector. In contrast, the Debt-to-Equity ratio (D/E = -1.867***) and the constant term (-40.49**) are negative and significant, implying that higher leverage reduces available working capital, as debt obligations limit liquidity. These findings align with insights from the All Pakistan Cement Manufacturers Association, which notes that cement firms rely on internal liquidity for production continuity and that excessive debt constrains their operational flexibility. The model explains a modest portion of the variation in working capital (R^2 = 0.1249), and the F-statistic (25.15, p = 0.0000) confirms overall model significance. (APCMA, 2023).

In the Cables & Electrical Goods sector, working capital is strongly influenced by firm size (8.209***), indicating that larger firms efficiently manage short-term assets and liabilities due to better operational capacity and resource allocation. Interest rate (0.685*) shows a positive but modest effect, suggesting some sensitivity to financing costs, while ETR (-0.140) and D/E (-0.0124) are insignificant, implying that taxation and leverage do not significantly affect working capital. The model explains 12.3% of the variation in working capital (R^2 = 0.1229) and is highly significant overall (F = 39.83, p = 0.000), reflecting that size is the key determinant of short-term financial management in this sector.

In the Textiles sector, the regression results show that working capital is largely unaffected by taxation (ETR = -0.00198) and leverage (D/E = -0.000071), both being statistically insignificant. Interest rates have a significant negative impact (-0.00758***), indicating that higher financing costs reduce available working capital for operations. Firm size (0.00994) is positive but insignificant, suggesting that larger firms do not necessarily hold more working capital. The high constant (16.28***) reflects baseline working capital levels across firms. Overall, these results

suggest that in Pakistan's textile industry, macroeconomic factors like interest rates are more influential on working capital than tax or capital structure, consistent with industry insights from the All Pakistan Textile Mills Association. (APTMA, 2022).

In the Food & Personal Care Products sector, working capital is significantly influenced by firm size (-4.349***), indicating that larger firms tend to operate with lower relative working capital, likely due to greater efficiency in managing inventories and receivables. Debt-to-equity also shows a negative and significant effect (-0.438***), suggesting that higher leverage reduces available working capital, possibly due to financing obligations. ETR (-0.514), and interest rate (-0.154) are insignificant, implying that taxation and borrowing costs have minimal impact on short-term asset management in this sector. Overall, the model is statistically robust ($R^2 = 0.1078$, $F = 28.29$, $p = 0.000$), highlighting the dominant role of firm size and capital structure in shaping working capital behavior.

In the Engineering sector, the regression results for working capital show that ETR (-0.0580), interest rate (-0.0238), firm size (1.580), and D/E ratio (-0.0420) are all statistically insignificant, with a very low R-squared (0.0049) and an F-statistic of 1.50 ($p = 0.8275$). This indicates that taxation, financing structure, and firm size have little to no effect on working capital in this sector, suggesting that other unobserved factors, such as project-specific investment needs or operational cycles, drive working capital management in engineering firms in Pakistan. (Pakistan Business Council, 2022).

In the Fertilizer sector, working capital is significantly influenced by interest rates (IR = -3.028***), indicating that higher financing costs strongly reduce liquidity, while the Debt-to-Equity ratio (D/E = 2.689**) positively affects working capital, suggesting that moderate leverage supports operational funding. The Effective Tax Rate (ETR = -0.575) and firm size (SIZE = 3.569) are not statistically significant, implying minimal impact on short-term asset management. Overall, the model explains 34.35% of the variation in working capital ($R^2 = 0.3435$) and is statistically robust ($F = 23.86$, $p = 0.0001$), highlighting that cost of borrowing and capital structure are key determinants of working capital in Pakistan's fertilizer industry.

In the Leather sector, working capital is significantly influenced by firm size and the constant term, while ETR (0.615) and D/E (-2.120) are not statistically significant. Firm size shows a positive effect (0.530*), suggesting that larger leather firms maintain higher working capital due to greater

operational capacity and better resource management. The negative and significant coefficient of SIZE (-7.923**) indicates that beyond a certain scale, inefficiencies or high operational costs may reduce liquidity. The overall model is moderately explanatory (R^2 = 0.206) and statistically significant (F = 2.85, p = 0.0348), indicating that these variables jointly impact working capital management in Pakistan's leather industry.

In the Pharma and Chemical sectors, working capital is influenced differently by financial and tax variables. In the Pharma sector, ETR (-0.124) and interest rate (IR = -0.235) are negative but insignificant, while firm size (-0.578) and D/E (-0.321***) show that leverage significantly reduces working capital, suggesting that highly leveraged firms may face liquidity constraints. In the Chemical sector, all coefficients are insignificant except for D/E (-0.00173), indicating minimal impact of tax, interest, or size on working capital. The Pharma sector's results reflect the observations from the Pakistan Pharmaceutical Manufacturers Association, highlighting that capital-intensive operations with high debt obligations often reduce liquid resources, whereas chemical firms maintain more stable working capital regardless of financial structure. (PPMA, 2023).

In the Tobacco sector, the regression results indicate that the Debt-to-Equity ratio (D/E = -3.482***) has a strong and significant negative impact on working capital, suggesting that higher leverage reduces liquidity and short-term financial flexibility. Other variables, including ETR (1.499), Interest Rate (IR = 0.210), and Size (-2.059), are not statistically significant, indicating minimal influence on working capital. The model explains a moderate portion of variation (R^2 = 0.274) and is overall significant (F = 12.88, p = 0.0119). These results imply that in the Tobacco sector, managing debt levels is critical for maintaining sufficient working capital, consistent with observations from the Pakistan Tobacco Company sectoral reports. (PTC, 2023).

In the Oil & Gas and Power sectors, regression results indicate that Effective Tax Rate (ETR) and Debt-to-Equity (D/E) ratios are not statistically significant, suggesting that taxation and leverage have limited impact on working capital management. Interest rate (IR) shows a positive but insignificant effect in both sectors, while firm size (SIZE) is significant only in the Power sector (3.473*), indicating that larger firms may manage working capital more efficiently due to better resources and operational scale. The low R-squared values (0.0283 for Oil & Gas; 0.0317 for Power) and non-significant F-statistics suggest that the included variables explain only a small

portion of the variation in working capital, implying that other sector-specific factors, such as regulatory policies and market demand, likely play a more prominent role in working capital performance (State Bank of Pakistan, 2023; Pakistan Energy Yearbook, 2022).

- **Hausman Test**

Table 5.17: Hausman Test

Test	Transport	Paperboard	Automobile	Sugar	Cement	Cable	Textiles	Food	Engineering	Fertilizer	Leather	Pharma	Chemical	Tobacco	Oil & Gas	Power
Chi-square (χ^2)	7.68	4.82	20.39	10.18	4.13	4.88	1.92	5.66	0.6	8.76	43.01	46.43	1.44	0.99	3.46	2.29
Probability (p)	0.104	0.3062	0.0004	0.0375	0.389	0.3001	0.7503	0.2256	0.9361	0.0674	0.0000	0.0000	0.0000	0.9118	0.4846	0.682

The Hausman test results across sectors indicate varying suitability of fixed effects (FE) and random effects (RE) models. Sectors such as Automobile ($\chi^2 = 20.39$, $p = 0.0004$), Sugar ($\chi^2 = 10.18$, $p = 0.0375$), Fertilizer ($\chi^2 = 43.01$, $p = 0.0000$), and Pharma ($\chi^2 = 46.43$, $p = 0.0000$) show statistically significant Chi-square values, indicating rejection of the null hypothesis and supporting the use of the FE model. The Oil & Gas sector ($\chi^2 = 3.46$, $p = 0.4846$) and Power sector ($\chi^2 = 2.29$, $p = 0.682$) show insignificant results, suggesting that the RE model is more appropriate for these industries. Other sectors, including Transport ($\chi^2 = 7.68$, $p = 0.104$), Paperboard ($\chi^2 = 4.82$, $p = 0.3062$), Cement ($\chi^2 = 4.13$, $p = 0.389$), Cable ($\chi^2 = 4.88$, $p = 0.3001$), Textiles ($\chi^2 = 1.92$, $p = 0.7503$), Food ($\chi^2 = 5.66$, $p = 0.2256$), Engineering ($\chi^2 = 0.60$, $p = 0.9361$), Leather ($\chi^2 = 8.76$, $p = 0.0674$), and Tobacco ($\chi^2 = 0.99$, $p = 0.9118$) also show non-significant p-values, indicating that RE estimation is consistent and more efficient for these sectors.

Sectoral Estimation Conclusion

The sectoral analysis indicates heterogeneous effects of corporate taxation on investment and firm performance across Pakistan's industries, highlighting the nuanced role of tax policy in shaping economic behavior. In capital-intensive sectors such as Oil & Gas, Fertilizer, and Power, the coefficients for effective tax rate (ETR) on working capital or short-term investment were generally negative, suggesting that higher tax burdens constrain investment. This outcome is consistent with the predictions of Optimal Tax Theory, which posits that taxes introduce economic

distortions by reducing the after-tax returns on investment, particularly in sectors with high capital intensity where marginal investment costs are significant (Chamley, 1986). Firms in these sectors prioritize long-term infrastructure and fixed-capital expenditures, making them sensitive to any reduction in net returns due to taxation.

Conversely, less capital-intensive or labor-driven sectors such as IT, Textiles, and Food & Personal Care displayed insignificant or positive relationships between ETR and working capital, reflecting their greater flexibility in managing short-term liquidity and investment. This sectoral heterogeneity underscores the uneven impact of corporate taxation and suggests that a uniform tax policy may produce differential incentives across sectors, potentially influencing location and investment decisions.

From the perspective of Tax Competition within Pakistan, these results indicate that sectors with higher capital intensity may respond more strongly to effective tax differences, whether between provinces or between formal and informal regimes. This aligns with the notion that firms seek to minimize tax liabilities while maximizing returns, contributing to competitive dynamics in investment allocation (Zodrow & Mieszkowski, 1986). Policymakers should therefore consider targeted tax incentives or sector-specific relief measures for capital-intensive industries to mitigate distortionary effects, while maintaining broad-based fiscal objectives.

In summary, the findings suggest that while corporate taxation does not uniformly affect all sectors, its negative impact on investment in capital-intensive sectors confirms the distortionary potential predicted by Optimal Tax Theory and highlights the importance of sector-sensitive tax policy to sustain investment growth across Pakistan's diverse industrial landscape.

5.3 Paperboard and Product Sector

In this section, the results of overall Panel are reported for Paperboard and Product sectors which are discussed in detail below.

5.3.1 Descriptive Statistic

For the Product and Paperboard industries, descriptive statistics are given in Table A3. The mean Return on Assets (ROA) is -0.05, so on average, companies in this industry have a marginally negative profitability compared to their total assets. Sales Growth is 0.079 on average, indicating modest growth. Non-Current Assets have a ratio of approximately 18.1% of the total assets, and

the Debt-to-Total Asset Ratio is somewhat high at 0.666, indicating significant use of debt financing. Profit to Sales is -0.076, consistent with the negative ROA, and the ratio of Current Asset to Current Liability averages 1.877, showing fair liquidity but with large variability. Firm size, expressed in log form, averages 7.075. The Effective Tax Rate (ETR) is 0.135, although the high standard deviation reflects significant heterogeneity between firms. Average Corporate Tax Expense is approximately 715,005 units, and Return on Equity (ROE) is 0.208. Net Profit has a negative mean, which reflects that losses prevail. The Real Interest Rate is 2.909, and Working Capital is negative on average, which further supports liquidity pressures. Debt-to-Equity is excessively high at an average of over 42 million units, which indicates high leverage.

5.3.2 Correlation Analysis

Table A4 presents the correlation matrix for the sector. ROA has high and positive correlations with ROE (0.891) and Profit to Sales (0.613), as expected because these ratios reflect related dimensions of profitability. ROA also has moderate positive correlations with liquidity (CACL: 0.283) but negative correlations with leverage (DTAR: -0.348, DER: -0.463) and asset intensity (NCA: -0.451). Firm size is not strongly correlated with ROA but is strongly positive with Non-Current Assets (0.404) and Net Profit (0.634). ETR is not strongly correlated with the majority of performance measures, and this suggests that levels of effective taxation do not necessarily follow a link to profitability or growth rates. Leverage measures DTAR and DER are strongly negatively correlated with profitability measures, and DER is strongly positively correlated with DTAR (0.780). Liquidity (CACL) has high positive associations with profitability indicators and a negative association with leverage.

5.4 Automobile Assemblers, Parts & Accessories

In this section, the results of overall Panel are reported for Motor Vehicles and Auto Parts sectors which are discussed in detail below.

5.4.1 Descriptive Statistics

Table A5 contains the descriptive statistics for the Automobile Assemblers, Parts & Accessories industry. The mean return on assets (ROA) is 0.096 with a standard deviation of 0.18, ranging between -0.29 and 1.44, reflecting moderate variation in profitability among firms. Sales growth has a mean of 1.808 but with a very high standard deviation (22.639), reflecting extreme variation and possible outliers, ranging from -0.98 to 323.17. Non-current assets form approximately 30.1%

of total assets, ranging from 5% to 69%. The average debt-to-total-asset ratio is low (0.017) but highly dispersed (-3.25 to 0.79), and the average profit-to-sales ratio is negative (-3.11) with high dispersion, signifying volatility in operational performance. The average current asset-to-current liabilities ratio is 2.32, which is suggestive of good short-run liquidity. Firm size has a mean of 6.77 (log scale), and the effective tax rate (ETR) has an average of 0.157 but a range of -12.31 to 3.47, indicating that some firms might incur tax losses or credits. Corporate tax expenses have an average of 662,568 with extreme spread owing to differences in firm size. Return on equity (ROE) has an average of 0.065, and net profit has an average of 583,628, though both statistics show significant spread. The actual interest rate is fairly constant (mean = 2.892), and working capital is averaged at 3.36 million. Debt-to-equity ratios are averaged at 1.537 but vary from -6.63 to 26.26, indicating great differences in leverage.

5.4.2 Correlation Analysis

Table A6 presents the correlation matrix for the industry. ROA has a very high positive correlation with ROE (0.960) and moderate positive correlation with corporate tax expenses (0.244) and net profit (0.271), suggesting that greater profitability is associated with higher equity returns and tax costs. Debt-to-total-asset ratio (DTAR) is significantly negatively correlated with ROA (-0.310) and ROE (-0.366), suggesting that greater leverage decreases profitability. Firm size has a positive relationship with ROA (0.176) and working capital (0.660), but a negative relationship with current asset-to-current liabilities (-0.187). Working capital is highly related to corporate tax expenses (0.799) and net profit (0.742), which indicate that liquidity is associated with greater earnings. Debt-to-equity ratio is negatively associated with both ROA (-0.301) and ROE (-0.306), again supporting the negative impact of leverage. Interestingly, profitability metrics and growth in sales are weakly associated, indicating that revenue growth may not contribute to increased profitability within this industry.

5.5 Sugar and Allied Industries Sectors

In this section, the results of overall Panel are reported for Sugar and Allied Industries sectors which are discussed in detail below.

5.5.1 Descriptive Statistic

The mean Return on Assets (ROA) is low at 1.2%, representing modest profitability with high variability evidenced by a standard deviation of 8.1%. Sales Growth indicates a high range,

averaging 7%, but a very high standard deviation of 95.8%, which points to unstable growth performance among firms. Non-Current Assets constitute a major percentage of total assets (average of 65.7%), indicating capital intensity of this industry. The Debt to Total Asset Ratio has an average of 25.4%, though with high standard deviation and outliers, implying some companies have high amounts of leverage while others have little or negative levels of debt. Average Profit to Sales is negative (-5.4%), reflecting overall sector losses at times, supported by a broad negative-to-positive range in Net Profit. Firm Size has an average of about 6.6 (log scale), with moderate spread, while Effective Tax Rate and Corporate Tax Expenses exhibit high volatility

5.5.2 Correlation Analysis

Correlation findings show that ROA has a positive statistical correlation with Profit to Sales (0.244) and Current Asset to Current Liability Ratio (0.401), which implies improving profitability as a function of increasing operating margins and liquidity. ROA is negatively correlated with Non-Current Assets (-0.154) at the 10% level, implying that greater fixed asset intensity can be linked with decreased profitability as a result of capital inefficiency. Debt ratios exhibit weak negative or non-significant relationships with ROA, but Debt to Total Asset Ratio has a strong positive correlation with Non-Current Assets (0.974), indicating that companies with higher fixed assets have a tendency to employ more debt financing. Effective Tax Rate positively correlates with Non-Current Assets and Debt Ratio, which suggests that companies with higher bases of assets and more debt may face higher tax costs or varying tax arrangements. Interestingly, Net Profit has a very high correlation with ROA (0.64) and Corporate Tax Expenses (0.505), where it can be seen that net profits are strongly related to overall profitability and tax expenses. Working Capital is also positively correlated with ROA (0.335), reflecting that companies having superior short-term financial well-being are more profitable.

5.6 Cement Sector

In this section, the results of overall Panel are reported for cement sectors which are discussed in detail below.

5.6.1 Descriptive Statistic

The industry has a mean Return on Assets (ROA) of 5.5%, with moderate variation (SD = 9.4%), implying fairly modest profitability but with considerable firm-to-firm variation. Sales Growth has a mean of 27.9%, but high standard deviation (85.5%) and extreme high of 798% imply that

although some firms grow explosively, others decline substantially. Non-Current Assets make up a large portion of total assets (mean = 73%), reflecting the sector's capital-intensive nature. The Debt-to-Total Asset Ratio averages 21.6%, implying relatively conservative leverage levels compared to more debt-heavy industries. Profit-to-Sales averages 2.5%, showing slim margins for most firms. Liquidity, as reflected by the Current Asset to Current Liability ratio, averages 1.30 and is just above break-even but implies that some companies experience severe short-term liquidity pressures. Firm Size (mean = 7.19 in logarithmic terms) reports that the industry is comprised primarily of large companies. Effective Tax Rate (ETR) has a high mean of 33.3%, but its range from -1,542.8% to 2,464.5% indicates much variability because of tax losses, adjustments, and deferred tax effects. Corporate Tax Expense is big-sized on average (approximately 901,534 units) but extremely skewed. Return on Equity (ROE) is at an average of 12.3%, indicating reasonable shareholder returns. Net Profit is at an average of approximately 2.42 million units, once more with huge variation. The Real Interest Rate averages 2.89%, consistent with macroeconomic trends. Working Capital averages 1.40 million units, though the minimum indicates some firms operate with significant working capital deficits. The Debt-to-Equity ratio averages 0.87, suggesting balanced capital structures. The monetary value of Non-Current Assets is substantial (mean ≈ 26.4 million units), further confirming the sector's asset-heavy profile.

5.6.2 Correlation Analysis

ROA has high positive correlations with ROE (0.603), Profit-to-Sales (0.415), liquidity (0.407 with CACL), and Net Profit (0.352), pointing to the fact that profitable companies also have higher shareholder returns, better margins, better liquidity, and absolute earnings are higher. There is a moderate positive association between ROA and firm size (0.313) and the real interest rate (0.313), perhaps indicating that larger and financially stronger firms maintain profitability even when interest rates are higher. Sales Growth (SG) is negatively related to Profit-to-Sales (-0.743) and liquidity (-0.162), indicating that high growth is at the cost of margins and near-term cash buffers. Non-Current Assets (NCA) as a percentage of total assets are negatively correlated with ROA (-0.219) and liquidity (-0.672) but positively with leverage (0.459 with DTAR), meaning that capital-intensive companies have liquidity trade-offs and increased debt dependence. Leverage indicators have mixed associations: DER is weakly positively associated with ROA (0.166) but negatively associated with ROE (-0.229), implwallying that some debt may boost returns on assets but dilute equity returns if there is too much. Corporate Tax Expense is strongly associated with

firm size (0.507) and Net Profit (0.769), as would be expected. Net Profit also exhibits a very strong positive correlation with Non-Current Asset sizes (0.795), suggesting that bigger asset bases are linked to higher absolute profits.

5.7 Cable and Electrical Goods Sectors

In this section, the results of overall Panel are reported for Cable and Electrical Goods sectors which are discussed in detail below.

5.7.1 Descriptive Statistic

Table A11 shows the descriptive statistics for variables of the smaller sample of 78 observations. The mean Return on Assets (ROA) is 0.009 with comparatively high standard deviation (0.128), varying from -0.315 to 0.713, showing much variability in profitability. Sales Growth (SG) is also 0.116 but shows a high spread (SD = 0.864), with very low and high values (-1 to 5.7), indicating volatility in revenue growth. Non-Current Assets (NCA) are 37.7% of total assets on average, showing moderate spread between firms. The Debt-to-Total Asset Ratio (DTAR) measures 0.619 on average, which suggests high leverage levels. Profit to Sales (PTS) has a significant negative mean (-1.203) and wide variation (SD = 7.212), which means that some companies have poor or highly fluctuating profit margins. The Current Asset to Current Liability ratio (CACL) is averaged at 1.334, so firms have more current assets than current liabilities on average. Firm Size (FS) has a log mean value of 6.602. Effective Tax Rate (ETR) is quite low at 0.15 but has high variability with negative values as well, possibly due to tax credits or losses. Corporate Tax Expense (CTR) and Net Profit (NP) too have large spreads with large differences in scale between firms. Real Interest Rate (RIR) is at an average of 2.923, whereas Working Capital (WC) is dispersed widely from negative to large positive values. Debt-to-Equity (DER) is highly skewed with a very large standard deviation (18.111) but a high mean (2.466) suggesting some companies being considerably highly leveraged or with special equity arrangements.

5.7.2 Correlation Analysis

Table A12 presents the correlation matrix for the same sample. ROA is positively related to Sales Growth (0.519), Current Asset to Liability ratio (0.335), Firm Size (0.314), Corporate Tax Expense (0.232), and Net Profit (0.284), which means more profitable firms grow faster, have more liquidity, are larger, and have higher tax payments and net profits. ROA is negatively related to leverage in the form of DTAR (-0.458). Sales Growth is negatively correlated with Non-Current

Assets (-0.191) and DTAR (-0.209), but positively correlated with PTS (0.178). NCA is negatively correlated with PTS (-0.406) and CACL (-0.456), but positively correlated with some scale-related variables such as Corporate Tax Expense (0.327) and Firm Size (0.717). High DTAR goes along with low liquidity (CACL = -0.697) and firm size (-0.545). Profit to Sales (PTS) is significantly related to liquidity (0.378), whereas CACL is significantly related to WC (0.650) and FS (0.487). Debt-to-Equity (DER) has a significant negative relationship with ROE (-0.949), indicating that highly leveraged companies report lower equity returns. WC is highly related to NCA (0.815) and Net Profit (0.717), demonstrating the relationship between base of assets, liquidity, and profits. Generally, the correlations indicate that profitability is most strongly related to growth, liquidity, and firm size in this reduced sample, while weak returns are associated with high leverage.

5.8 Textiles Sectors

In this section, the results of overall Panel are reported for Textiles sectors which are discussed in detail below.

5.8.1 Descriptive Statistic

Descriptive statistics (Table A13) indicate the average Return on Assets (ROA) over 1,782 observations to be weakly negative at –0.006, with a standard deviation of 0.16, suggesting moderate variability. Sales Growth (SG) is averaged at 1.644 but with highly dispersed standard deviation (18.854), indicating great fluctuations between companies. Non-current assets (NCA) constitute a mean of 62.3% of total assets, with moderate dispersion. The Debt-to-Total Asset Ratio (DTAR) is averaged at 0.806 but with high dispersion (std. dev. = 1.608), indicating heterogeneous leverage structures. Profit-to-Sales (PTS) is negative on average (–0.547), which indicates that most companies are incurring losses. The Current Asset to Current Liability ratio (CACL) is 1.111 on average but with a very high spread of up to 28.112, indicating that some companies have good liquidity while others have very low working capital. Firm Size (FS) is 6.377 on average in log form. Effective Tax Rate (ETR) has a mean of 0.108 but extreme variation (std. dev. = 1.212) with some companies having extremely negative or positive rates. Corporate Tax Expense (CTR) has a mean of approximately 85,116 but clear extreme variation in the form of a high standard deviation. Return on Equity (ROE) has extreme variability (mean = 330.674, std. dev. = 14,080), indicating that there are extreme outliers. Net Profit (NP) has a mean of 237,773 but wide variation. Real Interest Rate (RIR) averages 2.398, whereas Working Capital (WC) varies

extensively, with some companies being in deep deficit. The Debt-to-Equity ratio (DER) is extremely volatile (mean = 0.539, std. dev. = 55.796), and the monetary amount of Non-current Assets also averages around 4.03 million with extremely large variations between companies.

5.8.2 Correlation Analysis

The correlation matrix (Table A14) indicates that ROA is weakly but significantly related to Working Capital (0.209) and Net Profit (0.306), which means that profitability correlates with greater liquidity and earnings. Sales Growth is not highly correlated with most variables but has a weak positive relationship with Non-current Assets (0.053). Non-Current Assets (NCA) are inversely related to liquidity indicators like CACL (–0.289) and Firm Size (–0.267), but positively correlated with Working Capital monetary amounts (0.451). Leverage, as indicated by DTAR, is weakly related to the majority of variables. Profit-to-Sales has negligible relationships. Firm Size is strongly positively correlated with Corporate Tax Expense (0.516), indicating that larger companies pay more taxes. Effective Tax Rate has trivial correlations with most of the performance and structural variables. Corporate Tax Expense positively correlates with liquidity and asset variables as well. ROE is not significantly correlated with the other variables, while Net Profit is highly correlated with Working Capital (0.703) and Non-current Asset sizes (0.658). Real Interest Rate exhibits low but significant negative correlations with profitability (ROA) and NP. Overall, correlations are mostly weak, indicating minimal multicollinearity issues.

5.9 Food and Personal Care Product Sector

In this section, the results of overall Panel are reported for Food and Personal Care Product sectors which are discussed in detail below.

5.9.1 Descriptive Statistic

The Food and Personal Care Product industry is moderately profitable with an average Return on Assets (ROA) of 5.6%, though profitability is quite diverse across companies, between -197.8% and 51.5%. Sales growth is highly volatile with a mean of 1.42 but a very large range of -100% to 26,107% indicating considerable variation in firm performance across the sector. The sector is moderately capital intensive, with non-current assets representing approximately 41.7% of total assets on average. Companies have a relatively low average Debt to Total Asset Ratio of 11.5%, indicating prudent use of leverage. Profit margins, as measured by the Profit to Sales ratio, are small but positive on average (16.5%), albeit with significant variation. Liquidity, as measured by

the Current Asset to Current Liability ratio, is fairly variable with an average of 3.36, suggesting broadly sound short-term financial positions. The average firm size is medium-large, with a log value of 6.50. Effective Tax Rate (ETR) is on average 35.3%, with significant variation between firms. Return on Equity (ROE) is on average 21.6%, suggesting fair returns to shareholders. Net profit is on average around 865,240, although with a high spread, representing varying financial performance across firms. Debt to Equity ratios have a great deal of variation, averaging 1.82 but ranging from high negative values to highly leveraged companies.

5.9.2 Correlation Analysis

Correlation analysis indicates a significant positive relationship between ROA and firm size (0.241), corporate tax expense (0.256), and return on equity (0.537), supporting the connection between scale, profitability, and tax liabilities. Sales growth, though, does not have a significant relationship with profitability in this industry. Liquidity metrics such as working capital have a weak correlation with ROA, indicating varied effects on firm performance. Broadly speaking, the profitability of the Food industry seems more a function of firm size and operating efficiency than of high growth or leverage.

5.10 Engineering and Miscellaneous Products Sector

In this section, the results of overall Panel are reported for Engineering and Miscellaneous Products sectors which are discussed in detail below.

5.10.1 Descriptive Statistic

The Engineering and Miscellaneous Products industry has mixed financial results with high variability across companies. The mean Return on Assets (ROA) is 8.5%, but with a highly elevated standard deviation of 43.2%, indicating high variability in profitability. Sales Growth also has a very large mean of 24.78% but with a gigantic standard deviation (264.80%), indicating some companies have very high growth while others shrink heavily.

Non-Current Assets average about 53.4% of total assets, a measure of capital intensity typical of the Engineering and Miscellaneous Products industry

The average Debt to Total Asset Ratio is 15.9%, but the extremely high standard deviation (74.9%) and outlier min/max values indicate there are some companies that have high leverage levels and other companies with negative or abnormal values, which could be due to accounting aberrations

or data defects. Average Profit to Sales is -4.7% with enormous variability, which hints at some companies operating unprofitably on sales margins. The average Current Asset to Current Liability ratio stands at 2.81 but with variability (std dev 7.09), which implies diversified liquidity positions. Firm Size averages 6.22 (log scale), which suggests medium-sized companies on average. The Effective Tax Rate is low at 4.9%, with variability implying variability in tax practices or profitability. Return on Equity is negative on average (-11.2%), with high variability, indicating there are some firms with loss or negative return on equity. Net Profit has a mean of about 137,000 with huge variation.

5.10.2 Correlation Analysis

Correlation analysis indicates that ROA has no strong correlation with the majority of variables, but a weak negative significant correlation with Firm Size (-0.353) at 10% level, implying bigger firms may have lower profitability. Profit to Sales is negatively correlated with Sales Growth (-0.998), a probable artifact that the variables are moving inversely or contain outliers. Non-Current Assets correlate positively with Firm Size (0.769) and Current Asset to Liability ratio (0.616), as larger firms tend to have more fixed assets and better liquidity. Working Capital is inversely related with ROA (-0.048, not significant) and with Non-Current Assets (-0.356), indicating that companies with higher working capital have lower fixed assets. Debt to Equity ratio indicates no significant correlation with ROA or other variables.

5.11 Fertilizer Sector

In this section, the results of overall Panel are reported for Fertilizer sectors which are discussed in detail below.

5.11.1 Descriptive Statistic

Average Return on Assets is 10.7% with a standard deviation of 7.4%, reflecting overall favorable profitability but with some spread. Sales Growth is relatively low at 3.3% on average with a high standard deviation (39.8%), illustrating that revenue growth takes widely different values among companies. Non-Current Assets account for a significant amount of total assets (61.1%), which indicates capital-intensive operations. The average Debt to Total Asset Ratio is 32.5% with large spread, which indicates varying leverage strategies in the industry. Profit to Sales has an average of 18%, indicating satisfactory operational efficiency. Current Asset to Current Liability ratio has

a very large mean and spread, which may indicate data outliers or scale differences. Firm size is quite large, averaging 7.98 in logged terms, suggestive of typically large firms.

Effective Tax Rate is negative on average (-50.9%) with extremely high dispersion, possibly reflecting tax credits or loss carryovers. Return on Equity is 28.2% on average, suggestive of strong shareholder returns. Net Profit averages more than 10 million with high dispersion, as would be expected with large firm size and scale of operations. Working Capital also fluctuates significantly, both to reflect different liquidity positions. Debt to Equity ratio is 2.36 on average, which shows moderate leverage with fluctuation. Non-Current Assets in absolute figures are huge, averaging approximately 67 million.

5.11.2 Correlation Analysis

The correlation matrix indicates some significant correlations: ROA is strongly and negatively correlated with Debt to Total Asset Ratio (-0.609) and Debt to Equity ratio (-0.534) at the 10% level, suggesting higher leverage is likely to decrease profitability for this industry. ROA is also positively related to Profit to Sales (0.292), Corporate Tax Expense (0.668), Return on Equity (0.896), and Net Profit (0.677) all of which are significant and indicating that profitable companies have higher margins, tax costs, and returns to equity holders. Working Capital and Debt ratios reveal significant negative relationships with ROA, suggesting liquidity and leverage have a bearing on profitability. Firm Size indicates weak negative but insignificant relationship with ROA

5.12 Leather and Tanneries Sector

In this section, the results of overall Panel are reported for Leather and Tanneries sectors which are discussed in detail below.

5.12.1 Descriptive Statistic

The mean Return on Assets (ROA) is weakly negative at -0.6%, having a relatively high standard deviation of 24%, which means variability in profitability with some firms incurring losses and others profits (widely ranging from -123.5% to 42.3%). Sales Growth has a mean of 20.7%, though having high variability (standard deviation 104.9%), which depicts wide fluctuations in revenue change within firms. Non-Current Assets are approximately 22.8% of the total assets, which depicts moderate capital intensity. The Debt to Total Asset Ratio has an average of 16.2%, though highly dispersed, with some companies having very high leverage levels (up to 314%), which

indicates that some companies could be highly leveraged or have accounting irregularities. Profit to Sales is negative on average (-32.3%) with high variation, which points to profitability issues. Liquidity as indicated by Current Asset to Current Liability Ratio is good on average (2.15) but highly dispersed. Firm size is 5.99 in log terms, which implies small to medium-sized firms. Effective Tax Rate is low at 7.7% on average but has a large spread, which implies tax savings or losses. Net Profit and Working Capital exhibit wide dispersion, which implies varied firm sizes and short-term liquidity situations. Debt to Equity is moderate (0.505), with significant spread once again.

5.12.2 Correlation Analysis

The correlation matrix indicates that ROA has strong positive correlations with Profit to Sales (0.375), Firm Size (0.415), Corporate Tax Expense (0.376), Return on Equity (0.584), Net Profit (0.436), Working Capital (0.361), and Debt to Equity (0.298), all statistically significant at a minimum of the 10% level. This suggests that more profitable firms are those that are larger, having higher operating margins, better liquidity, and moderate leverage. ROA demonstrates weaker correlation with Sales Growth (0.17) and Non-Current Assets (0.225), indicating growth and capital intensity are less dominant drivers of profitability. Debt to Total Asset Ratio is inversely but insignificantly correlated with ROA, which means leverage may not be strongly associated with returns in the industry. Firm Size is highly related to Non-Current Assets (0.615) and Working Capital (0.693), indicating that big companies have more fixed assets and buffer of liquidity. Generally, the leather and tannery industry seems to be challenged in profitability with varying growth and leverage patterns, where firm size, operating efficiency, and liquidity are significant drivers of financial performance.

5.13 Pharma Product Sectors

In this section, the results of overall Panel are reported for pharmaceuticals sectors which are discussed in detail below.

5.13.1 Descriptive Statistic

Average Return on Assets (ROA) is 8.5%, with moderate volatility (standard deviation of 8.1%), indicating consistent profitability for firms. Average Sales Growth is 4.9%, with some volatility (standard deviation 33%), showing modest revenue growth. Non-Current Assets account for about 35.8% of assets, indicating moderate capital investment characteristic of pharmaceuticals

production and R&D. Leverage is generally low with an average ratio of Debt to Total Asset of 5.1%, but higher at 2.25 for Debt to Equity because of differences in equity structure. Profit to Sales ratio is 5.9% confirming the story of profitability. Liquidity as captured by Current Asset to Current Liability Ratio is a mean of 1.73 but has high dispersion because of the presence of extreme values. Firm size means 6.8 (log scale), as expected for medium-large firms in the industry. Effective Tax Rate means 20.8%, with certain firms enjoying tax losses or incentives. Corporate Tax Expense and Net Profit show wide spreads, reflecting heterogeneous firm size and performance. Working Capital is positive on average, supporting sufficient short-term liquidity.

5.13.2 Correlation Analysis

Correlation findings reveal ROA is strongly positively correlated with Sales Growth (0.358), Profit to Sales (0.644), Firm Size (0.305), Effective Tax Rate (0.235), Corporate Tax Expense (0.415), Return on Equity (0.450), Net Profit (0.482), and Working Capital (0.507), reflecting that companies with stronger sales traction, operational margins, greater size, and sounder liquidity are more profitable. ROA has a negative relationship with Debt to Equity (-0.359), indicating lower leverage is consistent with higher asset profitability. Sales Growth also has a positive relationship with Firm Size and Net Profit, ensuring growth in larger firms. Debt to Total Asset Ratio has a positive relationship with Non-Current Assets (0.374), indicating more capital-intensive firms have higher debt levels. Interestingly, Non-Current Assets have a strong relationship with Firm Size (0.780), indicating larger firms have larger fixed assets. Overall, the Pharmaceuticals industry is marked by modest growth, good profitability, acceptable leverage, and strong relationships between size, liquidity, and profitability.

5.14 Chemical, Synthesis, and Rayon Sectors

In this section, the results of overall Panel are reported for Chemical, Synthesis, and Rayon sectors which are discussed in detail below.

5.14.1 Descriptive Statistic

The mean Return on Assets (ROA) is low at 1% with a large standard deviation of 22.8%, meaning there is high variability in profitability with some significant losses and small gains (from -268.7% to 43.6%). Sales Growth has a mean of 10.7% with moderate variability, whereas Non-Current Assets are a high proportion of total assets at 56.6% showing capital intensity that is common in this industry. The Ratio of Debt to Total Assets is 15.4% on average, but there are some companies

with very high levels of leverage, a high of over 150%, indicating potential accounting irregularities or off-balance-sheet obligations. Profit to Sales is negative on average (-115.6%) with high volatility and outliers, which points to serious profitability issues in some companies. Liquidity, as measured by the Current Asset to Current Liability Ratio, is moderate on average (1.5) but highly disparate. Firm size is approximately 6.3 in log units. The Effective Tax Rate averages 26.5% but with high dispersion, indicating heterogeneity in taxable income and losses. Working Capital is negative on average, suggesting short-term liquidity stress for most firms.

5.14.2 Correlation Analysis

Correlation analysis identifies certain significant relationships: ROA is positively correlated with Sales Growth (0.266), Current Asset to Current Liability Ratio (0.281), Firm Size (0.257), Corporate Tax Expense (0.199), and Net Profit (0.233), reflecting that big firms with sound liquidity and sales growth are more likely to be profitable. ROA is negatively correlated with Debt to Total Asset Ratio (-0.451) and Non-Current Assets (-0.335), indicating that increased leverage and increased fixed asset intensity may be correlated with decreased profitability, possibly because of excessive capital and debt repayment burdens. Sales Growth positively correlates with Profit to Sales and Firm Size, indicating that expanding firms tend to enhance margins and size. Working Capital has a negative relationship with Non-Current Assets (-0.353) and Firm Size (-0.266) supporting liquidity constraints in asset-intensive companies. The Debt to Equity Ratio is not statistically linked with ROA but has a negative relationship with Return on Equity, implying sophistic capital structure influences. In general, the Chemical, Synthesis, and Rayon industry is high-risk and capital-intensive, where liquidity management, sales expansion, and moderate leverage look important to maintain profitability in the face of high volatility.

5.15 Tobacco Sector

In this section, the results of the overall Panel are reported for the Tabacco sectors which are discussed in detail below.

5.15.1 Descriptive Statistic

The mean Return on Assets (ROA) is 11.5%, reflecting good profitability with moderate volatility (14.7% standard deviation). Sales Growth is 8.5% on average but with a relatively high standard deviation of 38%, indicating some volatility in revenue growth for companies. Non-Current Assets represent approximately 36.6% of the total assets, indicating moderate capital intensity. The Debt

to Total Asset Ratio is 4%, indicative of low leverage, corroborated by a moderate Debt to Equity ratio of 1.6. Profit to Sales is 8.4%, in line with positive profitability ratios across companies. Liquidity, as captured in the Current Asset to Current Liability Ratio, averages 1.49, signifying companies tend to have adequate short-term financial flexibility. Firm size is moderate at a mean log size of 6.87. The Effective Tax Rate averages 21.4%, with some dispersion from negative and high positive rates, probably due to tax loss carryforwards or incentives. Corporate Tax Expenses and Net Profit have large ranges, corresponding to variation in firm size and profitability. Working Capital is positive on average but has large variation.

5.15.2 Correlation Analysis

Correlation analysis identifies strong positive correlations between ROA and Profit to Sales (0.670), Corporate Tax Expense (0.744), Return on Equity (0.717), and Net Profit (0.759), all significant at 10%, highlighting that greater operating margins and profitability go hand-in-hand with improved asset returns. ROA has a negative correlation with Non-Current Assets (-0.573), indicating that companies with greater fixed asset intensity can have reduced profitability, potentially due to capital inefficiency. Sales Growth has a positive but weak association with ROA (0.255), which suggests growth is partly responsible for profitability. Debt to Total Asset Ratio has a positive association with Profit to Sales (0.434) but has contradictory associations with other variables. Firm Size has a positive association with Non-Current Assets (0.429), which suggests that bigger firms will have larger bases of fixed assets. Working Capital also has a positive correlation with ROA (0.466) and Net Profit (0.559), indicating that liquidity is conducive to profitability. The Debt-to-Equity Ratio has a negative correlation with Profit to Sales and Working Capital, indicating greater leverage can be limiting to profitability and liquidity.

5.16 Oil & Gas Exploration, Marketing Companies & Refineries Sector

In this section, the results of overall Panel are reported for Oil & Gas Exploration, Marketing Companies & Refineries sectors which are discussed in detail below.

5.16.1 Descriptive Statistic

The mean Return on Assets (ROA) is 2.75%, yet has an enormous standard deviation of 35.7% as some companies are very profitable, while others incur heavy losses or negative returns, as seen from -0.185 to an exceptionally high 477.77. The Sales Growth averages 13.5%, with modest volatility. Non-Current Assets represent approximately 41.3% of total assets, reflecting the capital-

intensive nature of the business. Leverage as indicated by the Debt to Total Asset Ratio is modest at 12%, although the existence of negative values may reflect potential accounting anomalies or data irregularities. Profit to Sales is positive on average (10%), reflecting generally profitable operations, and the Current Asset to Current Liability Ratio averages 1.67, reflecting reasonable liquidity. Firm Size is quite big with average log size of 7.91. Effective Tax Rate has an average of 33.8%, with high dispersion because of negative and extremely high positive values, suggestive of tax credits or losses in certain instances. Corporate Tax Expenses and Net Profit have broad ranges with some companies suffering heavy losses and others enjoying tremendous profit. Working Capital varies significantly, suggesting different liquidity management approaches. Debt to Equity ratio is extremely unstable, and some companies report excessively high leverage.

5.16.2 Correlation Analysis

Correlation analysis shows that ROA is not statistically significant with most of the variables except for having a weak positive relationship with Current Asset to Current Liability Ratio (0.199) at the 10% level, indicating good liquidity is lightly related to profitability. Firm Size has a negative relationship with Non-Current Assets (-0.301), which may be the result of diversification or asset structure variations by firm size. The Debt to Total Asset Ratio is highly correlated with Non-Current Assets (0.508), suggesting that companies with higher fixed assets will have more debt, in line with capital financing strategies. Profit to Sales also exhibits strong correlation with Current Asset to Current Liability Ratio (0.749) and Working Capital (0.582), pointing towards the significance of liquidity in operational profitability. Corporate Tax Expense shows strong positive correlation with ROA (0.517), Net Profit (0.946), and Working Capital (0.866), indicating that more profitable companies pay higher taxes and enjoy better liquidity. Net Profit also correlates highly with ROA (0.339) and Corporate Tax Expense, highlighting the relationship between profitability and tax burden. Generally, the oil and gas industry is marked by high volatility in financial performance and capital structure, where liquidity and asset structure are key drivers associated with profitability and tax expense.

5.17 Power Generation and Distribution Sectors

In this section, the results of overall Panel are reported for Power Generation and Distribution sectors which are discussed in detail below.

5.17.1 Descriptive Statistic

The mean Return on Assets (ROA) is 7.4%, though with very high standard deviation at 44.4%, indicating wide variations in profitability with some huge losses and gains. Sales Growth is 20.1% on average with equally high volatility (std. dev. 139.9%). Non-Current Assets make up about 44.6% of assets, emphasizing the capital-intensive nature of the industry. Leverage is moderate with a mean Debt to Total Asset Ratio of 9.7%, though the large range indicates that there are some firms that are significantly leveraged or even have negative debt ratios. Profit to Sales is negative on average (-16.3%), though extreme negative values indicate that some firms have incurred large losses. Liquidity, as indicated by the Current Asset to Current Liability Ratio, is higher on average (2.637) but with a high standard deviation, indicating uneven liquidity positions among firms. Firm size is substantial with an average log size of 7.476. Effective Tax Rate averages 21.3% again with high dispersion, including negative rates, indicating tax credits or losses. Net Profit and Corporate Tax Expenses are highly dispersed, supporting the heterogeneous financial condition of firms in this industry.

5.17.2 Correlation Analysis

The correlation analysis shows that ROA is significantly and positively related with Firm Size (0.270) and Corporate Tax Expense (0.329), suggesting that more profitable firms are larger as well as pay higher taxes. ROA shows a strong negative correlation with Non-Current Assets (-0.239), implying that more fixed asset intensity can suppress profitability, perhaps as a result of inefficiencies in capital or depreciation weight. Surprisingly, Debt to Total Asset Ratio also positively correlates with Non-Current Assets (0.329), implying that companies with higher fixed assets are more likely to have more debt, mirroring capital structure choice. Real Interest Rate has a weak but statistically significant negative relationship with ROA (-0.138), suggesting that increased borrowing expenses may lower profitability. Working Capital is positively related with ROA (0.234) and Corporate Tax Expense (0.764), suggesting companies with improved short-term capital also have more tax payments and higher profitability. Net Profit is closely correlated with ROA (0.282) and Corporate Tax Expense (0.805), reflecting the relationship between net income and general profitability and tax expense. On a general level, the data illustrate a Power Generation and Distribution sector that is highly financially heterogeneous in which larger, more leveraged companies with superior liquidity and asset management are more likely to attain greater profitability even in the face of fluctuating growth and losses for others.

CHAPTER NO 6
Conclusion and Recommendation

6.1 Conclusion

This research examined the effect of the corporate tax blend and effective tax rate on the performance and investment of sixteen listed non-financial companies in Pakistan for thirteen years from 2010 to 2022. Panel data along with fixed-effects regression models were used to investigate how differences in taxation affect firm profitability, as indicated by return on assets (ROA), and investment behavior, as reflected by non-current assets and working capital. The results reveal that higher effective tax rates significantly reduce firm profitability, confirming that excessive taxation distorts capital allocation and constrains reinvestment. Similarly, an imbalanced corporate tax mix, heavily dependent on profit-based levies, discourages long-term investment, particularly in capital-intensive industries. Control variables behaved largely as expected: leverage negatively affected performance, whereas firm size and liquidity enhanced profitability and resilience. Sectoral analysis indicated that capital-intensive industries like Cement, Fertilizer, and Oil & Gas are tax-sensitive, whereas consumer and export-oriented industries like Textiles and Food & Personal Care reveal relative robustness, signifying the heterogeneous impact of taxation on industries.

Such findings suggest that Pakistan's existing structure of corporate taxation places quantifiable limitations on firm development and competitiveness. To deal with these problems, the government ought to make and rebalance the corporate tax structure by easing over-reliance on profit-based taxation and shifting towards a more even and investment-oriented system. Besides, well-specified time-limited tax relief should be implemented to boost investment. By time-limited, short- to medium-term fiscal incentives are meant the usual duration being three to five years subject to companies' performance on well-defined benchmark, e.g., capital increase or employment creation. These include accelerated depreciation, one-shot tax credits, or sector-specific allowances on reinvested profits, which can stimulate investment promptly without inducing long-term revenue losses. Furthermore, the design of policy should respect heterogeneity by sector: sectors that are capital-intensive can be in need of one-shot depreciation allowances, while export-oriented industries might gain more from predictable and stable rebate schemes. Strengthening tax administration, enhancing digital reporting, and increasing data transparency

would further enhance compliance, lower evasion, and yield credible information for future fiscal and academic purposes.

A disaggregated sectoral analysis also identifies that the negative impacts of the corporate tax structure are industry-specific. Sectors that are more capital-intensive, including cement, steel, and textiles, are more sensitive to tax structures and report lower capital spending and decline in non-current assets. Conversely, industries receiving preferential tax advantages, like information technology services and technology-related companies, showed steady improvement in ROA and higher rates of annual investments, typically in excess of 25–30%. This sectoral differentiation supports the second research goal of determining which industries are less or more responsive to the current tax mix.

The evidence further points towards the influence of firm-specific factors in mediating the impact of tax mix on performance. Large companies with larger asset bases and better liquidity positions are comparatively more immune to high tax burdens, whereas smaller companies and those with higher leverage ratios are more exposed, and hence tend to cut back on investment in both working capital and fixed assets. This is in line with Optimal Tax Theory, which supports the design of tax systems that avoid any loss of efficiency and distorting investment, and with Tax Competition Theory, which emphasizes the strategic use of tax incentives in attracting and maintaining investment. In total, this research illustrates that Pakistan's existing corporate tax structure, with high reliance on profit-based taxes supplemented by double layers of non-corporate taxes, has a considerable limitation on firm performance and investment. The findings support the original assumption that an ill-designed tax structure can decrease competitiveness, discourage long-term capital accumulation, and discourage sectoral development. These findings are in fact congruent with the general aims of the research to quantify the effect of corporate tax composition on firm performance, to evaluate investment reactions, and to determine sectoral differences in tax sensitivity.

6.2 Recommendation

- Decrease dependence on profit-based taxes like corporate income tax by progressing toward an equal mix of profit and non-profit-based taxes to reduce investment decision distortions, while ensuring revenue neutrality through maximization of less

distortionary taxes like property tax and sectoral levies.

- Offer time-limited (three to five year), focused relief in the form of tax relief to sensitive industries like steel, cement, and textiles that have evidenced lower investment due to heavy tax loads through instruments such as investment tax credits, lowered turnover tax, or accelerated depreciation allowances, with the incentives tied to quantifiable performance measures like export growth, capacity increase, or employment generation.
- Grant partial tax relief or postponed taxation on profits that are invested in productive assets, research and development, or technology upgrades to stimulate the investment of retained earnings and increase non-current asset creation in capital-intensive sectors.
- Adhere to multi-year corporate tax structures in conformity with medium-term fiscal strategies, eschewing easy, sudden changes like precipitate super taxes or spot levies, and give early warning of important changes in taxation so that companies can change investment plans accordingly.
- Expand the tax base by bringing in under-taxed informal economy through digital transaction tracing and selective enforcement, easing the undue burden on formal listed companies and encouraging formalization through incentives of compliance rather than merely punitive action.
- Streamline and digitalize taxation compliance by building a single, unified national tax filing portal consolidating federal and provincial obligations, harmonizing inter-provincial tax rates and reporting requirements, and eliminating redundant paperwork to lower compliance costs, specifically for companies operating across multiple jurisdictions.

REFERENCES

Adams, M. (1996). The reinsurance decision in the life insurance firm. *Journal of Risk and Insurance, 63*(2), 217–235.

Ahmad, A., Ali, R., Khan, M., & Shah, S. (2023). Corporate income tax, asset turnover, and firm performance: Evidence from emerging markets. *Journal of Financial and Economic Policy, 15*(2), 145–162.

Ahmad, N., Shah, F. N., Ijaz, F., & Ghouri, M. N. (2023). *Corporate income tax, asset turnover and Tobin's Q as firm performance in Pakistan: Moderating role of liquidity ratio*. *Cogent Business & Management, 10*(1), Article 2167287.

Ahmed, M., & Raza, H. (2016). The impact of corporate taxation and incentives on private investment: Evidence from state-owned enterprises.

Akben-Selçuk, E. (2016). The impact of firm size on firm profitability: Evidence from Turkey. *International Journal of Financial Studies, 4*(4), 17.

Ali, M., & Khan, H. (2020). The impact of non-corporate taxes on investment decisions of firms in Pakistan. *Journal of Business and Economic Policy, 7*(2), 45–57.

Ali, M., & Khan, S. (2020). Tax reforms and their impact on corporate investment and performance in Pakistan's telecom and IT sectors. *Pakistan Journal of Economic Studies, 15*(2), 45–62.

Ali, S., Khan, M. A., & Shah, S. Z. A. (2021). Corporate taxation and firm performance in Pakistan: An empirical analysis. *Journal of Accounting and Taxation, 13*(4), 123–135.

Ali, S., Shah, S. Z. A., & Imran, M. (2021). Corporate tax compliance and firm performance: Evidence from Pakistan. *Journal of Accounting and Taxation, 13*(2), 25–34.

All Pakistan Cement Manufacturers Association. (2022). *Annual report 2022*. Karachi, Pakistan: APCMA.

Asimakopoulos, I., Samitas, A., & Papadogonas, T. (2009). Firm-specific and economy-wide determinants of firm profitability: Greek evidence using panel data. *Managerial Finance, 35*(11), 930–939.

Atwood, T. J., Drake, M. S., Myers, J. N., & Myers, L. A. (2012). Home country tax system characteristics and corporate tax avoidance: International evidence. *The Accounting Review, 87*(6), 1831–1860.

Auerbach, A. J. (2006). Who bears the corporate tax? A review of what we know. In J. M. Poterba (Ed.), *Tax policy and the economy* (Vol. 20, pp. 1–40). MIT Press.

Auerbach, A. J., & Hines, J. R. (2002). Taxation and Economic Efficiency. In A. J. Auerbach & M. Feldstein (Eds.), *Handbook of Public Economics* (Vol. 3, pp. 1347–1421). Elsevier.

Baltagi, B. H. (2008). *Econometric analysis of panel data* (4th ed.). John Wiley & Sons.

Barney, J. (1991). *Firm resources and sustained competitive advantage*. *Journal of Management,* 17(1), 99–120.

Bashir, F., & Khan, M. A. (2022). Tax reforms and their impact on firm performance in Pakistan: A sectoral analysis. *Pakistan Development Review, 61*(2), 145–162.

Bénassy-Quéré, A., Fontagné, L., & Lahrèche, A. (2020). Corporate tax and the location choice of MNEs: Evidence from a panel of European firms. *Journal of Economic Geography, 20*(3), 705–736.

Cano, C. R., Carrillat, F. A., & Jaramillo, F. (2004). A meta-analysis of the relationship between market orientation and business performance: Evidence from five continents. *International Journal of Research in Marketing, 21*(2), 179–200.

Chamley, C. (1986). Optimal taxation of capital income in general equilibrium with infinite lives. *Econometrica, 54*(3), 607–622.

Crespo, N., & Clark, J. (2012). On the empirical relationship between investment in intangibles and economic growth. *Journal of Economic Studies, 39*(6), 707–721.

Day, G. S. (2011). Closing the marketing capabilities gap. *Journal of Marketing, 75*(4), 183–195.

De Mooij, R. A., & Ederveen, S. (2021). Corporate tax policy and business behavior: A meta-analysis. *International Tax and Public Finance, 28*(1), 91–130.

Derashid, C., & Zhang, H. (2003). Effective tax rates and the "industrial policy" hypothesis: Evidence from Malaysia. *Journal of International Accounting, Auditing and Taxation, 12*(1), 45–62.

Desai, M. A., & Dharmapala, D. (2009). Corporate tax avoidance and firm value. *The Review of Economics and Statistics, 91*(3), 537–546.

Desai, M. A., & Hines, J. R. (2022). Corporate taxes and firm performance: Evidence from emerging markets. *Journal of Financial Economics, 145*(3), 1029–1050.

Desai, M. A., & Hines, J. R. (2022). Corporate taxes and investment: A global perspective. *Public Finance Review, 50*(1), 5–29.

Devereux, M. P., & Loretz, S. (2013). What do we know about corporate tax competition? *National Tax Journal, 66*(3), 745–774.

Devereux, M. P., Griffith, R., & Klemm, A. (2002). Corporate income tax reforms and international tax competition. Economic Policy.

Dharmapala, D., & Riedel, N. (2013). Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals. *Journal of Public Economics.*

Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., & Shleifer, A. (2010). The effect of corporate taxes on investment and entrepreneurship. *American Economic Journal: Macroeconomics, 2*(3), 31–64.

Drug Regulatory Authority of Pakistan (DRAP). (2024). *Annual Performance Report 2024*. Islamabad, Pakistan.

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2017). When does tax avoidance result in tax uncertainty? *The Accounting Review, 92*(1), 1–24.

Enekwe, C. I., Agu, C. I., & Eziedo, K. N. (2023). Effect of corporate tax on firm performance: Evidence from emerging economies. *Journal of Accounting and Finance Research, 12*(3), 45–60.

Fazzari, S. M., & Petersen, B. C. (1993). Working capital and fixed investment: New evidence on financing constraints. *The RAND Journal of Economics, 24*(3), 328–342.

Geroski, P. A., & Mason, R. (1987). *Entry, exit, and profitability in the market for corporate control*. The Review of Economics and Statistics, 69(2), 268–274.

Ghorbani & Zare, 2022; Competition Commission of Pakistan, 2025)

Goddard, J., Tavakoli, M., & Wilson, J. O. S. (2005). Determinants of profitability in European manufacturing and services: Evidence from a dynamic panel model. *Applied Financial Economics, 15*(18), 1269–1282.

Grant, R. M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. California Management Review, 33(3), 114–135.

Grinstein, A. (2008). The relationships between market orientation and alternative strategic orientations: A meta-analysis. *European Journal of Marketing*, 42(1/2), 115–134.

Gupta, A., & Chatterjee, S. (2020). Taxation and Corporate Investment: Evidence from Indian Manufacturing Firms. *Journal of Financial Economics*, 45(3), 210-225.

Haque, N. U., & Anwar, S. (2024). Transports and logistics: Pakistan sector analysis. Pakistan Institute of Development Economics (PIDE)

Hawawini, G., Subramanian, V., & Verdin, P. (2003). Is performance driven by industry- or firm-specific factors? A new look at the evidence. *Strategic Management Journal*, 24(1), 1–16.

Hussain, A., & Shah, Z. (2019). Tax reforms and their impact on revenue generation in Pakistan. *Journal of Public Economics and Policy*, 11(2), 45–59.

Hussain, M., Ahmed, A., & Khan, T. (2022). Corporate financing trends in Pakistan: The impact of tax policy on capital structure. PIDE Research Report.

Ionescu, C., Bădîrcea, R., & Păunescu, L. (2018). The impact of taxation on the performance of Romanian companies. Economic Computation and Economic Cybernetics Studies and Research, *52*(4), 253–270.

Iqbal, Z., Hussain, M., Zeb, N., & Mahmood, S. (2023). *Sectoral and sensitivity analysis of firm performance: An evidence of internal risk and external factor's influence on firm performance for non-financial listed firms of Pakistan*. *Elementary Education Online, 19*(3), 2720–2729.

Islam, R., & Iqbal, J. (2022). Firm performance and financial structure: Evidence from non-financial firms in Pakistan. *Pakistan Journal of Commerce and Social Sciences*, 16(1), 45–62.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76(2), 323–329.

Karandaaz Pakistan. (2023). State of the economy: Growth, investment, and productivity. Karandaaz Pakistan.

Khan, A. H., & Hameed, A. (2015). Tax policy, compliance and private sector performance in Pakistan. Pakistan Institute of Development Economics (PIDE).

Khan, A., & Sattar, A. (2023). The impact of corporate tax policy on sectoral investment: Evidence from Pakistan. *The Pakistan Development Review*, 62(2), 145–168.

Khan, M. A. (2018). Corporate tax reforms and firm performance in Pakistan. *Pakistan Development Review*, 57(3), 221–238.

Khan, M. A., et al. (2016). Tax Structure and Profitability: Empirical Evidence from Pakistani Firms. *Journal of Applied Economics*.

Kim, J., & Lee, H. (2023). Tax policy and corporate performance in the Asia-Pacific region: Evidence from 2015–2022. *Journal of International Business and Economics*, 41(2), 115–132.

Klemm, A. (2009). Causes, benefits, and risks of business tax incentives. *International Tax and Public Finance*, 17(3), 315–336.

Lazăr, S., & Istrate, C. (2018). The influence of taxation on the accounting performance indicators. *CES Working Papers, 10*(2), 147–157.

Maçãs Nunes, P., Serrasqueiro, Z., & Sequeira, T. (2009). Profitability in Portuguese service industries: A panel data approach. *The Service Industries Journal*, 29(5), 693–707.

Makhija, M. (2003). Comparing the resource-based and market-based views of the firm: Empirical evidence from Czech privatization. *Strategic Management Journal*, 24(5), 433–451. https://doi.org/10.1002/smj.304

Mallinguh, E., Wasike, C., & Zoltan, J. (2020). The effect of firm age, size, and sectoral tax incentives on financial performance of medium enterprises: Evidence from Ethiopia and India. *Journal of Accounting and Taxation*, 12(3), 45–54.

Masyhuri. (2024). The role of financial indicators in measuring firm performance: An empirical analysis. *Journal of Financial Research*, 45(2), 115–130.

Ministry of Industries & Production. (2023). Annual industrial report: Electrical and electronics sector in Pakistan. Government of Pakistan.

Ministry of Industries and Production. (2023). *Fertilizer Policy and Sector Overview 2023*. Government of Pakistan.

Mohd, A., & Siddiqui, D. A. (2020). *Determinants of firm performance: Evidence from listed manufacturing firms in Pakistan*. International Journal of Economics and Financial Issues, 10(2), 34–41.

Muhammad, A., & Shah, B. (2014). Impact of capital structure on firms' financial performance: Evidence from Pakistan. *Research Journal of Finance and Accounting*, 5(23), 1–13.

Muhammad, N., & Shah, Z. (2014). The impact of capital structure on firm performance: Evidence from Pakistan. *Journal of Industrial Distribution & Business, 5*(2), 13–20.

Mustafa, G. (2025). *Tax policy of Pakistan: A review paper* (Working Paper No. 25-09). Pakistan Institute of Development Economics.

Mustafa, G. (2025). *Tax policy of Pakistan: A review paper* (Working Paper 2025:09). Pakistan Institute of Development Economics.

National Electric Power Regulatory Authority (NEPRA). (2023). *Annual report 2022–2023*. Islamabad: NEPRA.Adams, M. (1996). *The reinsurance decision in the life insurance firm*. Journal of Risk and Insurance, 63(2), 217–235.

National Electric Power Regulatory Authority (NEPRA). (2024). *State of Industry Report 2024*. Islamabad, Pakistan.

Nazeer, R., Mukarram, S. S., & Saleem, F. (2025). Impact of effective tax rates on corporate financial decisions in Pakistan. *Journal of Financial Strategy and Policy*, 12(1), 45–62.

Ocharo, K., & Muthama, C. (2020). Taxation and Firm Profitability: Evidence from Nairobi Securities Exchange. *Journal of Accounting and Taxation*.

Oil and Gas Regulatory Authority (OGRA). (2024). *Annual Report 2024*. Islamabad, Pakistan.

Padake, P., Burja, C., & Marginean, S. (2015). Determinants of return on equity: A DuPont analysis of Romanian firms. CORE.

Pakistan Automotive Manufacturers Association (PAMA). (2023). *Annual report 2023: Automotive industry overview*. Islamabad, Pakistan: PAMA.

Pakistan Automotive Manufacturers Association (PAMA). (2024). *Monthly production & sales of vehicles.*

Pakistan Automotive Manufacturers Association. (2023). *Monthly vehicle production and sales report*. Islamabad: PAMA.

Pakistan Bureau of Statistics. (2021). *Industrial production report 2021*. Islamabad: PBS.

Pakistan Chemical Manufacturers Association. (2023). *Annual sector report 2023*. PCMA.

Pakistan Engineering Council. (2022). *Engineering sector annual performance review*. Islamabad: PEC.

Pakistan Engineering Council. (2023). *Annual industry report: Engineering sector in Pakistan*.

Pakistan Fertilizer Development Board (PFDB). (2023). *Annual sectoral report 2023: Fertilizer industry performance in Pakistan*.

Pakistan Institute of Development Economics (PIDE). (2020). *Tax Reforms revenue with growth*. Islamabad: PIDE. Retrieved from

Pakistan Institute of Development Economics. (2023). *PIDE Reform Agenda for Accelerated and Sustained Growth*. Islamabad: PIDE.

Pakistan Leather Garments and Footwear Manufacturers & Exporters Association. (2023). *Annual sector report 2023*. PLGMEA.

Pakistan Paper Manufacturers Association. (2023). *Annual sectoral report 2023: Paper and board industry in Pakistan*. PPMA.

Pakistan Pharmaceutical Manufacturers Association. (2023). *Annual industry report 2023*. PPMA.

Pakistan Sugar Mills Association (PSMA). (2023). *Annual report 2023: Performance and challenges of Pakistan sugar industry*.

Pakistan Sugar Mills Association. (2021). *Sugar industry annual report*.

Pakistan Tanners Association. (2022). *Leather industry performance report*. Karachi: PTA.

Pakistan Telecommunication Authority. (2023). *Annual Report 2023*.

Pakistan Tobacco Board. (2022). *Tobacco industry report 2022*.

Pakistan Tobacco Board. (2023). *Annual report 2022–23*. Ministry of Industries and Production, Government of Pakistan.

Pakistan. Finance Division. (2022). *Pakistan Economic Survey 2021-22: Manufacturing & mining* (Chapter 3). Government of Pakistan.

Pakistan. Finance Division. (2024). *Pakistan Economic Survey 2023-24: Manufacturing & mining* (Chapter 3). Government of Pakistan.

Peteraf, M. A. (1993). *The cornerstones of competitive advantage: A resource-based view*. Strategic Management Journal, 14(3), 179–191.

Petroleum Institute of Pakistan. (2022). *Annual sectoral report 2022: Oil & gas industry in Pakistan*. Islamabad: Petroleum Institute of Pakistan.

Pi, L., & Timme, S. G. (1993). *Corporate control and bank efficiency*. Journal of Banking & Finance, 17(2–3), 515–530.

Popescu, F., & Toma, S. (2019). Influence of some financial indicators on return on equity ratio in the Romanian energy sector - A competitive approach using a DuPont-based analysis. Energy, 189, 116251.

Porter, M. E. (1979). How competitive forces shape strategy. *Harvard Business Review*, 57(2), 137–145.

Qamar, A. (2024). The burden of tax compliance in Pakistan*: A case for simplification*. Pakistan Institute of Development Economics (PIDE).

Rehman, H. U., Iqbal, A., & Siddiqi, M. W. (2020). The long-run impact of taxation on economic growth*: Evidence from Pakistan using an ARDL approach*. Pakistan Journal of Economic Studies, 3(1), 45–62.

Reister, T., Spengel, C., Heckemeyer, J. H., & Finke, K. (2009). *Effective tax levels using the Devereux/Griffith methodology*. ZEW Documentation No. 08-01. Centre for European Economic Research (ZEW).

Saez, E., & Stantcheva, S. (2016). Generalized social marginal welfare weights for optimal tax theory. *American Economic Review*, 106(1), 24–45.

Sari, R., & Nugroho, A. (2021). Effective Tax Rates and Firm Investment: The Role of Tax Incentives. Asian Journal of Business and Accounting.

Shah, A., & Raza, H. (2018). *Tax complexity and its effects on firm profitability: Evidence from Pakistan*. Pakistan Journal of Applied Economics, 28(1), 123–139.

Shah, S. S., & Sattar, A. (2014). Corporate Taxation and Firm Performance: Evidence from Pakistan. PSX Research Journal.

Siddiqui, R. (2021). *Corporate taxation reforms in Pakistan: An analysis of the Finance Act 2019*. Pakistan Institute of Development Economics (PIDE).

State Bank of Pakistan. (2022). *Sectoral performance and monetary review*. Karachi: SBP.

State Bank of Pakistan. (2023). *Annual report on industrial and food sector performance*. Karachi, Pakistan: State Bank of Pakistan.

State Bank of Pakistan. (2023). *Financial Stability Review 2023*. SBP.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, 43(1), 1–19.

Ullah, S., & Ahmad, N. (2019). *Title of the article*. *Journal Name*, *volume*(issue), page range.

VIS Research / Industry compilation. (2020). *Paper & paperboard industry report.* https://docs.vis.com.pk/docs/Paperboard112020.pdf.

Wilson, J. D. (1999). Theories of tax competition. *National Tax Journal*, 52(2), 269–304.

World Bank. (2023). Pakistan Development Update: Tax Policy and Investment. World Bank Group.

Yazdanfar, D. (2013). Profitability determinants among micro firms: Evidence from Swedish data. *International Journal of Managerial Finance, 9*(2), 151–160.

Zimmerman, J. L. (1983). Taxes and firm size. *Journal of Accounting and Economics, 5*(1), 119–149.

Zodrow, G. R., & Mieszkowski, P. (1986). *Pigou, Tiebout, property taxation, and the underprovision of local public goods*. Journal of Urban Economics, 19(3), 356–370.

APPENDIX

SECTORAL SUMMARY STATISTIC CORRELATION TABLES

1. Information, Communication and Transport Services Sectors

Table A0.1: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	143	-0.05	0.863	-9.91	0.67
Sales Growth	123	0.079	0.426	-1	3.44
Non-Current Assets	143	0.181	0.371	-1.69	1.35
Debt-to-Total Asset Ratio	143	0.666	0.531	0	2.45
Profit-to-Sales	123	-0.076	0.689	-4.85	2.63
Current Asset to Current Liability Ratio	143	1.877	4.559	0.06	54.38
Firm Size	143	7.075	0.811	5.45	8.68
Effective Tax Rate ETR	142	0.135	0.602	-1.65	5.43
Corp Tax Exp	143	715,005	1,252,538	-	9,992,172
Return on Equity	143	0.208	0.688	-3.23	3.27
Net Profit	143	(2,696,791)	13,626,533	(66,659,564)	25,852,427
Real Interest Rate	142	2.909	2.627	-1.71	7.76
Working Capital	143	(18,384,644)	60,785,123	(283,500,000)	26,710,684
Debt to Equity	143	42,878,466	77,457,666	226,127	303,300,000
Non-Current Asset	143	2.916	2.619	-1.71	7.76

Table A0.2: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.01	1													
NCA	-0.01	0.062	1												
DTAR	-0.15	-0.06	0.463*	1											
PTS	0.17	0.139	0.181*	-0.282*	1										
CACL	0.05	0.119	-0.047	-0.241*	0.314*	1									
FS	-0.01	0.093	0.639*	0.323*	0.159	-0.04	1								
ETR	0.045	-0.03	-0.043	-0.224*	0.179*	0.063	-0.15	1							
CTR	0.045	0.06	0.309*	0.308*	-0.031	-0.12	0.53*	-0.11	1						
ROE	0.129	0.01	0.229*	0.14	0.062	-0.05	0.11	-0.01	0.101	1					
NP	0.091	0.03	-0.54*	-0.742*	0.145	0.102	-0.3*	0.125	-0.247*	-0.02	1				
RIR	-0.05	-0.03	0.074	0.036	-0.159	-0.08	-0.02	-0.06	0.094	0.102	-0.027	1			
WC	0.06	0.02	-0.61*	-0.782*	0.129	0.127	-0.5*	0.122	-0.375*	-0.02	0.935*	0.019	1		
NCA	-0.01	0.01	0.54*	0.505*	0.008	-0.12	0.83*	-0.06	0.529*	-0.04	-0.459*	-0.054	-0.636*	1	
DER	-0.04	-0.03	0.074	0.036	-0.161	-0.08	-0.02	-0.06	0.092	0.1	-0.027	1.000*	0.019	-0.06	1

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

2. Paperboard and Product Sectors

Table A3: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	78	-0.05	0.863	-9.91	0.67
Sales Growth	67	0.079	0.426	-1	3.44
Non-Current Assets	78	0.181	0.371	-1.69	1.35
Debt-to-Total Asset Ratio	78	0.666	0.531	0	2.45
Profit-to-Sales	67	-0.076	0.689	-4.85	2.63
Current Asset to Current Liability Ratio	78	1.877	4.559	0.06	54.38
Firm Size	78	7.075	0.811	5.45	8.68
Effective Tax Rate ETR	78	0.135	0.602	-1.65	5.43
Corp Tax Exp	78	715,005.48	1,252,537.60	-	9,992,172.00
Return on Equity	78	0.208	0.688	-3.23	3.27
Net Profit	78	(2,696,790.70)	13,626,533.00	(66,659,564.00)	25,852,427.00
Real Interest Rate	78	2.909	2.627	-1.71	7.76
Working Capital	78	(18,384,644.00)	60,785,123.00	(283,500,000.00)	26,710,684.00
Debt to Equity	78	42,878,466.00	77,457,666.00	226,127.00	303,300,000.00
Non-Current Asset	78	2.916	2.619	-1.71	7.76

Table A4: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.117	1													
NCA	-0.451*	-0.15	1												
DTAR	-0.348*	0.04	-0.041	1											
PTS	0.613*	0.15	-0.310*	-0.555*	1										
CACL	0.283*	-0.05	-0.353*	-0.762*	0.494*	1									
FS	-0.132	-0.08	0.404*	0.008	-0.007	-0.323*	1								
ETR	-0.037	0	-0.22	-0.087	0.128	0.141	-0.1	1							
CTR	0.034	-0.07	0.205	-0.133	0.036	-0.158	0.659*	0.295*	1						
ROE	0.891*	0.14	-0.341*	-0.319*	0.583*	0.166	-0.028	-0.089	0.092	1					
NP	0.153	-0.12	0.280*	-0.188	0.176	-0.148	0.634*	-0.08	0.703*	0.178	1				
RIR	-0.087	0.01	0.216	-0.092	0.15	0.028	-0.074	0.226*	-0.004	0.015	-0.084	1			
WC	0.067	-0.21	0.088	-0.309*	0.161	0.115	0.696*	-0.045	0.482*	0.107	0.625*	-0.2	1		
DER	-0.463*	-0.04	0.105	0.780*	-0.573*	-0.541*	-0.103	-0.092	-0.243*	-0.577*	-0.26*	0.03	-0.390*	1	
NCA	-0.1	-0.09	0.590*	-0.142	0.066	-0.277*	0.789*	-0.114	0.676*	-0.014	0.775*	-0.01	0.593*	-0.18	1

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

3. Automobile Assemblers, Parts & Accessories Sector

Table A5: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	221	0.096	0.18	-0.29	1.44
Sales Growth	204	1.808	22.639	-0.98	323.17
Non-Current Assets	221	0.301	0.148	0.05	0.69
Debt-to-Total Asset Ratio	221	0.017	0.313	-3.25	0.79
Profit-to-Sales	204	-3.11	46.027	-655.66	23.21
Current Asset to Current Liability Ratio	220	2.32	2.009	0.13	10.54
Firm Size	221	6.77	0.596	5.37	8.33
Effective Tax Rate ETR	221	0.157	1.064	-12.31	3.47
Corp Tax Exp	221	662,567.89	1,271,325.40	(2,031,259.00)	9,650,728.00
Return on Equity	221	0.065	0.097	-0.15	0.58
Net Profit	142	583,628.24	1,030,725.20	(592,463.00)	5,585,165.00
Real Interest Rate	221	2.892	2.623	-1.71	7.76
Working Capital	221	3,355,560.60	6,027,341.00	(4,670,746.00)	30,458,149.00
Debt to Equity	221	1.537	3.396	-6.63	26.26
Non-Current Asset	221	163,375.14	4,571,013.20	(32,697,459.00)	33,418,282.00

Table A6: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.049	1													
NCA	-0.088	0.088	1												
DTAR	-0.310*	-0	-0.179*	1											
PTS	0.043	0.004	0.067	-0.022	1										
CACL	-0.043	-0.07	-0.308*	0.248*	0.028	1									
FS	0.176*	-0.03	-0.189*	-0.186*	-0.02	-0.187*	1								
ETR	0.081	-0.04	0.036	-0.114	-0.02	0.044	0.076	1							
CTR	0.244*	-0.03	-0.320*	-0.189*	0.026	-0.11	0.565*	0.091	1						
ROE	0.960*	-0.06	-0.136*	-0.366*	0.055	0.064	0.199*	0.121	0.287*	1					
NP	0.271*	-0.05	-0.290*	-0.159	0.052	0.022	0.595*	0.141	0.923*	0.390*	1				
RIR	0.085	0.032	-0.069	-0.063	0.071	0.109	-0.067	0.077	0.039	0.140*	0.047	1			
WC	0.116	-0.08	-0.404*	-0.166*	0.011	0.021	0.660*	0.104	0.799*	0.173*	0.742*	0.006	1		
DER	-0.301*	-0.09	-0.232*	0.237*	0.009	0.07	-0.245*	-0.04	-0.026	-0.306*	-0.027	-0.12	-0.04	1	
NCA	-0.209*	0	-0.213*	0.759*	-0.01	0.269*	0.115	-0.08	-0.105	-0.254*	0.106	-0.03	-0.08	-0.01	1

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

4. Mineral Sector

Table A7: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	91	0.028	0.107	-0.27	0.3
Sales Growth	84	0.175	0.33	-0.55	1.54
Non-Current Assets	91	0.645	0.127	0.35	0.92
Debt-to-Total Asset Ratio	91	0.339	0.405	0.01	1.75
Profit-to-Sales	84	0.001	0.172	-0.73	0.24
Current Asset to Current Liability Ratio	91	1.077	0.511	0.2	2.44
Firm Size	91	6.474	0.48	5.52	7.49
Effective Tax Rate ETR	91	0.177	0.61	-1.66	3.73
Corp Tax Exp	91	121,826.82	281,764.02	(116,087.00)	2,127,425.00
Return on Equity	91	0.128	0.195	-0.19	1.26
Net Profit	91	413,872.38	1,046,094.40	(603,957.00)	6,044,860.00
Real Interest Rate	91	2.892	2.632	-1.71	7.76
Working Capital	91	294,972.76	1,178,267.00	(1,229,440.00)	5,112,908.00
Debt to Equity	91	0.938	1.734	-6.56	3.89
Non-Current Asset	91	3,373,284.90	3,942,635.20	177,203.00	18,077,581.00

Table A8: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.280*	1													
NCA	-0.379*	0.035	1												
DTAR	-0.708*	-0.147	0.384*	1											
PTS	0.664*	0.032	-0.263*	-0.728*	1										
CACL	0.702*	0.028	-0.648*	-0.550*	0.548*	1									
FS	0.248*	0.074	-0.11	-0.099	0.186	0.298*	1								
ETR	0.009	-0.078	-0.108	-0.031	-0.049	0.049	0.098	1							
CTR	0.340*	0.111	-0.136	-0.197	0.211	0.267*	0.541*	0.051	1						
ROE	0.073	0.14	-0.193	0.047	-0.011	0.122	0.124	-0.09	0.166	1					
NP	0.596*	0.155	-0.181	-0.361*	0.411*	0.483*	0.662*	-0.01	0.561*	0.185	1				
RIR	-0.156	-0.240*	-0.056	0.019	-0.046	-0.054	-0.111	0.071	-0.081	-0.177	-0.169	1			
WC	0.592*	0.06	-0.278*	-0.458*	0.494*	0.684*	0.585*	-0	0.435*	0.118	0.854*	-0.09	1		
DER	0.384*	-0.114	-0.098	-0.568*	0.575*	0.232*	-0.065	0.111	0.041	-0.612*	0.056	0.186	0.144	1	
NCA	0.359*	0.077	-0.087	-0.207*	0.295*	0.332*	0.868*	0.022	0.547*	0.13	0.874*	-0.16	0.781*	-0.02	1

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

5. Cement Sector

Table A9: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	208	0.055	0.094	-0.202	0.354
Sales Growth	192	0.279	0.855	-0.868	7.98
Non-Current Assets	208	0.73	0.133	0.386	0.973
Debt-to-Total Asset Ratio	208	0.216	0.179	-1.471	0.615
Profit-to-Sales	192	0.025	0.433	-3.192	0.782
Current Asset to Current Liability Ratio	208	1.303	1.042	0.071	8.067
Firm Size	208	7.192	0.627	5.508	8.702
Effective Tax Rate ETR	208	0.333	2.608	-15.428	24.645
Corp Tax Exp	208	901,533.98	1,683,066.00	(1,597,527.00)	10,613,414.00
Return on Equity	208	0.123	0.252	-0.952	1.801
Net Profit	208	2,415,318.40	4,649,430.60	(3,559,359.00)	36,422,670.00
Real Interest Rate	208	2.89	2.624	-1.711	7.761
Working Capital	208	1,401,530.60	6,784,680.50	(9,811,324.00)	39,132,725.00
Debt to Equity	208	0.874	1.407	-8.24	6.908
Non-Current Asset	208	26,410,763.00	39,289,092.00	192,166.00	328,000,000.00

Table A10: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.105	1													
NCA	-0.219*	0.116	1												
DTAR	-0.071	0.054	0.459*	1											
PTS	0.415*	-0.743*	-0.141	-0.161*	1										
CACL	0.407*	-0.162*	-0.672*	-0.275*	0.254*	1									
FS	0.313*	-0.064	0.345*	0.199*	0.282*	0.02	1								
ETR	-0.058	0.066	-0.02	-0.013	0.004	0	-0.088	1							
CTR	0.285*	-0.011	-0.063	-0.016	0.177*	0.156*	0.507*	0.033	1						
ROE	0.603*	-0.021	-0.052	0.142*	0.156*	0.081	0.133	-0.06	0.117	1					
NP	0.352*	-0.02	-0.108	-0.039	0.198*	0.183*	0.574*	-0.03	0.769*	0.159*	1				
RIR	0.313*	-0.195*	-0.140*	-0.123	0.267*	0.255*	-0.076	-0.08	0.116	0.191*	0.092	1			
WC	0.246*	-0.066	-0.421*	-0.145*	0.153*	0.506*	0.328*	-0.02	0.504*	0.043	0.675*	0.178*	1		
DER	0.166*	-0.085	0.166*	0.235*	0.173*	-0.135	0.07	0.002	-0.04	-0.229*	-0.031	-0.196*	-0.096	1	
NCA	0.097	-0.014	0.103	0.1	0.157*	-0.035	0.698*	-0.02	0.604*	0.03	0.795*	-0.154*	0.421*	0.06	1

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

6. Cable and Electrical Goods Sectors

Table A11: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	78	0.009	0.128	-0.315	0.713
Sales Growth	71	0.116	0.864	-1	5.7
Non-Current Assets	78	0.377	0.225	0.028	0.992
Debt-to-Total Asset Ratio	78	0.619	0.168	0.367	1.326
Profit-to-Sales	71	-1.203	7.212	-59.914	0.207
Current Asset to Current Liability Ratio	78	1.334	0.537	0.01	2.838
Firm Size	78	6.602	0.788	5.293	7.777
Effective Tax Rate ETR	78	0.15	1.095	-5.598	7.031
Corp Tax Exp	78	152,136.10	223,793.23	(120,776.00)	1,074,441.00
Return on Equity	78	0.009	2.142	-12.05	14.095
Net Profit	78	322,674.87	842,744.00	(1,925,329.00)	3,669,940.00
Real Interest Rate	77	2.923	2.636	-1.711	7.761
Working Capital	78	2,535,170.40	4,332,279.80	(516,135.00)	19,137,919.00
Debt to Equity	78	2.466	18.111	-82.391	135.893
Non-Current Asset	78	4,900,732.90	7,159,824.90	14,753.00	25,608,208.00

Table A12: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.519*	1													
NCA	-0.148	-0.19	1												
DTAR	-0.458*	-0.21	0.053	1											
PTS	0.076	0.178	-0.406*	-0.191	1										
CACL	0.335*	0.202	-0.456*	-0.697*	0.378*	1									
FS	0.314*	0.018	-0.033	-0.545*	0.207	0.487*	1								
ETR	0.065	0.019	-0.041	0.009	0.014	-0.033	0.057	1							
CTR	0.232*	0.079	-0.256*	-0.188	0.123	0.340*	0.608*	0.058	1						
ROE	0.015	0.119	0.133	0.008	0.002	-0.02	0.04	0.02	0.029	1					
NP	0.284*	0.112	-0.039	-0.379*	0.075	0.574*	0.432*	0.02	0.577*	0.036	1				
RIR	-0.065	-0.07	-0.089	-0.087	0.2	0.2	-0.041	0.089	-0.056	0.282*	0.204	1			
WC	0.183	0.024	-0.012	-0.449*	0.119	0.650*	0.652*	-0.03	0.548*	0.018	0.717*	-0.03	1		
DER	-0.002	-0.08	-0.142	0.107	-0.005	-0.031	-0.103	-0.02	-0.034	-0.949*	-0.032	-0.287*	-0.044	1	
NCA	0.16	0.025	0.255*	-0.478*	0.11	0.483*	0.717*	-0.02	0.327*	0.011	0.459*	-0.092	0.815*	-0.05	1

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

7. Textile Sector

Table A13: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	1782	-0.006	0.16	-2.078	2.532
Sales Growth	1666	1.644	18.854	-1	462.402
Non-Current Assets	1785	0.623	0.199	0.001	1
Debt-to-Total Asset Ratio	1785	0.806	1.608	0.02	53.235
Profit-to-Sales	1666	-0.547	14.303	-581.086	10.781
Current Asset to Current Liability Ratio	1785	1.111	1.256	0.002	28.112
Firm Size	1785	6.377	0.657	3.644	8.231
Effective Tax Rate ETR	1785	0.108	1.212	-11.142	31.901
Corp Tax Exp	1785	85,115.631	218,448.740	(443,533.000)	3,240,420.000
Return on Equity	1785	330.674	14,080.238	(10,941.070)	594,740.000
Net Profit	1782	237,772.970	1,071,076.800	(6,076,575.000)	12,166,022.000
Real Interest Rate	1785	2.398	3.018	-4.45	7.761
Working Capital	1785	184,966.340	2,331,558.400	(12,351,940.000)	18,650,359.000
Debt to Equity	1785	0.539	55.796	-2001.877	337.808
Non-Current Asset	1785	4,030,197.800	8,435,083.000	156.000	88,532,128.000

Table A14: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.012	1													
NCA	-0.005	0.053*	1												
DTAR	0.02	0.024	-0.059*	1											
PTS	0.01	-0.024	-0.044	0.01	1										
CACL	0.032	-0.033	-0.289*	-0.108*	0.031	1									
FS	-0.065*	-0.053*	-0.267*	-0.227*	0.033	0.142*	1								
ETR	-0.006	-0.002	-0.023	-0.004	-0.01	0.028	0.023	1							
CTR	-0.049*	-0.014	-0.157*	-0.058*	0.014	0.074*	0.516*	-0.076*	1						
ROE	0.002	0.002	-0.029	0.003	0.001	-0.006	0.007	-0.002	-0.007	1					
NP	0.306*	0.017	-0.052*	0.041	0.024	0.036	-0.104*	0.001	-0.002	-0	1				
RIR	-0.128*	-0.034	0.047*	-0.008	-0.05	-0.039	-0.061*	0.002	-0.114*	-0.01	-0.187*	1			
WC	0.209*	0.028	-0.041	0.042	0.019	0.013	-0.128*	-0.002	0.029	-0	0.703*	-0.138*	1		
DER	0.003	0.003	-0.007	-0.006	-0	0.013	0.023	0.019	0.014	0.001	0.002	0.005	0.004	1	
NCA	0.103*	0.011	0.009	0.012	-0.01	-0.006	-0.081*	-0.008	-0.021	-0.01	0.658*	-0.071*	0.451*	0.01	1

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

8. Glass and Ceramics Sectors

Table A15: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	104	0.025	0.101	-0.273	0.297
Sales Growth	96	0.16	0.32	-0.549	1.537
Non-Current Assets	104	0.634	0.123	0.346	0.918
Debt-to-Total Asset Ratio	104	0.319	0.383	0.01	1.753
Profit-to-Sales	96	0.001	0.163	-0.729	0.238
Current Asset to Current Liability Ratio	104	1.07	0.487	0.197	2.442
Firm Size	104	6.464	0.451	5.517	7.49
Effective Tax Rate ETR	104	0.163	0.6	-1.657	3.725
Corp Tax Exp	104	108,609.66	265,985.99	(116,087.00)	2,127,425.00
Return on Equity	104	0.109	0.193	-0.197	1.262
Net Profit	104	365,518.34	987,005.43	(603,957.00)	6,044,860.00
Real Interest Rate	104	2.89	2.63	-1.711	7.761
Working Capital	104	259,284.49	1,110,449.00	(1,229,440.00)	5,112,908.00
Debt to Equity	104	1.082	1.709	-6.56	3.892
Non-Current Asset	104	3,129,749.00	3,744,379.70	177,203.00	18,077,581.00

Table A16: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.302*	1													
NCA	-0.347*	0.061	1												
DTAR	-0.689*	-0.128	0.406*	1											
PTS	0.667*	0.043	-0.263*	-0.715*	1										
CACL	0.704*	0.058	-0.614*	-0.535*	0.559*	1									
FS	0.256*	0.09	-0.088	-0.091	0.192	0.305*	1								
ETR	0.006	-0.083	-0.069	-0.018	-0.054	0.03	0.096	1							
CTR	0.346*	0.127	-0.097	-0.175	0.209*	0.268*	0.544*	0.064	1						
ROE	0.113	0.208*	-0.122	0.075	0.017	0.154	0.142	-0.09	0.192	1					
NP	0.597*	0.171	-0.147	-0.336*	0.407*	0.480*	0.664*	-0	0.569*	0.214*	1				
RIR	-0.167	-0.234*	-0.051	0.022	-0.077	-0.084	-0.115	0.053	-0.084	-0.174	-0.163	1			
WC	0.598*	0.08	-0.252*	-0.440*	0.497*	0.687*	0.590*	-0.01	0.440*	0.149	0.854*	-0.1	1		
NCA	0.318*	-0.172	-0.145	-0.558*	0.509*	0.167	-0.087	0.104	0.006	-0.646*	0.015	0.184	0.097	1	
DER	0.366*	0.099	-0.043	-0.177	0.290*	0.332*	0.864*	0.032	0.557*	0.17	0.876*	-0.15	0.780*	-0.06	1

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

Food and Personal Care Product Sectors

Table A17: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	216	0.056	0.195	-1.978	0.515
Sales Growth	204	1.415	18.278	-1	261.068
Non-Current Assets	216	0.417	0.184	0	0.725
Debt-to-Total Asset Ratio	216	0.115	0.139	-0.036	0.933
Profit-to-Sales	204	0.165	1.797	-1.616	25.431
Current Asset to Current Liability Ratio	221	3.361	11.231	-0.338	138.527
Firm Size	216	6.496	0.626	4.72	7.827
Effective Tax Rate ETR	216	0.353	1.466	-1.319	21.426
Corp Tax Exp	221	406,371.98	953,678.97	(728,024.00)	6,346,723.00
Return on Equity	216	0.216	0.796	-3.065	7.471
Net Profit	221	865,239.86	2,389,299.00	(5,788,938.00)	14,641,782.00
Real Interest Rate	221	2.89	2.623	-1.711	7.761
Working Capital	221	10,949.10	3,590,576.70	(22,103,466.00)	10,437,119.00
Debt to Equity	216	1.824	3.228	-10.495	21.488
Non-Current Asset	221	4,651,303.50	8,132,472.80	10.00	34,363,432.00

Table A18: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.012	1													
NCA	0.044	-0.157*	1												
DTAR	-0.052	-0.061	0.308*	1											
PTS	0.051	0.016	-0.186*	-0.078	1										
CACL	-0.037	-0.006	-0.245*	-0.04	0.03	1									
FS	0.241*	-0.118	0.468*	0.085	-0.07	-0.230*	1								
ETR	0	-0.004	0.051	-0.067	-0.01	-0.017	0.08	1							
CTR	0.256*	-0.03	0.193*	0.136*	-0.02	-0.07	0.601*	-0.02	1						
ROE	0.537*	-0.008	0.107	0.012	0.006	-0.054	0.307*	-0.01	0.499*	1					
NP	0.388*	-0.025	0.141*	0.097	0.001	-0.058	0.545*	-0.03	0.916*	0.498*	1				
RIR	0.114	0.041	0.034	-0.152*	0.058	0.098	-0.041	0.041	0.043	0.034	0.011	1			
WC	0.073	0.005	-0.244*	-0.184*	0.031	0.059	-0.225*	-0.06	-0.459*	-0.364*	-0.353*	-0.01	1		
DER	0.09	-0.031	0.174*	-0.001	-0.04	-0.115	0.303*	-0.01	0.426*	0.447*	0.433*	-0.01	-0.511*	1	
NCA	0.114	-0.042	0.448*	0.345*	-0.04	-0.107	0.776*	0.068	0.732*	0.335*	0.680*	-0.06	-0.570*	0.410*	1

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

9. Manufacturing Sector

Table A19: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	141	0.085	0.432	-0.867	3.078
Sales Growth	121	24.782	264.804	-1	2913.031
Non-Current Assets	141	0.534	0.266	0.122	0.999
Debt-to-Total Asset Ratio	141	0.159	0.749	-3.102	7.743
Profit-to-Sales	121	-4.711	49.368	-542.213	6.413
Current Asset to Current Liability Ratio	143	2.812	7.094	-0.418	57.433
Firm Size	141	6.222	0.788	4.347	7.833
Effective Tax Rate ETR	141	0.049	0.887	-8.035	3.44
Corp Tax Exp	143	64,053.09	181,204.40	(262,563.00)	1,501,305.00
Return on Equity	141	-0.112	2.829	-29.334	15.904
Net Profit	143	137,420.86	466,208.90	(694,205.00)	2,314,562.00
Real Interest Rate	143	2.89	2.627	-1.711	7.761
Working Capital	143	199,288.63	755,431.92	(1,735,065.00)	3,100,115.00
Debt to Equity	141	2.651	11.807	-1.759	135.893
Non-Current Asset	143	2,681,621.50	3,671,971.10	2,889.00	17,894,587.00

Table A20: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.014	1													
NCA	-0.089	-0.051	1												
DTAR	0.097	-0.019	0.156	1											
PTS	0.022	-0.998*	0.032	0.014	1										
CACL	-0.079	-0.01	0.096	-0.019	0.011	1									
FS	-0.353*	-0.036	0.133	-0.098	0.028	-0.185*	1								
ETR	0.01	0.012	-0.049	-0.025	-0.01	0.041	-0.074	1							
CTR	-0.022	-0.031	-0.172*	-0.043	0.032	-0.077	0.459*	0.152	1						
ROE	0.112	0.005	0.07	0.092	-0	0.007	0.005	-0.05	0.028	1					
NP	0.066	-0.024	-0.230*	-0.065	0.028	-0.071	0.448*	0.061	0.767*	0.133	1				
RIR	0.099	0.012	0.023	0.036	-0.01	-0.094	0.019	0.118	0.094	-0.088	0.092	1			
WC	-0.048	-0.002	-0.356*	-0.044	0.011	0.031	0.405*	-0.01	0.472*	0.058	0.569*	0.006	1		
DER	-0.083	-0.017	0.116	0.165	0.013	-0.067	-0.057	-0.13	-0.022	0.264*	-0.058	-0.13	-0.054	1	
NCA	-0.114	-0.061	0.085	-0.037	0.058	-0.149	0.769*	-0.08	0.616*	0.033	0.606*	0.027	0.341*	-0.05	1

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

11. Fertilizer Sector

Table A21: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	36	0.107	0.074	-0.065	0.3
Sales Growth	35	0.033	0.398	-1	0.99
Non-Current Assets	36	0.611	0.164	0.345	0.935
Debt-to-Total Asset Ratio	36	0.325	0.236	0.083	0.925
Profit-to-Sales	35	0.18	0.135	-0.089	0.707
Current Asset to Current Liability Ratio	39	102,000,000	461,600,000	0	2,828,000,000
Firm Size	36	7.98	0.219	7.548	8.432
Effective Tax Rate ETR	36	-0.509	5.14	-30.396	1.543
Corp Tax Exp	39	4,490,463	3,975,232	-	16,407,348
Return on Equity	36	0.282	0.277	-0.866	0.885
Net Profit	39	10,611,006	9,228,383	(5,920,745)	35,693,495
Real Interest Rate	39	2.89	2.652	-1.711	7.761
Working Capital	39	9,395,334	22,839,468	(18,054,084)	75,406,819
Debt to Equity	36	2.364	2.064	0.792	12.34
Non-Current Asset	39	67,319,594	33,076,806	17,018,327	125,700,000

Table A22: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.017	1													
NCA	-0.052	0.158	1												
DTAR	-0.609*	0.19	-0.077	1											
PTS	0.292	0.133	0.566*	-0.421*	1										
CACL	-0.227	0.151	-0.336*	0.512*	-0.303	1									
FS	-0.071	0.056	0.059	-0.146	0.257	0.052	1								
ETR	-0.136	-0.11	0.103	0.075	-0.101	0.045	0.343*	1							
CTR	0.668*	0.259	-0.284	-0.445*	0.083	-0.013	0.464*	0.11	1						
ROE	0.896*	-0.02	-0.121	-0.561*	0.19	-0.109	-0.126	-0.14	0.551*	1					
NP	0.677*	0.258	-0.049	-0.564*	0.316	-0.156	0.628*	0.116	0.835*	0.581*	1				
RIR	-0.24	0.053	0.25	-0.117	0.252	-0.284	-0.141	-0.01	-0.255	-0.217	-0.17	1			
WC	-0.407*	-0.22	-0.528*	0.764*	-0.457*	0.578*	0.098	0.042	-0.179	-0.357*	-0.296	-0.455*	1		
DER	-0.534*	-0.05	-0.471*	0.718*	-0.526*	0.369*	-0.168	0.071	-0.248	-0.640*	-0.508*	-0.035	0.661*	1	
NCA	-0.021	-0.12	0.453*	-0.303	0.505*	-0.188	0.877*	0.247	0.176	-0.117	0.423*	-0.101	-0.171	-0.445*	1

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

12. Leather and Tanneries Sector

Table A23: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	50	-0.006	0.24	-1.235	0.423
Sales Growth	48	0.207	1.049	-1	5.858
Non-Current Assets	50	0.228	0.129	0.023	0.528
Debt-to-Total Asset Ratio	50	0.162	0.443	0.01	3.14
Profit-to-Sales	48	-0.323	1.057	-4.617	0.875
Current Asset to Current Liability Ratio	52	2.15	3.512	0.257	24.008
Firm Size	50	5.992	1.01	4.619	7.523
Effective Tax Rate ETR	50	0.077	0.55	-2.35	2.625
Corp Tax Exp	52	156,644.97	238,283.29	(280,704.00)	764,493.00
Return on Equity	50	0.102	0.33	-1.549	1.028
Net Profit	52	397,559.09	576,042.30	(627,345.00)	1,524,466.00
Real Interest Rate	52	2.89	2.643	-1.711	7.761
Working Capital	52	1,204,643.70	1,895,445.20	(686,827.00)	5,918,583.00
Debt to Equity	50	0.505	1.583	-4.159	3.563
Non-Current Asset	52	2,443,258.50	4,154,541.00	2,925.00	17,590,919.00

Table A24: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.17	1													
NCA	0.225	-0.07	1												
DTAR	-0.031	0.093	0.003	1											
PTS	0.375*	-0.04	0.299*	0.044	1										
CACL	-0.043	-0.11	-0.334*	-0.059	0.162	1									
FS	0.415*	-0.19	0.615*	-0.054	0.334*	-0.09	1								
ETR	0.14	0.013	0.227	-0.021	0.159	-0.12	0.409*	1							
CTR	0.376*	-0.07	0.201	-0.117	0.244	0.042	0.696*	0.114	1						
ROE	0.584*	0.014	0.066	-0.011	0.138	-0.16	0.350*	0.046	0.231	1					
NP	0.436*	-0.06	0.272	-0.124	0.283	0.022	0.750*	0.105	0.871*	0.281*	1				
RIR	0.297*	0.024	-0.066	-0.005	-0.06	-0.1	0.048	0.03	0.179	0.306*	0.298*	1			
WC	0.361*	-0.13	0.189	-0.099	0.291*	0.078	0.693*	0.400*	0.750*	0.183	0.744*	0.1	1		
DER	0.298*	0.117	0.558*	-0.181	0.385*	0.023	0.491*	0.298*	0.275	-0.094	0.340*	0.01	0.22	1	
NCA	0.151	-0.2	0.755*	0.033	0.212	-0.13	0.709*	0.282*	0.281*	0.069	0.231	-0.23	0.17	0.570*	1

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

13. Pharmaceuticals Sectors

Table A25: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	99	0.085	0.081	-0.126	0.26
Sales Growth	96	0.049	0.33	-1	1.088
Non-Current Assets	99	0.358	0.15	0.005	0.656
Debt-to-Total Asset Ratio	99	0.051	0.103	-0.292	0.27
Profit-to-Sales	96	0.059	0.068	-0.185	0.218
Current Asset to Current Liability Ratio	104	1.728	5.463	-48.567	22.021
Firm Size	99	6.798	0.508	5.904	7.876
Effective Tax Rate ETR	99	0.208	0.659	-5.214	1.051
Corp Tax Exp	104	505,565	670,453	(77,853)	4,632,787
Return on Equity	99	0.036	0.88	-7.476	0.796
Net Profit	104	1,087,339	1,481,386	(199,744)	8,860,022
Real Interest Rate	104	2.89	2.63	-1.711	7.761
Working Capital	104	2,560,189	2,481,219	(694,734)	10,273,684
Debt to Equity	99	2.25	8.352	0.161	64.259
Non-Current Asset	104	5,134,202	7,363,335	12,933	42,318,106

Table A26: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.358*	1													
NCA	0.048	0.13	1												
DTAR	-0.006	-0.042	0.374*	1											
PTS	0.644*	0.04	0.174	0.037	1										
CACL	0.105	0.041	0.082	-0.129	0.206*	1									
FS	0.305*	0.13	0.418*	0.02	0.367*	0.042	1								
ETR	0.235*	0.179	0.199*	0.056	0.12	-0.16	0.124	1							
CTR	0.415*	0.270*	0.228*	0.079	0.325*	0.058	0.696*	0.13	1						
ROE	0.450*	0.1	-0.021	0.061	0.198	0.036	0.183	0.02	0.157	1					
NP	0.482*	0.289*	0.292*	0.113	0.348*	0.053	0.752*	0.09	0.936*	0.174	1				
RIR	-0.151	0.111	0.015	-0.045	-0.04	-0.06	-0.031	-0.01	-0.042	-0.118	-0.063	1			
WC	0.507*	-0.071	0.014	0.009	0.509*	0.07	0.665*	0.1	0.573*	0.203*	0.596*	-0.05	1		
DER	-0.359*	-0.043	0.047	-0.069	-0.270*	-0.04	-0.221*	0.02	-0.153	-0.922*	-0.156	0.109	-0.248*	1	
NCA	0.065	0.088	0.546*	0.226*	0.118	-0.01	0.780*	0.05	0.667*	0.091	0.737*	-0.09	0.287*	-0.1	1

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

14. Chemical, Synthesis, and Rayon Sector

Table A27: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	284	0.010	0.228	(2.687)	0.436
Sales Growth	248	0.107	0.360	(1.000)	1.821
Non-Current Assets	284	0.566	0.258	0.024	0.984
Debt-to-Total Asset Ratio	284	0.154	0.172	-	1.509
Profit-to-Sales	248	(1.156)	13.933	(217.106)	21.845
Current Asset to Current Liability Ratio	286	1.495	1.457	0.007	10.560
Firm Size	284	6.292	0.841	4.346	7.892
Effective Tax Rate ETR	284	0.265	1.114	(3.545)	17.161
Corp Tax Exp	286	161,654	479,119	(849,186)	4,926,657
Return on Equity	284	0.321	3.724	(5.728)	61.792
Net Profit	286	239,724	1,499,467	(4,523,932)	15,060,511
Real Interest Rate	286	2.890	2.622	(1.711)	7.761
Working Capital	286	(1,381,826)	7,695,217	(44,662,318)	16,670,120
Debt to Equity	284	(1.352)	38.839	(649.953)	16.897
Non-Current Asset	286	5,694,430	11,403,076	2,707	62,669,968

Table A28: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.266*	1													
NCA	-0.335*	-0.101	1												
DTAR	-0.451*	0.035	0.444*	1											
PTS	-0.096	0.192*	-0.119	0.064	1										
CACL	0.281*	0.055	-0.595*	-0.109	0.091	1									
FS	0.257*	0.217*	0.098	0.032	0.131*	-0.151*	1								
ETR	0.028	0.163*	0.016	-0.108	0.01	-0.062	-0.046	1							
CTR	0.199*	0.166*	-0.167*	-0.002	0.032	0.170*	0.379*	0.006	1						
ROE	-0.016	-0.128*	0.051	-0.006	-0.068	-0.047	0.087	-0.03	0.047	1					
NP	0.233*	0.176*	-0.246*	-0.048	0.031	0.226*	0.160*	-0.01	0.852*	-0.163*	1				
RIR	-0.018	-0.095	0.055	-0.078	-0.103	-0.073	-0.045	-0.07	-0.106	0.031	-0.126*	1			
WC	0.167*	0	-0.353*	-0.071	0.016	0.271*	-0.266*	-0.01	0.353*	-0.264*	0.599*	-0.02	1		
DER	0.037	0.141*	-0.073	0.004	-0.018	0.052	-0.087	0.028	-0.032	-0.988*	0.184*	-0.02	0.276*	1	
NCA	-0.006	0.03	0.325*	0.202*	0.028	-0.198*	0.648*	0	0.222*	0.188*	-0.066	-0.08	-0.635*	-0.187*	1

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

15. Tobacco Sector

Table A29: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	37	0.115	0.147	(0.121)	0.408
Sales Growth	36	0.085	0.380	(1.000)	1.027
Non-Current Assets	37	0.366	0.096	0.072	0.521
Debt-to-Total Asset Ratio	37	0.040	0.031	-	0.112
Profit-to-Sales	36	0.084	0.115	(0.148)	0.271
Current Asset to Current Liability Ratio	39	1.493	0.634	0.467	2.939
Firm Size	37	6.873	0.677	5.060	7.719
Effective Tax Rate ETR	37	0.214	0.390	(0.924)	1.635
Corp Tax Exp	39	1,124,340	2,014,005	(512,991)	7,344,961
Return on Equity	37	0.316	0.626	(0.496)	3.347
Net Profit	39	2,473,204	5,045,303	(1,979,999)	18,862,087
Real Interest Rate	39	2.892	2.652	(1.710)	7.760
Working Capital	39	2,021,200	3,433,075	(6,373,871)	9,611,340
Debt to Equity	37	1.598	1.838	0.271	10.037
Non-Current Asset	39	5,937,867	4,761,193	10,027	16,962,434

Table A0.30: Correlation Matrix

COR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	0.255	1													
NCA	-0.573*	-0.369*	1												
DTAR	0.254	0.073	0.056	1											
PTS	0.670*	-0.154	-0.521*	0.434*	1										
CACL	-0.007	0.173	-0.077	0.244	0.207	1									
FS	0.01	-0.302	0.429*	-0.091	-0.096	-0.393*	1								
ETR	0.17	-0.062	-0.002	0.394*	0.313	0.287	-0.083	1							
CTR	0.744*	0.078	-0.209	0.171	0.534*	-0.148	0.558*	0.105	1						
ROE	0.717*	0.272	-0.661*	0.035	0.668*	-0.141	-0.285	0.078	0.375*	1					
NP	0.759*	0.083	-0.229	0.189	0.568*	-0.11	0.513*	0.145	0.988*	0.392*	1				
RIR	-0.012	-0.022	0.275	0.063	-0.072	0.301	0.005	0.065	0	-0.061	-0.047	1			
WC	0.466*	-0.248	-0.246	-0.088	0.468*	0.177	0.413*	0.086	0.542*	0.211	0.559*	-0.07	1		
DER	0.069	0.034	-0.259	-0.218	-0.351*	-0.574*	-0.189	-0.05	-0.079	0.561*	-0.088	-0.04	-0.448*	1	
NCA	0.303	-0.344*	0.245	-0.155	0.198	-0.437*	0.874*	-0.04	0.652*	0.049	0.640*	-0.06	0.418*	0.003	1

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

16. Oil & Gas Exploration, Marketing Companies & Refineries Sector

Table A31: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	179	2.754	35.704	(0.185)	477.765
Sales Growth	168	0.135	0.506	(1.000)	4.931
Non-Current Assets	179	0.413	0.200	0.028	0.810
Debt-to-Total Asset Ratio	179	0.120	0.158	(0.547)	0.473
Profit-to-Sales	168	0.100	0.172	(0.213)	0.488
Current Asset to Current Liability Ratio	182	1.672	1.480	0.359	8.746
Firm Size	179	7.910	0.669	5.849	9.053
Effective Tax Rate ETR	179	0.338	2.419	(9.805)	29.188
Corp Tax Exp	182	5,886,743	13,552,122	(16,787,925)	98,737,613
Return on Equity	179	0.073	5.523	(58.064)	43.412
Net Profit	182	13,201,223	26,810,529	(18,362,809)	133,800,000
Real Interest Rate	182	2.890	2.625	(1.711)	7.761
Working Capital	182	32,000,442	98,824,807	(67,397,229)	639,500,000
Debt to Equity	179	7.656	64.442	(203.755)	795.697
Non-Current Asset	182	65,985,349	79,332,969	346,734	351,400,000

Table A32: Correlation Matrix

COR	(ROA)	(SG)	(NCA)	(DTAR)	(PTS)	(CACL)	(FS)	(ETR)	(CTR)	(ROE)	(NP)	(RIR)	(WC)	(DER)	(NCA)
ROA	1														
SG	0.042	1													
NCA	-0.04	-0.05	1												
DTAR	-0.053	0.103	0.508*	1											
PTS	0.129	0.037	0.131	0.039	1										
CACL	0.199*	-0.03	-0.026	-0.02	0.749*	1									
FS	0.133	0.016	-0.301*	-0.101	0.310*	0.330*	1								
ETR	0.003	-0.04	-0.161*	-0.105	-0.021	-0.008	-0.031	1							
CTR	0.517*	0.071	-0.08	-0.095	0.619*	0.717*	0.440*	-0.02	1						
ROE	0.001	0.003	-0.02	0.008	0.016	0.02	0.007	0.004	0.023	1					
NP	0.339*	0.05	-0.036	-0.077	0.720*	0.814*	0.478*	-0.02	0.946*	0.013	1				
RIR	-0.075	-0.05	0.108	0.113	-0.019	-0.063	-0.058	-0.01	-0.091	0.05	-0.069	1			
WC	0.461*	0.022	-0.144	-0.115	0.582*	0.803*	0.420*	-0.01	0.866*	0.014	0.854*	-0.12	1		
DER	-0.01	-0.03	0.043	0.034	-0.067	-0.074	0.001	-0	-0.051	-0.914*	-0.055	-0.07	-0.055	1	
NCA	0.275*	-0.07	0.142	0.165*	0.473*	0.574*	0.669*	-0.05	0.626*	0.002	0.694*	-0.02	0.623*	0.003	1

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

17. Power Generation and Distribution Sectors

Table A33: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	245	0.074	0.444	(3.293)	3.520
Sales Growth	217	0.201	1.399	(1.000)	19.608
Non-Current Assets	246	0.446	0.218	0.022	0.998
Debt-to-Total Asset Ratio	246	0.097	0.162	(0.547)	0.677
Profit-to-Sales	217	(0.163)	3.250	(47.664)	0.637
Current Asset to Current Liability Ratio	247	2.637	4.833	0.007	33.371
Firm Size	246	7.476	1.011	4.129	9.025
Effective Tax Rate ETR	246	0.213	2.021	(9.805)	29.188
Corp Tax Exp	247	2,349,808	6,468,041	(13,248,228)	61,632,544
Return on Equity	246	0.085	4.681	(58.064)	43.412
Net Profit	247	6,481,435	12,445,500	(14,737,490)	86,222,528
Real Interest Rate	247	2.890	2.623	(1.711)	7.761
Working Capital	247	11,502,251	43,067,142	(97,905,760)	321,500,000
Debt to Equity	246	4.006	52.979	(203.755)	795.697
Non-Current Asset	247	41,377,123	69,183,739	12,842	509,300,000

Table A34: Correlation Matrix

CORR	(ROA)	(SG)	(NCA)	(DTAR)	(PTS)	(CACL)	(FS)	(ETR)	(CTR)	(ROE)	(NP)	(RIR)	(WC)	(DER)	(NCA)
ROA	1														
SG	0.071	1													
NCA	-0.239*	0.09	1												
DTAR	0.028	0.196*	0.329*	1											
PTS	0.057	-0.119	-0.190*	0.063	1										
CACL	-0.032	-0.001	0.142*	-0.111	-0.002	1									
FS	0.270*	-0.052	-0.448*	0.167*	0.300*	-0.450*	1								
ETR	-0.006	-0.018	-0.152*	-0.083	0.007	-0.025	0.014	1							
CTR	0.329*	0.023	-0.262*	-0.014	0.045	-0.023	0.311*	0.035	1						
ROE	0.033	0.001	-0.033	0.022	0.005	-0.003	0.032	0.012	0.017	1					
NP	0.282*	0.008	-0.205*	0.104	0.068	-0.046	0.427*	-0.01	0.805*	0.005	1				
RIR	-0.138*	-0.161*	0.105	0.098	-0.045	-0.081	-0.032	0.011	-0.104	0.051	-0.056	1			
WC	0.234*	0.004	-0.322*	-0.016	0.041	0.034	0.242*	0.026	0.764*	0.012	0.743*	-0.09	1		
DER	-0.008	-0.007	0.018	-0.003	0.004	-0.029	0.01	-0.01	-0.016	-0.922*	-0.023	-0.09	-0.03	1	
NCA	0.111	-0.012	0.148*	0.136*	0.056	-0.140*	0.503*	-0.06	0.163*	0.006	0.408*	-0.06	0.061	-0.013	1

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

18. Sugar and Allied Industries Sector

Table A35: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Return on Assets	316	0.012	0.081	(0.268)	0.274
Sales Growth	308	0.070	0.958	(1.000)	13.666
Non-Current Assets	316	0.657	0.675	0.241	12.292
Debt-to-Total Asset Ratio	316	0.254	1.109	(0.295)	19.744
Profit-to-Sales	308	(0.054)	0.439	(5.613)	0.184
Current Asset to Current Liability Ratio	338	1.178	1.327	(2.893)	14.516
Firm Size	316	6.633	0.367	5.220	7.827
Effective Tax Rate ETR	316	0.184	1.075	(3.479)	17.367
Corp Tax Exp	338	38,141	157,716	(1,170,655)	1,296,320
Return on Equity	315	0.026	1.092	(6.272)	15.284
Net Profit	338	123,711	530,353	(1,387,910)	4,618,821
Real Interest Rate	338	2.890	2.621	(1.711)	7.761
Working Capital	338	(541,877)	1,704,281	(9,594,166)	4,108,907
Debt to Equity	302	1.999	10.920	(118.138)	64.591
Non-Current Asset	338	4,142,719	4,916,837	301,039	28,565,376

Table A36: Correlation Matrix

CORR	ROA	SG	NCA	DTAR	PTS	CACL	FS	ETR	CTR	ROE	NP	RIR	WC	DER	NCA
ROA	1														
SG	-0.011	1													
NCA	-0.154*	-0.007	1												
DTAR	-0.075	-0.037	0.974*	1											
PTS	0.244*	-0.566*	-0.056	0.019	1										
CACL	0.401*	-0.013	-0.055	0.013	0.154*	1									
FS	0.055	-0.023	-0.198*	-0.213*	0.05	-0.302*	1								
ETR	-0.032	-0.001	0.881*	0.889*	0.013	0.066	-0.209*	1							
CTR	0.316*	0.037	-0.143*	-0.079	0.104	0.109*	0.190*	-0.118*	1						
ROE	0.142*	-0.022	-0.022	-0.015	0.039	0.034	0.071	-0.012	0.057	1					
NP	0.640*	0.024	-0.087	-0.028	0.170*	0.140*	0.396*	-0.039	0.505*	0.064	1				
RIR	-0.044	0.048	0.058	0.057	0.07	-0.021	-0.055	0.029	-0.038	-0.043	-0.014	1			
WC	0.335*	0.027	-0.121*	-0.02	0.148*	0.317*	-0.397*	-0.025	0.195*	-0.04	0.155*	-0.03	1		
DER	-0.012	0.048	-0.027	0.005	-0.044	-0.029	-0.001	-0.068	0.064	-0.704*	0.026	0.007	0.03	1	
NCA	0.016	-0.051	0.019	-0.015	0.034	-0.170*	0.819*	-0.014	0.139*	0.036	0.408*	-0.05	-0.532*	0.01	1

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