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Capital Structure and Firm Performance: Exploring the Moderating Role of Size

by

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Capital Structure and Firm Performance: Exploring the Moderating Role of Size

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I dedicate this Ph.D. thesis to the memory of my late father, Misbah ud Din, and late uncle, Abdul Mateen. They were both instrumental in shaping the person I am today and instilling in me a love of learning and a desire to succeed. Their unwavering support and encouragement were instrumental in helping me to pursue this academic journey, and their love and guidance will always be remembered. Although they are no longer with us, their legacies will live on through the knowledge and skills that I have acquired during this research, and I am honored to have had the opportunity to pay tribute to them in this way. This work is dedicated to their memory and to the lasting impact that they have had on my life. May Allah grant them the highest ranks in Jannah. Ameen

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List of Publications

It is certified that following publication(s) has been accepted out of the research work that has been carried out for this thesis:-

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Abstract

The capital structure of a firm plays a central role in its performance. It is perhaps one of the most researched areas of Corporate Finance, yet there is mixed empirical evidence. The studies concluding a negative relationship between capital structure and firm performance outnumber the studies reporting a positive relationship between them. Even though many theories explain the positive relationship but there is hardly any theory that explains the negative relationship. A probable reason could be that previous studies have used accounting and market-based measures of firm performance arbitrarily and interchangeably presuming a high positive correlation between them. The novelty of this study is that it first tests whether these two types of measures are statistically correlated or not. Then the impact of capital structure on firm performance using each type of measure has been tested while taking firm size as a moderator. For this purpose, this study selects 285 non-financial firms listed on PSX for a period of 21 years from 1999 to 2019. All the required pre-estimation diagnostic tests are used to ensure that the data are free from statistical problems. Various estimation techniques, i.e., Pooled OLS, FE Model, RE Model, and GMM technique, based on the pre-estimation diagnostics. The findings of the study show that there is a weak correlation between accounting and market-based measures of firm performance. The findings also show that the impact of capital structure on firm performance if measured by accounting measures is invariably negative and statistically significant, and if measured by market-based measures is mixed and statistically not so strong. The moderating effect of size is negative which indicates that the impact of capital structure on firm performance of big-size firms is more negative than that of small-size firms. These results suggest a new rationale that is named mind-set change theory to explain the negative relationship between capital structure and firm performance. This rationale states that if firm managers finance a new project by equity only, then their objective remains to maximize the amount as well as the rate of return. However, if they have the option to finance a project by debt, then their objective changes; it becomes to maximize the amount of return in the neglect of rate of return on the total invested amount as explained further in the text. The policy

implication of this research is that equity financing may be encouraged while debt financing may be discouraged to improve ROA at an aggregate level in an economy.

Keywords: Capital Structure, Firm Performance, Firm Size, Trade-off Theory, Shareholder Theory, Stakeholder Theory, Mindset Change Theory

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Abbreviations

AZL	Almost Zero Leverage
BSM	Black Scholes Model
DV	Dependent Variable
EM	Equity Multiplier
FEM	Fixed Effects Model
GMM	Generalized Method of Moments
GTA	Growth in Total Assets
GTM	Growth in Total Market Capitalization
IRR	Internal Rate of Return
IV	Independent Variable
KSE	Karachi Stock Exchange
MBVE	Market to Book Value of Equity
NPV	Net Present Value
OLS	Ordinary Least Square
PE	Price-to-Earnings Ratio
PSX	Pakistan Stock Exchange
REM	Random Effects Model
ROA	Return of Assets
ROE	Return on Equity
ROS	Return on Sales
ROSP	Return on Share Price
SBP	State Bank of Pakistan
TDA	Total Debt to Assets Ratio
TDE	Total Debt to Equity Ratio
VIF	Variance Inflation Factor

Chapter 1

Introduction

This chapter introduces the study. The initial section of the chapter provides a background of the study followed by very few key studies from the past in this area. These studies highlight the importance of research regarding association among firm performance and capital structure. Even though there has been extensive literature available in this area, there are still some gaps and issues that require resolution. The studies highlighted in this chapter provide the problem statement and research gap that needs to be addressed. The later sections include discussions on the construction of association among firm performance and capital structure. This chapter also highlights the most widely followed theories of association among firm performance and capital structure. This chapter also sheds light on the problems associated with the previous studies and the identification of a gap where research on association among firm performance and capital structure can be improved. The last section discusses significance of the study.

1.1 Background of the Study

The value of any organization is dependent upon the decisions of its past and future investments, and upon the decision of its financing whether by equity or debt or by a mix of them. There are different views about the performance of organizations concerning their source of financing. Firm performance is measured differently, therefore, to finance these expenditures, the best possible capital structure must

be chosen, thus making the financial mix one of the main areas of concern for the management. It can, therefore, be argued that capital structure is the main strategic concern that has ever been central in Corporate Finance. The core objective of the firm has always been the increase of shareholders' wealth by increasing its value, therefore, firms should finance their projects in a way that minimizes their overall cost of financing. Because firm value is dependent upon financing decisions, the capital structure of a company is critical to its success (Kumar et al., 2017).

After understanding the value of the role of capital structure in managerial decisions, association among firm performance and capital structure needs to be explored as their relationship is not clear despite so many studies in this area (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Researchers have found mixed results on association among firm performance and capital structure. The positive relationship can be supported by many theories but it is hard for researchers to support their negative relationship results with any theory. Therefore, researchers are now updating their methodologies to identify the causes of the mixed results. Some researchers suggest the use of interaction terms to test whether association among firm performance and capital structure is moderated or mediated by any other factors (Dao and Ta, 2020), whereas, some researchers have questioned the proxy measures used to assess firm performance (Gentry and Shen, 2010).

The following sections discuss the organization of this study in the said manner. After providing the background of the study, the next part clarifies the multi-dimensionality of firm performance. According to some researchers, firm performance is not a uni-dimensional construct, therefore, the proxies used to examine company performance in the literature need to be analyzed individually. The final section discusses the role of moderators in the study of association among firm performance and capital structure.

1.2 Multi-Dimensionality of Firm Performance

Before exploring association among firm performance and capital structure, exploring unique aspects of company performance is crucial. Firm performance is a multi-dimensional construct. The most widely used metrics of financial profitability are ROA, ROE, ROS, PE ratio, ROSP and MTB ratio. Along with these measures, various researchers use other measures as well, including, return on capital employed (ROCE), and other financial ratios. Gentry and Shen (2010) raise a question on the common practices of researchers while studying firm financial performance. According to them, these common measures of firm performance as used by researchers are correlated neither theoretically nor empirically as witnessed in various studies. Theoretically, the accounting measures of firm performance reflect the previous performance of a firm, whereas, the market measures are a reflection of future expectations (Hoskisson et al., 1994; Keats and Hitt, 1988). The accounting measures of firm performance can be used to analyze and predict the current operating performance of a firm while the market measures of firm performance are totally based on shareholders perceptions (Davidson III et al., 1990; Kumar and Shetty, 2018). One of the most cited articles about the measures used for firm performance is (Venkatraman and Ramanujam, 1986). In their article, even though they argue about a conceptual relationship between various firm performance measures, they also suggest that there may not be a correlation between these metrics of company performance. The short-term goals and long-term goals are not always same. As various measures of firm performance relate to different goals of the firms, it is highly likely that these measures may not correlate.

1.3 Capital Structure and Firm Performance

Zero-leverage puzzle is a popular conundrum in Corporate Finance. It is very strange to know that comparatively, corporate debt of is quite low than the predicted values by the theories of capital structure (Graham, 2000; Miller, 1977). Strebulaev and Yang (2013) conducted a study on the zero-leverage puzzle. The non-financial listed companies are included in their investigation in the US from 1962 to 2009.

According to them, after 1980, the number of firms following the zero-leverage policy is growing rapidly. From 4.3% of the companies with zero leverage in their capital structure, the number has come closer to 20% after 2000. Firms with less than 5% of their assets financed through debt are considered to be almost zero-leverage (AZL). More than one-third of the firms are in the AZL category in 2009. They argue that these are not any outliers or a short-term effect rather this is their policy. The findings of their study are very startling. The performance of the firms that follow zero-leverage policy is better than organizations with leverage in their capital structure. The firms following the zero-leverage policy maintain higher cash balances, their market-to-book values are higher, and they pay higher dividends and taxes as compared to the firms that have used debt along with equity to finance their investments.

Before discussing association among firm performance and capital structure, it is to be noted that these variables can be measured in various ways as discussed in the literature review section. Even though firm performance contains various dimensions and one of the most studied dimensions is its financial perspective, there is no consensus among the researchers on this dimension. Whereas, the capital structure is implied to be a source of financing the investments of a company, this study uses the most frequently used proxies of performance of the firms and their capital structure, i.e., ROA, ROE, ROS, PE ratio, ROSP, and MBV ratio as proxies of firm performance (Al-Awadhi et al., 2020; Gale, 1972; Golubov and Konstantinidi, 2019; Hidayat et al., 2020; Ho et al., 2022; Horngren et al., 2012; Libby et al., 2009; Megginson et al., 2000; Park, 2019; Umar et al., 2021; Williams et al., 2015), and TDA and TDE ratios as measures of capital structure (Horngren et al., 2012; Libby et al., 2009).

Despite the fact that there are numerous capital structure theories, two of them are most commonly discussed i.e. Modigliani and Miller's Irrelevance Theorem and Kraus and Litzenberger's Trade-off Theory. Trade-off Theory is the most commonly discussed capital structure theory in the literature on finance. The theory states that an initial rise in leverage leads to an improvement in firm value but after an optimal point it starts affecting negatively. The most notable and cited work in the area of capital structure is Irrelevance Theorem. Any discussion about capital

structure is incomplete without it. In their seminal article, Modigliani and Miller (1958) state that in a perfect market, a firm's capital structure and its value are not related. It depends on the real assets owned by an organization and not on the source of financing these assets. After about five years, Modigliani and Miller (1963) revised their theorem as they had to face criticism from researchers whose empirical studies were against their earlier work. In their revised study, they argue that in the case of imperfect markets, companies can benefit from tax shields by using debt in their capital structure.

A major contribution in the area of capital structure is by Titman and Wessels (1988) where they have investigated the theories surrounding firm leverage along with factors that determine capital structure. Firm performance is a measure consisting of various aspects of an organization like organizational survival, corporate reputation, operational effectiveness, etc. but the most broadly researched area of firm performance is its financial aspect (Gentry and Shen, 2010). Henceforth, in this study, firm performance means firm financial performance. Iqbal (2016) believes that companies try to maximize their amount of profit instead of profit per invested amount. As these investments are mostly financed by debt, large companies have an advantage over small companies in this regard. Some of the main reasons to explain this advantage as mentioned in the textbooks of Corporate Finance are because large firms have (a) more fixed assets, (b) more financial and economic resources, (c) more amount of profit, (d) relatively larger cash flows, (e) more exports, and (f) more tools for financial hedging. These are some of the reasons why can large firms attract a higher amount of debt as compared to small firms. According to Lim et al. (2020), organizations having higher amounts of fixed assets have relatively easier access to debt financing as compared to firms that have lower amounts of fixed assets. Thus, large companies are more likely to finance their investments through debt even though they are less efficient. In view of the literature that has been discussed in this section as well as the next section, the work of researchers in this area can be classified into three main perspectives i.e. the irrelevance perspective, the mainstream perspective, and the positive perspective. The irrelevance perspective (i.e. MMs irrelevance theorem) opines that firm performance does not depend on the source of financing rather it depends

on investment in real assets. The mainstream perspective (i.e. trade-off theory) is of the view that a higher portion of debt leads to an improvement in firm value but after a certain level, it starts affecting negatively. The positive perspective (i.e. agency theory, free cash flow theory) is of the view that leverage positively affects the performance of the company. Kumar et al. (2017) have summarized the studies that have been conducted on association among firm performance and capital structure. There are diverse explorations that have empirically shown a significant and direct association among firm performance and capital structure (Ahmed and Afza, 2019; Kumar et al., 2017). Whereas, contrary to the aforementioned studies, some of the examinations have empirically shown a negative association among firm performance and capital structure (Abor, 2005; Majumdar and Chhibber, 1999; Ronoowah and Seetanah, 2023; Salim and Yadav, 2012). Yasmin and Rashid (2019) have empirically investigated that businesses with little debt are more profitable and that they are able to pay bigger dividends than companies with a high level of debt. Based on their results, they argue that various organizations are at the extreme of conservatism while using debt in their capital structure, coined as "zero-leverage puzzle". After being observed in the US for the first time, this trend was adopted later on internationally as well.

According to the literature, while determining the capital structure of business ventures, an ideal mix of equity and debt is crucial since it is thought to be a key factor in the progress of every organization (Dodoo et al., 2023). The success of the company is improved for a variety of reasons if it raises capital by issuing a sizable part of equity. First of all, it lacks a defined maturity date and fixed fees. The reduction of bankruptcy risk or leverage results in an improvement in creditworthiness, which is the second advantage of equity financing. Thirdly, while issuing equity, such companies are not subject to any form of restrictive covenants. By allowing managers of business ventures to participate in riskier but more lucrative initiatives, funding through equity further decreases the disparities in concerns among loan-holders and shareholders. However, companies send the shareholders a bad message when they announce the issue of fresh equity, which reduces share prices. Issue of fresh equity is percieved by the shareholders as a signal that the company needs funding to finance their operations. Some shareholders also

think that issuing fresh equity will dilutes the ownership and decreases earnings per share. Furthermore, businesses with unstable financial conditions employ equity funding to buy assets, merely to divide expenses with the investor. Since managers and investors of the organisation have distinct interests, equity financing also increases agency costs. Furthermore, stock money is regarded as an expensive source of funding. As a result, equity financing should only be resorted to in extreme cases (Kim et al., 2006; Myers and Majluf, 1984). The association among firm performance and capital structure needs to be explored as their relationship is not clear despite so many studies in this area (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Researchers have found mixed results on association among firm performance and capital structure. Although, positive relationship can be supported by many theories but it is hard for researchers to support their negative relationship results with any theory.

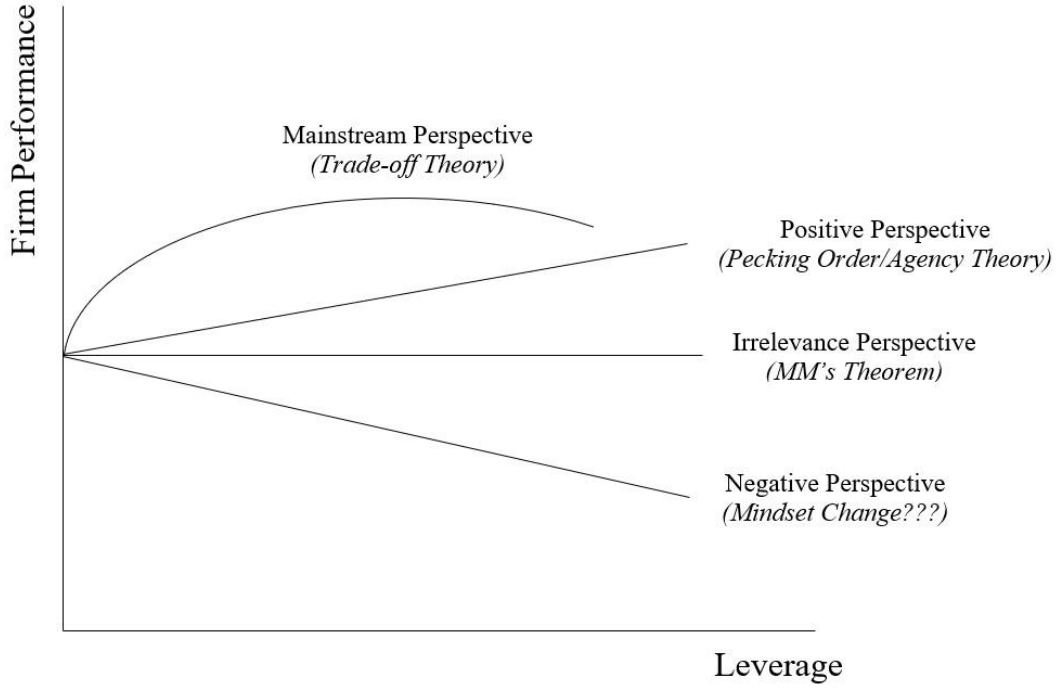

FIGURE 1.1: Capital Structure and Firm Performance

Figure 1.1 shows the summarized version of theories regarding association among firm performance and capital structure. Although the studies that report a negative association among firm performance and capital structure outnumber the studies that report either a positive or an insignificant relationship between them (Dao and Ta, 2020), there is almost negligible literature available to explain this phenomenon.

This study is an attempt to draw the attention of researchers to explain this phenomenon theoretically by proposing a new rationale "mindset change theory".

1.4 Firm Size as a Moderator

The association among firm performance and capital structure needs to be explored as their relationship is not clear despite so many studies in this area (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Researchers have found mixed results on association among firm performance and capital structure. The positive relationship can be supported by many theories but it is hard for researchers to support their negative relationship results with any theory. Therefore, researchers are now updating their methodologies to identify the causes of the mixed results. Some researchers suggest the use of interaction terms to test whether association among firm performance and capital structure is moderated by any other factors (Dao and Ta, 2020). The association among firm performance and capital structure can be explained more clearly if further moderators or mediators are included. Almost all the theories relating to association among firm performance and capital structure have theoretically explained their direct relationship. However, mixed empirical results have been found. In fact, the number of studies that report a negative association is far greater than the number of studies that report a positive association among firm performance and capital structure even though almost all the theories propose a positive relationship between them (Dao and Ta, 2020). According to Gentry and Shen (2010), there is a need to change the methodology of studies in this area. One of the suggested future directions for researchers in the literature includes exploring the roles of moderators and mediators in their relationship. This study also incorporates this suggestion and tests whether firm size moderates association among firm performance and capital structure or not.

This study uses firm size as a moderator for association among firm performance and capital structure. The use of firm size as a moderator is justified through the literature. NPV is the most commonly accepted technique to evaluate projects (Magni, 2009). Theoretically, it is considered to be the best capital budgeting

technique as suggested in many corporate finance textbooks (Bierman and Smidt, 2012; Brealey et al., 2012; Copeland and Weston, 1988; Damodaran, 1999; Koller et al., 2000). On the contrary, various authors have critically evaluated NPV and have mentioned several flaws in it. For example, Iqbal (2017) and Berkovitch and Israel (2004) have raised a question on the practical use of NPV. According to them, although NPV is preferred over Internal Rate of Return (IRR) academically, managers of firms prefer to use IRR for the evaluation of projects. Extending the literature, Iqbal (2016) has identified two flaws in the NPV method of evaluating projects that are as follows:

1. Firm managers always try to maximize the amount of NPV while selecting between various projects thus making NPV a positive function of size. Consequently, NPV is biased towards larger-sized projects even if these projects are less efficient according to IRR.

2. The basic assumption of NPV is that every project under consideration is to be financed by debt.

The first flaw talks about the biasness of NPV toward bigger projects even if the project is inefficient which implies a lower return on assets. The second flaw talks about debt cost as an opportunity cost. Based on the analysis of Iqbal (2016), if the aforementioned flaws are linked together, it can be proposed that there exists an inverse association among firm performance (i.e. ROA) and leverage (i.e. debt to equity), whereas, size moderates this relationship.

Moreover, Demirg-Kunt et al. (2020) tested the changes in capital structure during the financial crisis of 2008. They argue that even in times of financial crisis, they have not witnessed any significant decrease in the debt level of large companies. On the other hand, small companies have witnessed a significant decrease in their debt level. They call the capital markets as "spare tire". According to them, capital markets are easily accessible to major businesses and they can secure a loan easily due to their large size of fixed assets, whereas, small businesses lack easy accessibility to capital markets and they cannot easily secure loans due to their small size of fixed assets. These arguments also lead to the proposition that an

association exists among firm performance and capital structure and the size of the firm moderates this relationship.

1.5 Research Gap

Abundant literature is available on the study of association among firm performance and capital structure but the direction of their association is still inconclusive and a puzzle for researchers (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). It has been termed "a puzzle" because of mixed empirical results in the literature. The discussed capital structure theories argue that sometimes a positive association can be seen in the firm value due to the firm's debt level. Contrary to the different explanations for a direct relationship association among firm performance and capital structure, there has not yet been any theory presented for the explanation of a negative relationship as witnessed by various empirical studies (Abor, 2005; Ahmed and Afza, 2019; Salim and Yadav, 2012). Although some of these studies have tried to explain this "anomaly", these are not theoretical explanations. For example, Ahmed and Afza (2019) argue that the negative association among firm performance and capital structure exists because of information asymmetry and the high cost of debt financing, whereas, Abor (2005) explains this negative impact as noncurrent debt bearing too much cost thus reducing the profitability of the firm. Certain companies are so conservative while using debt in their capital structure that they have overall leverage equal to zero, known as the "zero-leverage puzzle", even though they have more profits and dividend-paying ability than their counterparts (Yasmin and Rashid, 2019). Based on capital structure theories, it is really odd to learn that some businesses have far lower debt levels than would be expected (Graham, 2000; Miller, 1977). The zero-leverage policy following firms have increased from 4.3% to around 20% recently (Strebulaev and Yang, 2013). The major part of this increase is witnessed after 1980. In 2009, more than one-third of US non-financial companies had capital structures with less than 5% debt. The findings of their study are very startling. The performance of the firms that follow zero-leverage policy is better than organizations having leverage in their capital structure. The firms following

the zero-leverage policy maintain higher cash balances, their market-to-book values are higher, and they pay higher dividends and taxes as compared to the firms that have used debt along with equity to finance their investments. Graham (2000) argues that despite such rich literature that is available on association among firm performance and capital structure, there are unanswered questions. One such question is why so many firms appear to be under-levered. Researchers in the future are required to explore it. Contrary to conventional capital structure theories, businesses with very little debt tend to be more stable and successful than businesses with a more permissive approach to employing debt in their capital structure.

A common and notable factor among previous studies is that they consider mostly market value or ROE against leverage, whereas, Gentry and Shen (2010) show that the covariance between market measures and accounting measures of profitability is less than 10%. According to them, a single theory cannot be developed to explain variation in both of these measures, therefore, they suggest that organizational researchers should focus on developing different theories of capital structure affecting firm performance so that variation in both market and accounting measures related to firm performance can be effectively explained. While developing these theories, researchers should also focus on developing a rationale that why these measures differ from each other. Abdullah (2016) has found that the predicting power of accounting-based measures is superior to market-based measures. Therefore, there should be some theoretical explanation for this association among firm performance and capital structure. Adding to the discussion, Abdullah (2016) clearly states that while theorists make market models attractive, their empirical performance proves them to be inferior as accounting models outperform market models empirically. Miller et al. (2013) recommend that researchers are required to stop the current practices. Although this is not easy to challenge the current practices but the multi-dimensional approach to firm performance dominates the empirical work. It is also a fact that the work of many theorists can not be extended to empirical work. They recommend using a microscopic approach where each measure of firm performance should have its own theoretical explanation.

Iqbal (2016) thinks that companies try to maximize their amount of profit instead of

profit per invested amount. As these investments are mostly financed by debt, large companies have an advantage over small companies in this regard. According to Lim et al. (2020) and Demirg-Kunt et al. (2020), organizations having larger amounts of long-term assets have relatively easier access to debt financing as compared to firms that have lower amounts of fixed assets. Thus, large companies are more likely to finance their investments through debt even though they are less efficient. Researchers have found mixed results on association among firm performance and capital structure. A positive relationship can be supported by many theories but it is hard for researchers to support their negative relationship results with any theory. Therefore, researchers are now updating their methodologies to identify the causes of the mixed results. Some researchers suggest the use of interaction terms to test whether association among firm performance and capital structure is moderated or mediated by any other factors (Dao and Ta, 2020), whereas, Some scholars have questioned the proxy measures used to assess corporate performance (Gentry and Shen, 2010).

Based on these arguments, it can be proposed that a gap exists between theories and empirical evidence that needs to be addressed and a rational explanation be developed for the negative association among capital structure and firm performance. Some scholars have questioned the proxy measures used to assess corporate performance whereas size moderates this relationship.

1.6 Problem Statement

Researchers use a mix of firm performance measures even if these measures are either uncorrelated or even negatively correlated, sometimes. This study tests whether metrics of financial performance as opted by previous studies can be used interchangeably or they represent different dimensions. Both the mainstream perspective and the positive perspective have empirical evidence as well as theoretical support, whereas, the negative perspective has only empirical evidence and no theoretical support. Despite this empirical evidence for the negative association among firm performance and capital structure, no formal theory for this aspect has yet been developed. This study draws the attention of researchers to theoretically

explain the negative association among firm performance and capital structure with the help of size acting as a moderator by proposing what may be called a mindset change theory.

1.7 Research Questions

The following questions are addressed in this thesis.

1. Is there any correlation between the accounting measures and market measures of firm financial performance?
2. What is the impact of capital structure measures on accounting measures of firm performance?
3. What is the impact of capital structure measures on market measures of firm performance?
4. Does size moderate the association among the firm performance and capital structure?
5. Has capital structure any non-linear impact on firm performance?

1.8 Objectives of the Study

This study has following objectives:

1. To test whether the accounting measures and market measures of firm performance are correlated.
2. To study the association among the accounting measures of firm performance and capital structure for non-financial firms listed on PSX.
3. To study the association among the market measures of firm performance and capital structure for non-financial firms listed on PSX.
4. To study the moderating roles of firm size in the association among the firm performance and capital structure for non-financial firms listed on PSX.

5. To study the non-linear association among the firm performance and capital structure.

1.9 Significance of the Study

Capital structure has ever been of central importance to firm management while financing their investments. The findings of this study has four contributions to the literature. Regardless of the higher number of studies reporting a negative association among firm performance and capital structure as compared to the lower number of studies reporting a positive association, there has been no theory that mainly focuses to explain this negative association. This study is an attempt to draw the attention of the researchers of corporate finance that there is a need to theoretically explain this effect. Secondly, this study uses firm size as a moderator to association among firm performance and capital structure with logical arguments. It can be argued from the findings of the study that investors should be cautious as the management of bigger firms prefer a higher absolute amount of return even if the investment is comparatively inefficient in terms of rate of return. Trade-off theory is the most prevalent capital structure theory. Thirdly, this study tests whether Pakistani non-financial firms follow the trade-off theory while financing their investments or not. Recent literature shows that researchers use a mix of firm performance measures. Fourthly, this study empirically finds that the measures of firm performance are not a uni-dimensional construct. Moreover, this study identifies a need to study these measures separately. If the measures of firm financial performance are to be treated separately, then there should be one specific measure that should be preferred over others.

Business strategy provides an edge to a firm over others. This is why business strategies should be formulated in such way that the objectives are fulfilled. Along with contribution to the literature, this study is also significant for policy makers of firms, i.e., firm managers. This study will help the companies in understanding the importance of the choice of financing in firm performance and help them in choosing the best method of financing their investments.

1.10 Structure of the Thesis

The first chapter discussed the introduction of the study. The next chapter reviews the literature by developing hypotheses after highlighting theories of capital structure and firm performance. Third chapter discusses data, sample, time frame, variables, econometric models, and estimation methods. The fourth chapter provides the results of the estimations and discusses them considering the reviewed literature. The last chapter is reserved for conclusions and recommendation.

Chapter 2

Literature Review

Previous studies regarding association among firm performance and capital structure are covered in this chapter. The theories relating to capital structure and firm performance are also discussed. In the end, hypotheses are developed based on these discussions. The current chapter illustrates a comprehensive view of the theoretical and empirical research that has already been done and discusses the research gaps based on prior studies.

2.1 Pioneer Studies of Capital Structure and Firm Performance

Academicians have made significant efforts over the past 60 years to investigate the ideal ratio of debt to equity and how it affects a firm's performance, but there is still no agreement on the expected outcomes. In 1958, Modigliani and Miller presented a seminal argument about a link between firm leverage and its overall value. According to their theory, in an ideal world where market efficiency is high and there are no external factors such as taxes, information asymmetry, agency costs, or bankruptcy costs, the method of financing a company's operations will not have any impact on the company's value. This means that regardless of whether a company is funded through debt or equity, the company's overall worth should remain unchanged (Modigliani and Miller, 1958). However, in reality, there are several factors that can impact a company's value. For instance, when taxes

come into play, debt financing may become more attractive as interest has tax advantage, making it a cost-effective way of raising funds. Additionally, information asymmetry, where one party has more information than the other, may make it difficult for companies to raise funds through equity as investors may be hesitant to invest without sufficient knowledge about the company's financial position. Agency costs and bankruptcy costs can also affect a company's ability to raise funds and can impact its value. Despite these external factors, Modigliani and Miller's theory remains a fundamental starting point for understanding association among firm performance and capital structure, and their ideas have continued to influence the ongoing debate around corporate finance. This proposition posits that real assets determine value of a firm rather than ratio of debt capital and equity capital otherwise arbitrage mechanism takes place in the absence of this proposition. In the arbitrage mechanism, the investors hold the shares of a company that is undervalued, whereas, they sell the shares of a company that is overvalued thus increasing the demand for an undervalued firm's shares and increasing the supply of an overvalued firms shares. The law of demand and supply plays its role and ultimately share prices of undervalued firms rise and share prices of overvalued firms fall down.

Even though it is commonly believed that Modigliani and Miller (1958) started discussion of capital structure, earliest discussion can be traced back to Durand (1952). He proposed the pioneer financial leverage approaches, i.e., Net Operating Income Approach and Net Income Approach. These are regarded as pioneers of theoretical capital structure analysis. The Net Income Approach proposes that altering a company's debt ratio through financing options can reduce its cost of capital thus enhancing its value. Opting for borrowing money instead of using cash to acquire assets reduces weighted average cost of capital thus improving company's income. A decrease in gearing, on the other hand, raises borrowing costs generally, which results in a decrease in stockholder value. Firms can reduce their cost of capital by using net income approach while expanding debt financing. Net Operating Income Approach states that firm's profitability and weighted average cost of capital remain same even though debt ratio changes in the ideal capital market. In other words, a corporation's market performance is unaffected by

whether it uses debt or equity funding. As a result, when investors are choosing their investments, the capital structure is not important.

2.2 Theories of Capital Structure and Firm Performance

There is a large body of literature on theoretical explanations of capital structure since last six decades. Almost all the theories of capital structure propose that an upsurge in leverage is directly related to a rise in financial performance of firms. However, empirical findings of studies that report a negative association among them outnumber the studies that report direct association them (Dao and Ta, 2020). Some major theories of capital structure are highlighted in this section.

2.2.1 Durand's Financial Leverage Approach

As discussed earlier the earliest discussion on financial leverage can be traced back to Durand (1952). He argues that the cost of capital changes with a change in the debt level of a company. The performance of a firm improves with an increase if the company takes on more debt. The weighted average cost of capital decreases as debt increases. According to this study, increasing the debt level increases the firm's capital structure in size; increasing the capital structure results in a decrease in the weighted average cost of capital; and a decrease in the weighted average cost of capital leads to a rise in firm financial performance.

2.2.2 MM Theorem

It is also called Irrelevance Theory of Capital Structure. This theory was proposed by Modigliani and Miller in 1958 in their seminal article (Modigliani and Miller, 1958). Under the premise of ideal capital markets with no transaction costs and corporation taxes, they examined how the firm's capital structure affects its performance. Future profits are unanimously expected to be very high, and all profits are paid to stockholders. They contend that the debt ratio of the business

has no bearing on the value of the company, regardless of whether it gets debt or equity funding. Even if debt financing is regarded to be a less expensive source of funding than other financing options, the inclusion or removal of leverage does not raise firm value because it will increase its cost of equity. Because financial benefits of reduced debt costs are exactly offset by the increase in equity costs, both firm performance and cost of capital stay unchanged. This theorem put forward two propositions.

1. **Proposition I:** According to the first proposition the value of a firm is not affected by changing its capital structure. Firm performance is independent of the choice of capital structure. The financing of investment and operations either through debt or equity is irrelevant to the decision of the management for their choice. If there are two identical firms, one finance its investments through debt and the other finance its investments through equity, there will be no change in their performance. The capital structure is like a pizza. It does not matter how you divide the pizza, how many slices you make, and how big or small slices you cut. In the end, you will have the same amount to eat. Similarly, the choice of capital structure is irrelevant to firm performance.

2. **Proposition II:** The second proposition supports the arguments of Durand (1952) more or less. According to this proposition, the use of debt improves the performance of the firm, but, only when tax information is available. Leverage lowers the weighted average cost of capital which in turn improves the overall firm performance but this is dependent upon the availability of tax information.

2.2.3 MM Theorem-Revised

After the proposition of their theorem in 1958, Modigliani and Miller faced various criticisms. These criticisms lead them to revise their work and put forward an explanation of their earlier theory with an alteration (Modigliani and Miller, 1963). The revised study is normally referred to as MM2. After the publication of their earlier work where they argued that firm performance is not affected by the choice

of capital structure, researchers empirically tested the theorem. The empirical findings of these studies did not support this theorem and they criticized their work due to which the original theorem was revised. According to the revisions, Modigliani and Miller (1963) argue that the change in the performance of the firms due to change in capital structure is because debt provides a tax shield. If the tax shield is ignored, then the original theorem still holds. They argue that firms can improve their performance by financing their projects through debt which basically provides a tax shield. Due to these reductions in taxes, a firm can enjoy higher amounts of profits.

2.2.4 Traditional Approach

Solomon (1963) put forth the traditional capital structure theory. It is thought of as a compromise between the net income and net operating income approaches. According to this approach, the option of financing for investments affects both the cost of capital and the value of a company. By using a reasonable amount of debt, the company can accomplish the right capital structure, which lowers its overall cost of capital and improves the performance of the enterprise. Higher leverage reduces the company's total cost of capital because debt financing is a much more affordable source of capital than equity. However, debt financing increases a company's value and reduces the cost of capital up to a predetermined ideal level; once companies use debt financing above that level, the cost of capital as a whole rises, which has a negative impact on the performance of the company in the market. In order to maximise wealth, businesses should blend their debt and equity capital. This method consists of three steps. Under specific assumptions, when the debt ratio rises in the initial stage, the overall cost of capital drops. These presumptions state that the cost of debt and the cost of equity remain constant regardless of the firm's gearing ratio. After the company achieves a certain debt ratio in the second stage, any new debt financing will have little effect on the company's value (the ideal level). As a result, the value of the company and its cost of capital remain within a specific range. The range of debt ratios when the firm's worth is at its highest and its cost of capital is at its lowest is more precise. When a corporation reaches the next level of its capital structure, the cost of debt and

equity both increase due to higher debt financing, and the value of the company declines as a result of a high level of bankruptcy risk.

2.2.5 Trade-off Theory

The work of Durand (1952), Modigliani and Miller (1958), Modigliani and Miller (1963), and Solomon (1963) led to the discussion of debt providing tax shield to the corporations. As a result, these studies gave birth to the most widely accepted theory of capital structure. This theory is generically called the Trade-off Theory. Both the Static Trade-off Theory and the Dynamic Trade-off Theory are included in this hypothesis. By putting forward the Static Trade-off Theory, Kraus and Litzenberger (1973) significantly expanded the body of knowledge on capital structure. In accordance with this approach, the firm calculates the desired debt financing/ratio based on its requirements before taking incremental steps to reach it. Furthermore, they argue that while debt is preferable to equity because interest payments are tax deductible and qualify for agency benefits (in contrast to dividend payments, which do not), a significant amount of financing through debt can increase the likelihood of a company experiencing financial difficulties or even bankruptcy. This, in turn, can decrease the overall value of the firm. To prevent such scenarios, corporations need to find the right balance between equity and debt financing. While debt financing can provide certain benefits, such as tax advantages and lower interest rates, it also comes with drawbacks, such as fixed payment obligations and a higher risk of default. Thus, it's crucial to determine the optimal mix of equity and debt financing that maximizes the benefits while minimizing the risks associated with each. This way, the corporation can ensure its long-term stability and financial success. This theory also states that highly profitable firms prefer debt financing to equity financing to give the extra benefit to the shareholders. Whereas, firms that are either uncertain or they have high growth prospects prefer equity financing to debt financing. The corporation deviates from the desired capital structure for several reasons, including stock price movements, market timing, financial deficiencies, and other pertinent factors. Due to these variances, the company will trade off marginal gains and costs to maximize shareholder wealth.

The trade-off theory was formally introduced in the work of Kraus and Litzenberger (1973). They argue that the management tends to balance out the cost of financial distress with the tax shield provided by debt financing (Myers, 1984). Baxter (1967) classifies the financial distress costs into direct costs and indirect costs. Direct costs are the legal costs and administrative costs incurred by a firm that goes bankrupt. The indirect costs include the inability of the firm to pay its debts. The market value of a firm is decreased due to indirect costs.

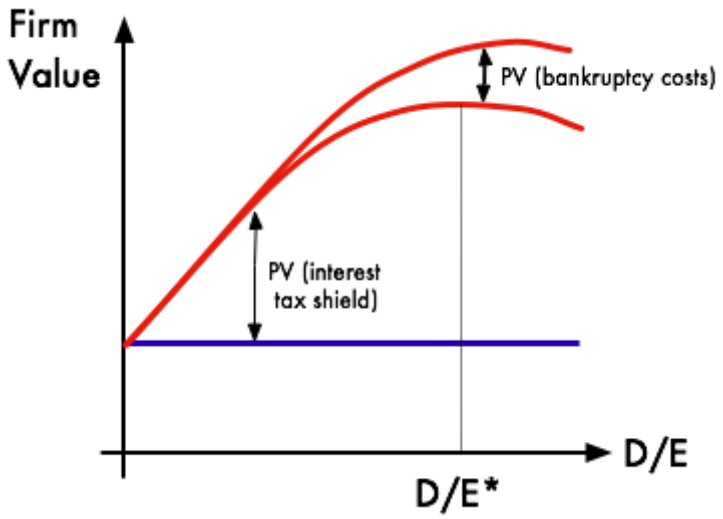

FIGURE 2.1: The Trade-off Theory of Capital Structure (Source: Brealy, Myers and Allen (2007, pp504)

The trade-off theory has four major predictions. The first prediction is that the optimal capital structure varies from firm to firm. Every firm has its own mix of debt and equity ratios to finance its investment and operations. This prediction is supported by the study of Graham and Harvey (2001). The second prediction is that firms with a higher amount of tangible assets tend to finance their investments through debt rather than equity. On the other hand, firms with a lower amount of tangible assets tend to borrow less as their financial distress cost is higher compared to their counterparts. This prediction is supported by the studies of Rajan and Zingales (1995), and Frank and Goyal (2009). The third prediction is that firms with a higher tax rate are more likely to finance their investments and operations through debt rather than equity. This prediction is supported by the studies of Graham (1996), and MacKieMason (1990). The last prediction of the trade-off theory is that firms with lower non-debt tax shields are more likely to finance their

investments through debt rather than capital. A firm with more value of expenses that do not provide a tax shield, like depreciation, is less likely to borrow more (DeAngelo and Masulis, 1980).

2.2.6 Agency Theory

The main proposition of the agency theory is that the management of the firms does not always act in the best interest of the shareholders. This theory was put forward by Jensen and Meckling (1976). They call the shareholders as principles and the managers as agents working on behalf of the shareholders. An increase in debt level reduces the agency costs but a further increase in the level of debt rises the agency cost that in return gives a rise to financial distress which may ultimately result in liquidation or bankruptcy . Since the argument of Jensen and Meckling (1976), various scholars have studied the relationship between the capital structure of a firm and its performance. These studies, however, provide mixed and contradictory results. Some authors find a positive association among firm performance and capital structure (Hadlock and James, 2002; Roden and Lewellen, 1995; Taub, 1975), whereas, other scholars report a association among them (Fama and French, 1998; Gleason et al., 2000; Simerly and Li, 2000).

This approach is designed to tackle the agency problem that emerges when there are conflicting interests between different parties such as debt holders and shareholders or shareholders and management. The agency problem occurs when one party, such as managers, prioritizes their own interests over those of other parties such as shareholders, which can lead to conflicts of interest and potentially harmful actions. For example, one common agency problem arises when managers engage in moral hazard issues, which refers to situations where they take actions that increase their own wealth but are not aligned with the best interests of shareholders. In such cases, managers may be incentivized to take on excessive risk or make decisions that prioritize short-term gains over long-term stability, which can negatively impact the company's financial performance and shareholder value. To address these challenges, this approach proposes a set of measures to align the interests of different parties and mitigate the risks of moral hazard. These measures may include establishing clear performance targets and linking executive compensation

to long-term company performance, enhancing board oversight and transparency, and increasing shareholder participation and engagement. In doing so, the approach aims to ensure that managers act in the best interests of shareholders and the company as a whole, rather than pursuing their own self-interests at the expense of others. By addressing agency problems, the approach seeks to promote long-term value creation and sustainable growth for all stakeholders. To reduce moral hazard issues, the shareholders must pay substantial monitoring and incentive expenses, also known as agency costs. However, more debt financing not only improves performance but also lessens corporate disputes between managers and investors. In order to lower the firm's agency cost, debt financing may be used as a preferable method. Due to the possibility of default, a different kind of agency issue develops when stockholders and debt holders have competing interests. Because their payment responsibilities are unchanged and the additional cash inflows increase their wealth, the shareholders are free to participate in riskier business endeavours to boost their financial benefits. In this situation, debt financing has a negative effect on how well a corporation performs. However, debt holders also participate in the losses if the riskier investments do not pay off. To avoid this, bondholders place strict protective covenants or monitoring mechanisms on businesses to protect themselves, resulting in agency costs. Protective covenants are provisions in loan agreements that determine the dividend payment ratio, maintain a certain level of liquidity, stipulate the sum to be spent on asset acquisition, standardized executive compensation, etc. Because of this, creditors are safeguarded from agency problems and managers are required to use free cash flow in the best interests of shareholders by incorporating the relevant terms in the loan agreement.

2.2.7 The Signaling Theory

The signaling theory was first proposed by Ross (1977). According to the theory, the choice of financing a firms investment either through debt or equity depends upon the information asymmetry between the management and shareholders. The management of an undervalued firm will prefer debt over equity and the management of an overvalued firm will prefer equity to debt. Through these activities, the management of the firms sends a signal to the shareholders as they

have the inside information. A firm issues debt when it can bear its costs. This way, they send a signal to the market that they are confident about future earnings. If a firm is not sure of future earnings and may go into bankruptcy, it will not issue any debt covenants.

2.2.8 Pecking Order Theory

The pecking order theory was proposed by Myers and Majluf (1984) but the concept can be traced back to Donaldson in 1961 (Kumar et al., 2017). Contrary to the static trade-off theory, this theory proposes that there is no specific or desired optimal level of capital structure. The capital structure is a result of signaling issues and information asymmetries. According to this theory, investors prefer to buy stocks only at a discount when company managers have access to more knowledge about the operational and investment activities of the company than the shareholder. Due to information asymmetries between shareholders and company managers, the firm's value is decreased. According to the capital structure pecking order hypothesis, there is no set ideal debt ratio for enhancing business value.

According to the theory, businesses should finance their assets according to a specific hierarchy, in particular, they should favor internal financing, such as retained earnings, over external financing, such as debt and equity. Furthermore, companies should prioritize debt financing over equity capital. This hierarchy is believed to be the most effective way of financing a company's assets. Retained earnings should be used in the beginning if the company needs money to run its operations (internally generated funds). If retained earnings are no longer sufficient to sustain business operations, companies should first obtain extra capital through debt instruments before turning to equity financing as a last resort. The two basic justifications for choosing a certain financing pattern are (a) external finance transaction costs and (b) asymmetric information.

According to the first rationale, while forming the capital structure, transaction costs in conjunction with financing options are crucial. Utilizing internally generated funds (retained earnings) is not connected with any transaction costs, but when enterprises finance their assets from outside sources, they are subject to those costs

(debt or equity). However, debt financing has a lower transaction cost than equity financing. Financing through retained earnings avoids scrutiny from any external source, while the issuance of debt instruments gives investors a good indication that the business unit will have sufficient cash flows in the future. Therefore, internal financing is preferable to external financing, and debt financing is preferred over equity financing.

2.2.9 Market Timing Theory

Baker and Wurgler (2002) put forward the Market Timing Theory. According to this theory, the capital structure of a firm is the reflection of its past decisions. A company issues new shares when the price of the shares is seen to be overvalued and buys back its own shares when the price of the shares is thought to be undervalued. As a result, the debt ratio of the company is significantly correlated with the present capital structure of the company and historical stock market values or stock market volatility.

A summary of the theories underlying capital structure and firm performance is shown in Table 2.1 as summarized mostly by Kumar et al. (2017).

TABLE 2.1: Summary of the Theories Underlying Capital Structure and Firm Performance

Theory Name	**Presenter(s)**	**Statement**
Financial Leverage Approach	Durand (1952)	An increase in debt leads to a decrease in the weighted average cost of capital which ultimately leads to an increase in firm value.
Irrelevance Theory	Modigliani and Miller (1958)	Firm value is not affected by the choice of capital structure rather it is the real assets of the firm that determines its value
Irrelevance Theory Revised	Modigliani and Miller (1963)	The change in firm performance due to the difference in capital structure is due to the tax shield provided by leverage.
Traditional Approach	Solomon (1963)	The choice of financing the investments affects both the cost of capital and the value of a corporation

Pecking Order Theory	Donaldson (1961), and Myers and Majluf (1984)	The firms finance their projects through internal funds as their first choice and external funds as their last choice.
Shareholder Theory	Friedman (1962)	The major duty of the management is to serve the interest of shareholders by increasing their wealth.
Trade-off Theory	Kraus and Litzenberger (1973)	The use of debt improves the performance of a firm but only up to a certain level after which extra debt financing deteriorates the performance of the firm.
Agency Theory	Jensen and Meckling (1976)	The use of debt financing reduces the agency costs of a firm that in return leads to an increase in the value of the firm.
Signaling Theory	Ross (1977)	The management of an undervalued firm will prefer debt over equity and the management of an overvalued firm will prefer equity to debt which sends a signal to the market.
Cash Flow Theory	Scott (1981)	Survival and performance of the companies are associated with their ability to meet their expenses.
Stakeholder Theory	Freeman (1984)	The main objective of the management should be to serve the interest of all the stakeholders.
Free Cash Flow (FCF) Theory	Jensen (1986)	Free cash flow does not necessarily mean improved firm performance. The management may invest it in less profitable projects thus wasting the FCF.
Dual-investor Theory	Schlossberger (1994)	The survival of a firm is dependent upon all the stakeholders.
Stewardship Theory	Davis, Schoorman and Donaldson (1997)	The management of a firm is self-motivated and it gains satisfaction through the performance of the firm.
Market Timing Theory	Baker and Wurgler (2002)	A firm chooses to issue either debt or stock depending on whichever increases the value of the firm.

2.3 Firm Performance

Firm performance is the most important aspect of organization science. Being the central focus of every firm on its performance, numerous studies have studied the constructional build of firm performance. These studies have identified

several problems both conceptually and empirically (Miller et al., 2013). In their seminal article, Venkatraman and Ramanujam (1986) argue that discussing firm performance is perhaps the toughest issue faced by research scholars. Richard et al. (2009) argue that firm performance is a multi-dimensional construct. It consists of various dimensions such as measuring how effective an organization is in its operations, determining the corporate reputation, and how long can the organization survive. However, the most widely studied dimension of firm performance is its financial aspect. The dimension of firm performance in this study is also its financial perspective. Henceforth, in this study, firm performance means the financial dimension of firm performance.

Even though the firm performance contains various dimensions and one of the most studied dimensions is its financial perspective, there is no consensus among researchers on this dimension. Miller et al. (2013) have mentioned some of the explanations of firm performance as described in some of the oft-cited articles. Jensen and Meckling (1976) describe the firm performance as the maximization of the present value of the firm. Wernerfelt (1984) defines firm performance as a higher rate of return over the long run. The ratio used to describe the firm performance by Rumelt (1991) is the return on assets. Venkatraman and Ramanujam (1986) have explained the firm performance in a broader aspect than the formerly mentioned researchers. According to them, firm performance means achieving the economic goals set by the firm. These aforementioned definitions are from only a few of the many studies to discuss a firm performance. Looking from the surface, these definitions might seem the same, but in reality, they are very different from each other. Some of the definitions talk about the stability of a company, some of them talk about the measures of returns used, whereas, others talk about whether the returns should be used in absolute measures of relative measures. From this contextual perspective, researchers should not be surprised there is confusion on which measures to use for firm performance and why they obtain contradictory results (Miller et al., 2013).

Firm performance is perhaps the most important aspect of organization science. Being the central focus of every firm on its performance, it is of grave importance to identify the determinants of firm performance (Barney, 1997; Lubatkin and Shrieves,

1986; March and Sutton, 1997; Schendel and Hofer, 1979). Miller et al. (2013) recommend that researchers are required to stop the current practices. Although this is not easy to challenge the current practices but the multi-dimensional approach to firm performance dominates the empirical work. It is also a fact that the work of many theorists can not be extended to empirical work. They recommend using a microscopic approach where each measure of firm performance should have its own theoretical explanation.

Researchers use a mix of firm performance measures even if these measures are either uncorrelated or even negatively correlated, sometimes. There is a need to test these measures and if they are not related, researchers should develop separate theories for their explanation (Gentry and Shen, 2010). This section discusses the measures that are used in this study.

According to Libby et al. (2009), ROA is the broadest measure of firm profitability and the effectiveness of management. This measure is independent of the firms financing strategy. This measure is often used by investors to compare firm performances and managerial performances with each other (Williams et al., 2015).

$$ROA_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Assets_{i,t}} \tag{4}$$

ROE measures the performance of the management in utilizing shareholders investments. It is one of the key performance measures as shareholders are always keen to know how their investment is accelerating as compared to their counterparts (Libby et al., 2009; Williams et al., 2015).

$$ROE_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Shareholders'\ Equity_{i,t}} \tag{5}$$

Every firm strives to increase its return on every unit of sales. ROS is used as a measure of how much an organization is earning on every unit of monetary sales. This ratio shows the efficiency of the organization in converting its sales into profits (Horngren et al., 2012).

$$ROS_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Sales_{i,t}} \tag{6}$$

Price to earnings ratio is used to check how much the investors trust a firm and its management. PE ratio tells us how much an investor is willing to invest for each monetary unit of earning (Horngren et al., 2012; Libby et al., 2009; Williams et al., 2015).

$$PE_{i,t} = \frac{Share\ Price_{i,t}}{Earnings\ per\ Share_{i,t}} \tag{7}$$

Return on share price might not be popular as a measure of firm profitability taught in the textbooks of accounting yet it is the most studied area by researchers and the most focused measure of profitability by investors. This measure has been used by a lot of researchers since long (Gale, 1972; Hidayat et al., 2020; Megginson et al., 2000; Umar et al., 2021).

$$ROSP_{i,t} = ln\frac{Share\ Price_{i,t}}{Share\ Price_{i,t-1}} \tag{8}$$

Market to book ratio is a widely used measure by investors and researchers to assess the value of a firm whether it is overvalued or undervalued (Al-Awadhi et al., 2020; Golubov and Konstantinidi, 2019; Ho et al., 2022; Park, 2019). If the market value of a firm is higher than its book value, the firm is overvalued and vice versa.

$$MBV_{i,t} = \frac{Market\ Value\ of\ Equity_{i,t}}{Book\ Value\ of\ Equity_{i,t}} \tag{9}$$

2.4 Capital Structure

The capital structure is referred to as the source of financing the investments of a company. Broadly classified, there are two major categories of financing, i.e., equity and debt. For equity financing, the firms use either common stocks or choose preferred stocks. Debt financing may also be classified further into two broader categories, i.e., debt financing from financial intermediaries or debt financing from the general public and other institutions. The debt financing from financial intermediaries is mostly in the form of long-term loans generally referred to as notes payables in the books. Whereas, debt financing from other sources

than the financial intermediaries is generally referred to as bonds. Equity holders are the owners of the firms while debt holders are referred to as the creditors. Equity holders have a long-term commitment to the firm while debt holders do not have a long-term commitment to the firm. Equity holders expect the firm to grow in the future while debtholders are more interested in regular payments of interest and timely payment of the principle. Capital structure is one of the most important aspects of Corporate Finance as the goals of the management, equity holders, and debt holders are different. The management wants to invest cash in long-term investments. The equity holders want regular payment of dividends. The debt holders want regular interest payments and timely principal payments. Thus making capital structure one of the key areas in corporate finance as well as managerial finance (Chadha and Sharma, 2015).

Capital structure is perhaps one of the most densely studied areas of corporate finance. Recently, various theories have been presented for explaining the use of either debt or equity, or a mix of both in a firms capital structure. The proposal of almost every theory is based on either the separate use or a combination of both modes of financing depending on the various attributes such as costs and benefits. According to Titman and Wessels (1988), the empirical work may not be justified through the theoretical work in this area. This might be due to the fact that certain attributes are constructed abstractly and researchers find it difficult to calculate them directly.

The explanatory variable used in this study is the capital structure of a firm. The association among firm performance and capital structure was studied in 1958 for the first time (Modigliani and Miller, 1958). Since then this topic has been one of the greenest areas for researchers. Despite a densely researched area, the relationship is still a puzzle and inconclusive (Ahmed and Afza, 2019; Kumar et al., 2017; Mardones and Cuneo, 2020). This study uses the frequently used proxies of capital structure by researchers, i.e., total debt to assets ratio (TDA) and total debt to equity ratio (TDE) or equity multiplier (EM) (Horngren et al., 2012; Libby et al., 2009).

$$TDA_{i,t} = \frac{Total\ Liabilities_{i,t}}{Total\ Assets_{i,t}} \tag{10}$$

$$EM_{i,t} = \frac{Total\ Assets_{i,t}}{Total\ Equity_{i,t}} \tag{11}$$

2.5 Capital Structure and Firm Performance

The value of a firm is dependent upon the decisions of its past and future investments, and upon the decision of its financing whether by equity or debt or by a mix of them. There are different views about the performance of organizations concerning their source of financing. Firm performance is measured differently, therefore, it is necessary to choose an optimal capital structure to finance these investments, thus making the financial mix one of the main areas of concern for the management. It can, therefore, be argued that capital structure is the main strategic concern that has ever been central in Corporate Finance. The core objective of the firm has always been the increase of shareholders' wealth by increasing its value, therefore, firms should finance their projects in a way that minimizes their overall cost of financing. Because firm value is dependent upon financing decisions, capital structure plays a significant role in a firm's success (Kumar et al., 2017).

One of the most known puzzles in the field of Corporate Finance is the zero-leverage puzzle. It is very strange to know that certain firms have a very low level of debt in comparison with the predicted values by the theories of capital structure (Graham, 2000; Miller, 1977). Strebulaev and Yang (2013) conducted a study on the zero-leverage puzzle. Their study includes the non-financial listed firms in the US from 1962 to 2009. According to them, after 1980, the number of firms following the zero-leverage policy is growing rapidly. From 4.3% of the companies with zero leverage in their capital structure, the number has come closer to 20% after 2000. Firms with less than 5% of their assets financed through debt are considered to be almost zero-leverage (AZL). More than one-third of the firms are in the AZL category in 2009. They argue that these are not any outliers or a short-term effect rather this is their policy. The findings of their study are very startling. The performance of the firms that follow zero-leverage policy is better than the firms with debt in their capital structure. The firms following the zero-leverage policy maintain higher cash balances, their market-to-book values are higher, and they

pay higher dividends and taxes as compared to the firms that have used debt along with equity to finance their investments. Graham (2000) argues that despite such rich literature that is available on association among firm performance and capital structure, there are unanswered questions. One such question is why so many firms appear to be under-levered. Researchers in the future are required to explore it. It is in contradiction with the traditional theories of capital structure to note that the firms with a very low level of debt are more stable and profitable than the firms that follow a relaxed approach to using debt in their capital structure.

Although there are many theories regarding capital structure, two of them are most commonly discussed i.e. Modigliani and Miller's Irrelevance Theorem and Kraus and Litzenberger's Trade-off Theory. Trade-off Theory is the most commonly discussed capital structure theory in the literature on finance. The theory states that an initial rise in leverage leads to an improvement in firm value but after an optimal point it starts affecting negatively. The most notable and cited work in the area of capital structure is Irrelevance Theorem. Any discussion about capital structure is incomplete without it. In their seminal article, Modigliani and Miller (1958) state that in a perfect market, a firm's capital structure and its value are not related. It depends on the real assets owned by an organization and not on the source of financing these assets. After about five years, Modigliani and Miller (1963) revised their theorem as they had to face criticism from researchers whose empirical studies were against their earlier work. In their revised study, they argue that in the case of imperfect markets, companies can benefit from tax shields by using debt in their capital structure.

A major contribution in the area of capital structure is by Titman and Wessels (1988) where they have analyzed the determinants of capital structure and examined the theories regarding capital structure. Firm performance is a measure consisting of various aspects of an organization like organizational survival, corporate reputation, operational effectiveness, etc. but the most broadly researched area of firm performance is its financial aspect (Gentry and Shen, 2010). Henceforth, in this study, firm performance means firm financial performance. Iqbal (2016) believes that companies try to maximize their amount of profit instead of profit per invested amount. As these investments are mostly financed by debt, large

companies have an advantage over small companies in this regard. Some of the main reasons to explain this advantage as mentioned in the textbooks of Corporate Finance are because large firms have (a) more fixed assets, (b) more financial and economic resources, (c) more amount of profit, (d) relatively larger cash flows, (e) more exports, and (f) more tools for financial hedging. These are some of the reasons why can large firms attract a higher amount of debt as compared to small firms. According to Lim et al. (2020), firms that have higher amounts of fixed assets have relatively easier access to debt financing as compared to firms that have lower amounts of fixed assets. Thus, large companies are more likely to finance their investments through debt even though they are less efficient. In view of the literature that has been discussed in this section as well as the next section, the work of researchers in this area can be classified into three main perspectives i.e. the irrelevance perspective, the mainstream perspective, and the positive perspective. The irrelevance perspective (i.e. MMs irrelevance theorem) opines that firm performance does not depend on the source of financing rather it depends on investment in real assets. The mainstream perspective (i.e. trade-off theory) is of the view that a higher portion of debt leads to an improvement in firm value but after a certain level, it starts affecting negatively. The positive perspective (i.e. agency theory, free cash flow theory) is of the view that leverage brings a positive impact on firm performance. Kumar et al. (2017) have summarized the studies that have been conducted on the association between the performance of the firm and its capital structure. There are diverse explorations that have empirically shown a significant and positive relation between firm performance and its level of debt (Ahmed and Afza, 2019; Kumar et al., 2017). Whereas, contrary to the aforementioned studies, some of the examinations have empirically shown a negative association between the performance of the firms and their levels of debt (Abor, 2005; Majumdar and Chhibber, 1999; Salim and Yadav, 2012). Yasmin and Rashid (2019) have empirically investigated that firms with a low level of debt are more profitable and that they possess the ability to pay higher dividends as compared to firms with a high level of debt. Based on their results, they argue that various organizations are at the extreme of conservatism while using debt in their capital structure, coined as "zero-leverage puzzle". After being observed in

the US for the first time, this trend was adopted later on internationally as well.

According to the literature, while determining the capital structure of business ventures, an ideal mix of equity and debt is crucial since it is thought to be a key factor in improving the performance of the organization. The success of the company is improved for a variety of reasons if it raises capital by issuing a sizable part of equity. First of all, it lacks a defined maturity date and fixed fees. Secondly, equity financing enables companies to avoid restrictive covenants, which are contractual terms that limit a company's ability to take certain actions, such as borrowing additional funds or paying dividends. Since equity investors do not expect fixed payments, they do not impose such restrictions on the company's management. Thirdly, equity financing can help reduce conflicts of interest between creditors and stockholders. When a company uses debt financing to fund its operations, it has to pay interest and principal payments to its creditors, which can limit its ability to pursue risky but potentially lucrative initiatives. However, with equity financing, the company's managers can invest in these initiatives without the fear of defaulting on loan payments, thereby aligning the interests of managers and shareholders. However, there are also some potential drawbacks to equity financing. Firstly, when a company issues new shares, it dilutes the ownership of existing shareholders, which can lead to a decrease in the market value of their shares. This is because the issuance of new shares reduces the earnings per share, which can make the stock less attractive to investors. Secondly, companies with unstable financial conditions may use equity funding to buy assets that ultimately result in losses. This can result in a loss for investors who have invested in the company's equity. In summary, equity financing can provide several benefits to a company, including improved creditworthiness, greater flexibility in decision-making, and reduced conflicts of interest between stakeholders. However, it also carries some risks, such as dilution of ownership and potential losses for investors. Companies need to carefully consider their financing options and weigh the advantages and disadvantages of each approach. Equity financing also raises agency costs since managers and investors of the company have different interests. Furthermore, stock money is regarded as an expensive source of funding. As a result, equity financing should only be resorted to in extreme cases (Kim et al., 2006; Myers and

Majluf, 1984). Association among firm performance and capital structure needs to be explored as their relationship is not clear despite so many studies in this area (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Researchers have found mixed results on association among firm performance and capital structure. The positive relationship can be supported by many theories but it is hard for researchers to support their negative relationship results with any theory.

Although the studies that report a negative association among firm performance and capital structure outnumber the studies that report either a positive or an insignificant relationship between them (Dao and Ta, 2020), there is almost negligible literature available to explain this phenomenon. This study is an attempt to draw the attention of researchers to explain this phenomenon theoretically by proposing a so-called "mindset change theory".

2.6 Other Factors Affecting Firm Performance

The discussion of capital structure starts with the paper of Modigliani and Miller (1958) where they state that in an efficient market, and in the absence of taxes, asymmetric information, agency costs, and bankruptcy costs, the overall value of the firms remains unaffected by the source of financing. This proposition posits that real assets determine the value of a firm rather than the ratio of debt capital and equity capital otherwise arbitrage mechanism takes place in the absence of this proposition. In the arbitrage mechanism, the investors hold the shares of an undervalued firm, whereas, they sell the shares of an overvalued firm thus increasing the demand for an undervalued firm's shares and increasing the supply of an overvalued firms shares. The law of demand and supply plays its role and ultimately the prices of the shares of an undervalued firm rise and the prices of the shares of an overvalued firm fall down.

Since the publication of Jensen and Meckling (1976), there is vast literature available on the agency theoretic explanations of capital structure. An increase in debt level reduces the agency costs but a further increase in the level of debt rises the agency cost that in return gives a rise to financial distress which may ultimately result

in liquidation or bankruptcy. Since the argument of Jensen and Meckling (1976), various scholars have studied the relationship between the capital structure of a firm and its performance. These studies, however, provide mixed and contradictory results. Some authors find a positive relationship between the use of leverage and the performance of the firms (Taub, 1975; Roden and Lewellen, 1995; Champion, 1999; Ghosh et al., 2000; Hadlock and James, 2002),whereas, other scholars report a negative impact on the firm performance through the use of debt financing (Fama and French, 1998; Gleason et al., 2000; Simerly and Li, 2000).

The other factors used in this study that affect firm performance are size, growth, and age. These are discussed as follows along with their measurement.

To test the relationship between two variables, other variables should be held constant so that the results are generated solely by the regressional experimentation of these two variables. For this purpose, researchers use control variables. Previous studies on association among firm performance and capital structure have mostly used firm size (Size), growth in total assets (GTA), growth in total market capitalization (GTM), firm age since its incorporation to date (Age), and tangibility of assets (Tangibility) as control variables (Abor, 2005; Ahmed and Afza, 2019; Fosu, 2013; Le and Phan, 2017). Using their methodology, this study also uses these variables as control variables. GTA is used when estimating for accounting measures and GTM is used when estimating for market measures.

$$Size_{i,t} = \ln(Net\ Fixed\ Assets_{i,t}) \tag{12}$$

$$GTA_{i,t} = \frac{Total\ Assets_{i,t}}{Total\ Assets_{i,t-1}} \tag{13}$$

$$GTM_{i,t} = \frac{Total\ Market\ Capitalization_{i,t}}{Total\ Market\ Capitalization_{i,t-1}} \tag{14}$$

$$Age_{i,t} = Difference\ between\ observation\ year\ and\ establishment\ year \tag{15}$$

The proxy used for firm size is the net fixed assets. This proxy is used as this thesis attempts to study whether firm size moderates association among firm performance and capital structure or not. A company can obtain huge amounts of loans if it has the value of its fixed assets is high. If a companys fixed assets are low then it is very difficult for the company to obtain huge amounts of loans. This proxy of firm size will serve as the best solution for this study.

2.7 Size Moderating the Relationship Between Capital Structure and Firm Performance

Because of the benefits of economies of scale, firm size is very important in today's world. In comparison to small businesses, large corporations can enjoy lower cost-benefit ratios. Firms on the forefront hope to grow in size in order to gain a competitive advantage over their competitors by lowering costs and increasing market value. Large corporations have access to both types of financing (internal and external) . They have the option of reducing their debt, which could improve market credibility, firm value, and stock price. The capital structure and performance relationship of a firm are influenced by its size (Fatima and Bashir, 2021). Various scholars have used different proxies of firm size, e.g., Fatima and Bashir (2021) have used natural logarithm of total sales. This study argues that the financing decisions are mostly made because of investment in fixed assets, therefore, this study uses natural log of fixed assets as a proxy of firm size.

Before discussing the role of size as a moderator in association among firm performance and capital structure, the techniques of capital budgeting need to be highlighted. These techniques, especially NPV provide the basis for logical argumentation that why size moderates this relationship.

When considering an investment proposal, it is essential to assess whether it can generate a return that meets or surpasses the expectations of the investors, which is commonly referred to as capital budgeting. In other words, an investment proposal should be evaluated based on its ability to provide a financial gain that is at least equal to or greater than what investors expect to receive in return for their

investment. This return could be in the form of dividends, capital appreciation, or any other type of financial gain. Therefore, before making any investment decisions, it is crucial to determine the minimum required rate of return (or hurdle rate) that investors expect, and assess the proposal's potential to meet or exceed this rate. By doing so, investors can ensure that they are investing their money wisely and are likely to achieve their financial goals. Van Horne & Wachowicz Jr (2008) have identified these four as major capital budgeting techniques.

2.7.1 Payback Period

The payback period is the time in the number of years that is required by a project to return the initial investment on the basis of the expected cash inflows. The decision of either accepting or rejecting a project investment depends on whether the project returns the initial investment in the required time or not. The project will be approved if the initial investment is recuperated within the designated time frame. Conversely, the project will be turned down if the initial investment cannot be regained within the specified time frame. There are three problems associated with this capital budgeting technique. The first problem is that this method does not take into account the cash flows that are beyond the specified time. The second problem with this method is that it does not consider the time value of money. The last problem with this technique is that the specified time of the project is purely subjective (Brealey et al., 2012; Ross et al., 2008; Van Horne and Wachowicz Jr., 2008).

2.7.2 Internal Rate of Return

One way to define the internal rate of return is as the discount rate that makes the present value of the anticipated cash inflows equal to the present value of the cash outflows. The acceptance and rejection of a project according to this technique depend upon the required rate of return. If the required rate of return is either equal to or below the internal rate of return, the project is accepted. If the required rate of return is above the internal rate of return, the project is rejected. It is important to note that while the internal rate of return is a widely used financial

metric, it has some limitations and should not be the sole criterion for investment decision-making. It assumes that all cash flows can be reinvested at the same rate, which may not be realistic. Additionally, it does not consider the magnitude or timing of cash flows beyond the initial investment and the total return. Another problem with the internal rate of return is that sometimes this technique provides a dual rate of return which makes the decision-making difficult. Therefore, it is essential to use other measures in conjunction with the internal rate of return to evaluate the viability of an investment project (Brealey et al., 2012; Ross et al., 2008; Van Horne and Wachowicz Jr., 2008).

2.7.3 Net Present Value

The net present value is another technique used for capital budgeting. It is the most preferred technique in the books of Corporate Finance. NPV is calculated by comparing the present value of all cash inflows with the present value of all cash outflows. If the present value of all cash inflows is either equal to or greater than the present value of all cash outflows, the project is accepted. If the present value of all cash inflows is lower than the present value of all cash outflows, the project is rejected (Brealey et al., 2012; Ross et al., 2008; Van Horne and Wachowicz Jr., 2008).

2.7.4 Profitability Index

The profitability index is the ratio of the present value of all the cash inflows to the present value of all the cash outflows. A project is accepted if the value of the profitability index is either greater than or equal to 1. A project is rejected if the value of the profitability index is less than 1 (Brealey et al., 2012; Ross et al., 2008; Van Horne and Wachowicz Jr., 2008).

The association among firm performance and capital structure can be explained more clearly if further moderators or mediators are included. Almost all the theories relating to the effect of capital structure and firm performance have theoretically explained their direct relationship. However, the mixed empirical results have been found. In fact, the number of studies that have reported a negative relationship

are far greater than the number of studies that have reported a positive association among firm performance and capital structure even though almost all the theories propose a positive relationship between them. According to Gentry and Shen (2010), there is a need to change the methodology of studies in this area. One of the suggested future directions for researchers in the literature include by exploring the roles of moderators and mediators between their relationship. This study also incorporates this suggestion and tests whether firm size moderates association among firm performance and capital structure or not.

Net Present Value (NPV) is the most commonly used capital budgeting technique to evaluate projects (Magni, 2009). Theoretically, it is considered to be the best capital budgeting technique as suggested in many corporate finance textbooks (Bierman and Smidt, 2012; Brealey et al., 2012; Copeland and Weston, 1988; Damodaran, 1999; Koller et al., 2000). On the contrary, various authors have critically evaluated NPV and have mentioned several flaws in it. For example, Iqbal (2017) and Berkovitch and Israel (2004) have raised a question on the practical use of NPV. According to them, although NPV is preferred over Internal Rate of Return (IRR) academically, yet managers of the firms prefer to use IRR for evaluation of projects. Extending the literature, Iqbal (2016) has identified two flaws in NPV method of evaluating projects that are as follows:

1. Firm managers always try to maximize the amount of NPV while selecting between various projects thus making NPV a positive function of size. Consequently, NPV is biased towards larger sized projects even if these projects are less efficient according to IRR.

2. The basic assumption of NPV is that every project under consideration is to be financed by debt.

The first flaw talks about biasness of NPV towards bigger project even if the project is inefficient that implies lower return on assets. The second flaw talks about cost of debt to be the opportunity cost. Based on the analysis of Iqbal (2016), if the aforementioned flaws are linked together, it can be proposed that there is a negative link between leverage (i.e. debt-to-equity) and firm performance (i.e. return on assets) whereas size moderates this relationship.

Iqbal (2016) notes that the main difference between NPV and IRR criteria for project evaluation is that NPV ranks high that project which maximizes the amount of profit whereas IRR ranks high that project which maximizes the rate of profit on invested funds. Since absolute profit is a positive function of the size of a project, therefore he concludes that NPV criterion is biased towards bigger size projects even if their rate of return is less. He also proves that NPV criterion is based on the presumption that every project is financed by borrowed money which can be obtained in any amount under the assumption of perfect capital markets. Iqbal (2017) illustrates numerically that NPV criterion, being biased towards bigger-size projects and being used by majority of firm managers according to many quoted survey studies, results in less than potential investment and growth rate in an economy which has a limited supply of loanable funds and in which loans are granted to borrowers on the first come, first served basis.

Based on i) Iqbal (2017) results, ii) superior results of capital rationing through IRR rather than NPV in face of hard rationing of funds for a given firm as discussed in text books such as , iii) empirical results showing a negative impact of debt financing on firm performance as discussed above and iv) better performance of zero leveraged firms as discussed above, a new theory named mindset change theory is proposed in this research that explains a negative impact of debt financing on firm performance. According to this theory, as soon as a firm manger has access to borrowed money to finance new investments, he/she starts preferring big size projects keeping in view their absolute amount of profit and ignoring their rate of return. Hence, debt financing causes a decrease in overall rate of return on invested funds.

Moreover, Demirg-Kunt et al. (2020) tested the changes in capital structure during the financial crisis of 2008. They argue that even in times of financial crisis, they have not witnessed any significant decrease in the debt level of large companies. On the other hand, small companies have witnessed a significant decrease in their debt level. They call the capital markets "spare tire". According to them, large firms have easy access to capital markets and they can secure a loan easily due to their large size of fixed assets, whereas, small firms do not have easy access to the capital markets and they cannot easily secure loans due to their small size of fixed

assets. These arguments also lead to the proposition that there is a association among firm performance and capital structure and the size of the firm moderates this relationship.

2.8 Empirical Studies on Capital Structure and Firm Performance, especially in Pakistan

Abundant literature is available on the study of the association between the performance of a firm and its capital structure but the direction of their association is still inconclusive and a puzzle for researchers (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). They have referred to this relationship as inconclusive because of mixed results regarding the direction of their relationship. Since the argument of Jensen and Meckling (1976), numerous researchers have tried to explore this relationship through agency theory. However, empirical results in this regard are either mixed or contradictory.

Ullah et al. (2020) studied the association between the use of debt financing and firm performance. The sample of their study includes 90 firms from the textiles sector in Pakistan from the period of 2008 2017. The results of their study show that debt to equity has a negative relationship with firm performance, whereas, the debt to assets ratio is not significantly associated with firm performance in the textile sector of Pakistan. Moreover, their results also show that firm size, used as a control variable, is also negatively linked to the performance of the firm. They support their results with the help of pecking order theory by discussing that pecking order theory posits that an increase in equity capital leads to an increase in firm performance, whereas, an increase in debt capital leads to a decrease in firm performance.

Naseem et al. (2019) explored whether capital structure mediates the link between corporate governance measures and firm performance. The sample of their study includes 179 firms of Pakistan from 2009 2015. Their results show that capital structure partially mediates the link between corporate governance measures and firm performance. The role of capital structure as a mediator between their studies

measures sometimes plays a positive role, whereas, other times, it plays a negative role as a mediator.

Various other scholars have also studied whether firm performance is affected by the capital structure in Pakistan. Memon et al. (2012) explored the affiliation of firm performance and capital structure of 141 Pakistani textile firms from 2004 2009. They report a negative relationship between leverage and return on assets. Similarly, Muhammad and Shah (2014) investigated the cement sector of Pakistan whether firm performance is affected by capital structure or not. Using data of 5 years from 2009 to 2013, they report negative association between capital structure measures and all their used measures of firm performance. These measures include gross profit margin (GPM), net profit margin (NPM), return on assets (ROA), and return on equity (ROE). They have used debt to assets and debt to equity as capital structure measures.

Bokhari and Khan (2013) use data of 7 years from 2005 2011 to study the link between capital structure measures and firm performance measures. They investigated the overall non-financial sector of Pakistan with around 380 firms. Their used measures of capital structure include total debt along with short-term and long-term debts. Their used measures of firm performance include accounting measures of firm performance comprising return of equity, return on assets, net profit margin, and earnings per share. Using the OLS method of estimation, they tested twelve relationships among these measures. Out of these 12 estimations, 7 estimations report a negative association between leverage and profitability of a firm, whereas, only 3 estimations report no significant association between these variables. The non-significant associations include the relationship between long-term debt and ROE, the relationship between total debt and ROE, the relationship between short-term debt and net profit margin, the relationship between long-term debt and net profit margin, and the relationship between total debt and net profit margin. The significant associations include the relationship between short-term debt and return on assets, the relationship between long-term debt and return on assets, the relationship between total assets and return on assets, and the relationship between capital structure measures and return on equity.

Ahmed and Afza (2019) conducted a study on Pakistan from the period of 2006 2013. Their results show that short-term debt ratio (SDR) and total debt ratio (TDR) are associated positively with the firm value when calculated through Tobins Q. This positive relationship is also supported by other studies (Champion, 1999; Ghosh et al., 2000; Hadlock and James, 2002).

Apart from the evidence of a positive association between the performance of a firm and its capital structure as mentioned above, many studies empirically prove that a negative association exists between these two (Fama and French, 1998; Gleason et al., 2000). According to Ahmed and Afza (2019), the relationship between return on assets, long-term debt ratio, return on equity and short-term debt ratio of the firm is significant and negative.

Abdullah and Tursoy (2021) and Kumar et al. (2017) have summarized the empirical studies on capital structure and firm performance along with the direction of their relationship as follows.

TABLE 2.2: Some empirical evidence on the association among the firm performance and capital structure

Author(s)	**Year**	**Findings**
Jouida	2018	Positive
Margaritis and Psillaki	2007	Positive
Zhang	2010	Positive
Nunkoo and Boateng	2010	Positive
Kaur and Rao	2009	Positive
Al-Ajmi et al.	2009	Positive
Chechet and Olayiwola	2014	Negative
Van Caneghem and Van Campenhout	2012	Negative
Arvanitis et al.	2012	Negative
Chakraborty	2010	Negative
Frank and Goyal	2009	Negative
Antoniou et al.	2008	Negative
Daskalakis and Psillaki	2008	Negative
Mazur	2007	Negative
Sogorb-Mira	2005	Negative
Cassar and Holmes	2003	Negative
Hall et al.	2004	Negative

Fama and French	2002	Negative
Simerly and Li	2000	Negative
Michaelas et al.	1999	Negative
Titman and Wessels	1988	Negative

The majority of Pakistani empirical research have only explored the direct effect of capital structure on business performance using samples from different Pakistani industries. Most of the articles are discussed by Ahmed and Afza (2019). For instance, Akhtar et al. (2012) investigated the association between financial leverage and company performance by choosing 20 publicly listed companies from the energy and fuel industry between 2000 and 2005. To calculate the capital structure of the enterprises, the gearing ratio and debt to equity ratio were chosen, whilst the return on equity, return on assets, dividend to equity ratio, earnings per share, and net profit margin were used to assess the performance of the firms. The study's findings indicated a link between debt levels and business success. Similarly, Khan (2012) chose 36 publicly listed engineering companies in Pakistan from 2003 to 2009 to investigate how capital structure affects the performance of a company. The study's findings revealed an inverse link between financial leverage and business performance. Umar et al. (2012) investigated the link between debt ratio and firms' financial performance using a sample of the top 100 listed companies on the Karachi Stock Exchange over four years (2006 to 2009). The performance of the company was assessed using six metrics, including ROA, ROE, EPS, EBIT, P/E ratio, and NPM, while the capital structure of the company was assessed using short, long, and total debt ratios. According to the findings of generalized least squares regression analysis, all capital structure proxies were negatively correlated with NPM, EPS, ROA, and EBIT. On the other hand, the link between the P/E ratio and the short-term debt ratio was favorable.

To investigate the effect of capital structure on the performance of the chosen sample enterprises, Raza (2013) used panel data from 482 listed non-financial firms in Pakistan collected over six years (2004 to 2009). The debt to equity ratio was used to calculate leverage, while return on total assets and return on equity were used to assess financial performance. The study's main conclusion indicated an inverse association between the selected enterprises' performance and debt ratio.

Additionally, the textile industry, which had the lowest degree of profitability, had the largest debt ratio. Furthermore, it was claimed that aggressive long-term debt financing adversely affects the businesses profitability. Ahmed Sheikh and Wang (2013) chose 240 listed non-financial enterprises from Pakistan between 2004 and 2009 to examine the effect of debt financing on corporate performance. While three proxies, namely short term, long term, and total debt ratio were used to evaluate the capital structure of the businesses, return on assets (ROA) and market to book ratio (M/B) were used to measure performance. The findings show that the accounting and market performance of Pakistani enterprises were predicted by all three of the capital structure proxies in the negative direction. Mumtaz et al. (2013) chose 83 publicly traded companies from Pakistan's KSE 100 index to study the relationship between capital structure and company financial worth. Earnings per share, return on equity, return on assets, and net profit margin were used to calculate the performance of the businesses, while the total debt ratio was used to gauge leverage. The study's findings indicated that the development of debt and equity financing had a considerable, unfavorable impact on the firm's accounting performance. Additionally, the market's performance and risk level had an adverse relationship with debt financing.

To empirically investigate the effect of capital structure on a firm's performance, Saeed and Badar (2013) used the financial data of 10 listed food companies in Pakistan from 2007 to 2011. The study used the assets turnover ratio and return on assets as the response variables to calculate the firm's worth. On the other hand, the debt to equity ratio, long-term debt ratio, and short-term debt ratio were used to calculate the firm's capital structure. The findings of the multiple regression models revealed a strong and adverse association between the firm's performance and the debt to equity ratio and the short-term debt ratio, whereas long-term debt financing greatly improves the performance of the company. Rehman (2013) conducted a study to look at the link between leverage and performance of 35 listed companies in Pakistan's sugar sector. While ROA, EPS, NPM, ROE and growth in sales were used to gauge a company's success, the debt ratio was used in the study to evaluate the capital structure. The research's findings showed conflicting capital structure outcomes.

Muhammad and Shah (2014) investigated the relationship between debt ratio and company performance using a sample of 25 listed Pakistani cement companies from 2009 to 2013. The selected businesses' capital structures were examined using the debt to assets and debt to equity ratios, while the performance of the enterprises was assessed using the ROA, ROE, Gross Margin and Net Margin. The study's findings showed a strong and inverse association between debt and company performance. Mujahid and Akhtar (2014) examined the impact of capital structure on the firm's financial performance by taking into account the 155 listed textile companies in Pakistan during six years (2006 to 2011). Leverage was shown to be significantly and favorably associated with shareholders' wealth and the firm's performance in the study, which employed EPS, ROE, and ROA to calculate the firm's performance and shareholders' wealth. Inam and Mir (2014) used a sample of all Pakistan's listed energy and fuel sectors to study the effect of debt ratio on the firm's performance. RPS, ROCE, ROE, ROA and NPM were used to calculate the financial performance of the companies. Two ratios, i.e., DE ratio and gearing ratio were used to assess capital structure. Their findings demonstrated a strong correlation between leverage and the businesses' financial success. They also suggested that by increasing debt financing, Pakistan's energy and petroleum industries might boost their future growth.

Kausar et al. (2014) investigated the relationship between 197 Pakistani listed companies' capital structures and their business performance. Long-term, short-term, and total debt ratios were used to calculate capital structure, while price-earnings and Q ratios were chosen to assess the performance of the chosen organizations. The results of the panel regression and Ordinary Least Square analyses showed that the P/E ratio and Tobin's Q were strongly and negatively correlated with all capital structure proxies. The survey also revealed that Pakistan's listed companies were heavily dependent on short-term loan funding. Javed et al. (2014) experimentally investigated the link between leverage and performance by choosing 63 Karachi Stock Exchange-listed companies over five years, from 2007 to 2011. Return on sales, return on assets, and return on equity were used to calculate the performance of the sample, while long-term debt ratio, total debt ratio, and equity to assets ratio were used to determine the capital structure of the businesses.

When evaluated by the equity to assets ratio, leverage favorably outperformed ROA and ROE, although the study's findings were equivocal. LDR and TDR, on the other hand, substantially and adversely predicted ROS. Tauseef et al. (2015) investigated the association between leverage and performance by choosing 95 listed textile companies in Pakistan from 2002 to 2008. Return on equity was chosen as the indicator of financial success, and the debt to assets ratio was used to calculate capital structure. Results indicated a non-linear link between return on equity and the debt to asset ratio. It was inferred that as leverage increased, a firm's performance would improve up to the optimal capital structure level before beginning to decline. The study also determined that the ideal debt-to-income ratio for Pakistan's textile industry is roughly 56 percent. Additionally, while size did not predict performance of the companies, the increase of the firm's sales was a favorable predictor of return on equity. Ahmad and Ali (2016) investigated how financial leverage affected the cement industry's performance. Shahzad et al. (2015) investigated the association between capital structure and financial performance using panel data from 112 listed Pakistani textile companies from 1999 to 2008. To calculate financial performance, the researchers used both accounting measures such as return on total assets and market measures such as the Q ratio while the capital structure was assessed using the total debt ratio, long-term debt ratio, short-term debt ratio, and debt to equity ratio. As the capital structure of the chosen sample had a negative influence on accounting performance and a favorable impact on the market performance of the businesses, the research's findings indicated mixed outcomes.

2.9 Hypotheses of the Study

Based on the literature review as discussed above the following hypotheses are developed. The methodology of testing these hypotheses is discussed in chapter 3, whereas, chapter 4 discusses the results of the estimations.

There is a great deal of literature available on the study of the relationship between performance of the firms and their capital structure, but the direction of their

relationship is still unclear to researchers (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020).

Past studies have used various measures of firm performance interchangeably while testing its relationship with capital structure. Some researchers have reported a positive relationship, whereas, others have reported a negative relationship. There is a possibility that this mixed evidence might be a result of the use of various firm performance measures. Therefore, there is a need to test whether these various measures of firm performance are related to each other, or they represent completely different dimensions (Abdullah, 2016; Gentry and Shen, 2010; Miller et al., 2013). This study also tests whether the measures of firm performance are correlated or not. Based on past literature, this study develops the following hypothesis.

H_1 Measures of firm performance are not strongly correlated.

The second hypothesis is to check the direct impact of leverage on firm performance. According to the discussed literature, there is a negative association between leverage and the accounting measures of firm performance. However, the association between leverage and the market measures of firm performance is mixed (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Based on these studies, the first second hypothesis is as follows.

H_{2a} Leverage has a negative impact on accounting measures of firm performance.

H_{2b} Leverage has a mixed impact on market measures of firm performance.

It has been found that it is easier for big-sized firms to finance their projects through debt, whereas, small-sized firms face difficulties in securing loans for their investments. Even in times of financial crisis, the capital market serves as a spare tire for big-sized firms. Based on this discussion, it can be argued that firm size moderates association among firm performance and capital structure.

H_3 Firm size negatively moderates the association among the firm performance and capital structure.

The trade-off theory proposes that leverage impacts the firm performance in a non-linear behavior. In the beginning, leverage affects the firm performance positively till the point where the cost of debt is lower than the distress cost. After a specific level, the bankruptcy risk, and the cost of debt also increase which ultimately decreases the firm performance.

H_4 There is a negative non-linear impact of capital structure on firm performance.

2.10 Theoretical Framework

Firm performance is dependent upon the strategies of the firm. One of the most important strategies is related to the investment of the firm. If these investments are not financed carefully, it may harm the stakeholders thus making financing decision a key decision. Therefore, it is important for firm managers to choose their capital structure in such a way that maximizes the performance of the firm (Kumar et al., 2017). Keeping in view the importance of choosing the capital structure, various theories have been developed to study the effect of capital structure upon firm performance. Some of the notable theories that are also discussed in Section 2.2. include MM Theorem by Modigliani and Miller (1958), Trade-off Theory by Kraus and Litzenberger (1973), Agency Theory by Jensen and Meckling (1976), The Signaling Theory by Ross (1977), Pecking Order Theory by Myers and Majluf (1984), and Market Timing Theory by Baker and Wurgler (2002). All these theories explain the association among capital structure and firm performance with different explanations.

Based on the theories discussed earlier, the following conceptual framework is developed.

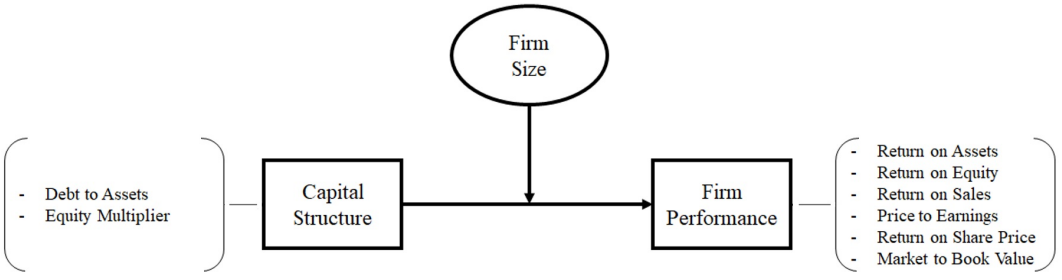

FIGURE 2.2: The Conceptual Framework

Chapter 3

Research Methodology

There are five parts in this chapter. The research philosophy is described in the first part. The population and sample are described in the second part. The third section describes the econometric models used for analyses. The fourth section describes the variables that are used. The last section describes the estimation techniques of analyses.

3.1 Philosophical Approach

The approach to conducting research can be classified based on three factors - the research philosophy, research strategy, and research instruments employed. A research philosophy comprises a set of beliefs about how data should be collected, analyzed, and utilized. It defines the researcher's perspective and influences the approach taken to study a phenomenon. The two key types of research philosophies are epistemology and doxology. Epistemology refers to the methods used to determine what is true, while doxology refers to what is believed to be true. There are several research approaches and philosophies that fall under the umbrella of epistemology. The objective of scientific research is to transform beliefs into knowledge. In the Western scientific tradition, two primary research philosophies have been identified: positivism and interpretivism. Positivism is a scientific approach that involves the use of empirical evidence, logical reasoning, and scientific methods to establish facts and discover causal relationships. It assumes

that the social world can be studied objectively, and reality exists independent of the researcher's perception. In contrast, interpretivism emphasizes the subjective nature of social reality and the importance of understanding the meaning and context of human behavior. It involves the study of how people interpret and make sense of their experiences and interactions with others. Positivism is of the belief that reality is constant that it can be witnessed and explained objectively (Kleinberg-Levin, 1988). The positivist research philosophy asserts that reality exists externally and independently of human consciousness. This implies that the researcher can study reality as an objective and observable entity, separate from their subjective perceptions. The focus is on studying phenomena that are measurable, quantifiable, and empirically verifiable through scientific methods. The goal is to uncover objective truths about the social world through systematic observation and analysis of data (Collis and Hussey, 2014). This study follows a positivism approach of research as it believes that reality is objective and it can be witnessed by the gathered data.

3.2 Population and Sample of the Study

The population of this study includes all the non-financial firms listed on Pakistan Stock Exchange (PSX). Pakistan Stock Exchange is the result of a merger of the three former stock exchanges of Pakistan, i.e., Karachi Stock Exchange, Lahore Stock Exchange, and Islamabad Stock Exchange in 2016. Data are gathered from the Financial Statements Analysis report (formerly known as the Balance Sheet Analysis report) of the Statistics & DWH Department of the State Bank of Pakistan. This report includes the analysis for every 6 consecutive years. SBP has classified the non-financial listed companies on PSX into 14 economic groups.

The Pakistani stock market has faced record losses during the COVID-19 outbreak (Fraz, 2020). Due to this problem, data beyond 2019 are not used in the analysis. The earliest data available for the population of the study are from the year 1999. The most recent year for which the data are gathered is 2019 making a total of 21 years timeframe of data. According to the FSA report of SBP published in 2019, there were a total of 363 non-financial firms listed on the Pakistan Stock Exchange.

Out of these 363 firms, 62 were placed on the defaulters list by the Pakistan Stock Exchange at the end of 2019, whereas, data of 16 firms were incomplete. Consequently, 285 non-financial listed firms are picked as the final sample. Table 3.1. exhibits the complete details of the economic groups as per SBP, the initial sample, and the final sample.

TABLE 3.1: Classification of non-financial listed firms and final sample

No.	Economic Group	Initial Sample	Defaulted Firms	Missing Data	Final Sample
1	Textile	129	44	2	83
2	Sugar	29	4	-	25
3	Food Products	19	1	4	14
4	Chemicals & Pharmaceuticals	43	3	-	40
5	Manufacturing	32	2	2	28
6	Mineral Products	9	-	1	8
7	Cement	17	1	-	16
8	Motor Vehicles, Trailers & Autoparts	19	-	1	18
9	Fuel & Energy	21	3	3	15
10	Information, Comm. & Transport	11	-	-	11
11	Coke & Refined Petroleum Products	10	-	1	9
12	Paper, Paperboard & Products	9	2	1	6
13	Electrical Machinery & Apparatus	6	-	-	6
14	Other Services Activities	9	2	1	6
	Total	**363**	**62**	**16**	**285**

There is a fair chance of outliers during data collection period. Such outliers may significantly alter the estimation results. Heteroscedasticity is one of such problems caused by outliers (Gujarati, 2012). Therefore, following the methodology of Khan et al. (2020), and Gentry and Shen (2010), data are trimmed at the 5^{th} and 95^{th} percentiles.

3.3 Econometric Model

The purpose of this thesis is four-fold as discussed in the introduction chapter. The first objective is to find out how closely accounting measures of firm performance and market measures of firm performance are related. The second objective is

to study association among firm performance and capital structure. The third objective is to study the moderating roles of firm size in association among firm performance and capital structure. The last objective is to test the non-linear association among firm performance and capital structure.

The first objective does not require any econometric model. It is met through a correlations matrix between the accounting measures of firm performance and market measures of firm performance. However, the other three objectives are met through the following econometric models.

The econometric model used to study association among firm performance and capital structure is represented by eq. (1).

$$FP_{i,t} = \alpha + \beta CS_{i,t} + \gamma CV_{i,t} + \epsilon_{i,t} \tag{1}$$

Where:

$\text{FP}_{i,t}$ = Firm Performance
$\text{CS}_{i,t}$ = Capital Structure
$\text{CV}_{i,t}$ = Control Variables (i.e. size, growth, tangibility)

Equation (1) is used to test the following hypotheses.

H_{2a} Leverage has a negative impact on accounting measures of firm performance.

H_{2b} Leverage has mixed impact on market measures of firm performance.

The third objective of this thesis is to study the moderating roles of size on association among firm performance and capital structure. The econometric model used to study this relationship is represented by eq. (2).

$$FP_{i,t} = \alpha + \beta CS_{i,t} + \delta CS_{i,t} \times Size_{i,t} + \gamma CV_{i,t} + \epsilon_{i,t} \tag{2}$$

Where:

$\text{FP}_{i,t}$ = Firm Performance
$\text{CS}_{i,t}$ = Capital Structure
$\text{Size}_{i,t}$ = Firm Size
$\text{CV}_{i,t}$ = Control Variables (i.e. size, growth, tangibility)

Equation (2) is used to test the following hypotheses.

H_3 Firm size moderates the association among the firm performance and capital structure.

The fourth objective of this thesis is to test whether there is a linear or a non-linear association among firm performance and capital structure. The econometric model used for this purpose is represented by eq. (3).

$$FP_{i,t} = \alpha + \beta CS^2_{i,t} + \gamma CV_{i,t} + \epsilon_{i,t} \tag{3}$$

Where:

$\text{FP}_{i,t}$ = Firm Performance
$\text{CS}_{i,t}$ = Capital Structure
$\text{CV}_{i,t}$ = Control Variables (i.e. size, growth, tangibility)

Equation (3) is used to test the following hypothesis.

H_3 There is a negative non-linear impact of capital structure on firm performance.

Equation (4) is used for estimations through GMM.

$$FP_{i,t} = \alpha + \phi FP_{i,t-1} + \beta CS_{i,t} + \gamma CV_{i,t} + \epsilon_{i,t} \tag{4}$$

Where:

$FP_{i,t}$ = Firm Performance
$CS_{i,t}$ = Capital Structure
$CV_{i,t}$ = Control Variables (i.e. size, growth, tangibility)

3.4 Descriptions of Variables

The main purpose of this thesis is to study the moderating roles of firm size in association among firm performance and capital structure. For this purpose, this thesis uses the following classification of variables.

3.4.1 Dependent Variable

Firm performance is considered to be the foremost concern of every corporation in management research. Numerous studies are available that argue that firm performance is not a unidimensional construct rather it is a multi-dimensional construct (Gentry and Shen, 2010). Researchers have used different dimensions of firm performance. For example, Graham and Potter (2015) have used firm performance in the context of International Business Process Performance (IBPP), whereas, Boiral (2002) has used firm performance in the context of Learning and Growth Performance (LGP). Similarly, some researchers have used multiple dimensions of firm performance. For example, Gupta and Gupta (2020) have used four dimensions of firm performance, i.e., financial performance, customer performance, IBPP and LGP. However, the densely studied dimension of firm performance is firm financial performance.

The explained variable of this thesis is firm financial performance. Henceforth, firm performance in this study means firm financial performance. The measures of firm performance are classified into two measures, i.e., market measures of firm performance and book measures of firm performance as this study also believes that firm performance is not a unidimensional construct rather it is a multi-dimensional

construct and these constructs should be studied separately. Gentry and Shen (2010) are also of the same opinion that these are all the measures of firm performance are distinct and should be studied separately. Consequently, separate theories should be developed for each construct. Using the same argumentation, this study uses return on assets (ROA), return on equity (ROE) and return on sales (ROS) as book measures of firm performance, and price to earnings ratio (PE), return on share price (ROSP) and market to book value of equity (MBVE) as market measures of firm performance.

According to Libby et al. (2009), ROA is the broadest measure of firm profitability and the effectiveness of management. This measure is independent of the firms financing strategy. This measure is often used by investors to compare firm performances and managerial performances with each other (Williams et al., 2015).

$$ROA_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Assets_{i,t}} \tag{5}$$

ROE measures the performance of the management in utilizing shareholders investment. It is one of the key performance measures as shareholders are always keen to know how their investment is accelerating as compared to their counterparts (Libby et al., 2009; Williams et al., 2015).

$$ROE_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Shareholders\ Equity_{i,t}} \tag{6}$$

Every firm strives to increase its return on every unit of sales. ROS is used as a measure of how much an organization is earning on every unit of monetary sales. This ratio shows the efficiency of the organization in converting its sales into profits (Horngren et al., 2012).

$$ROS_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Sales_{i,t}} \tag{7}$$

Price to earnings ratio is used to check how much the investors trust a firm and its management. PE ratio tells us how much an investor is willing to invest for each monetary unit of earning (Horngren et al., 2012; Libby et al., 2009; Williams et al., 2015).

$$PE_{i,t} = \frac{Share\ Price_{i,t}}{Earnings\ per\ Share_{i,t}} \tag{8}$$

Return on share price might not be popular as a measure of firm profitability taught in the textbooks of accounting yet it is the most studied area by researchers and the most focused measure of profitability by investors. This measure has been used by a lot of researchers since long (Gale, 1972; Hidayat et al., 2020; Megginson et al., 2000; Umar et al., 2021).

$$ROSP_{i,t} = ln\frac{Share\ Price_{i,t}}{Share\ Price_{i,t-1}} \tag{9}$$

Market to book ratio is a widely used measure by investors and researchers to assess the value of a firm whether it is overvalued or undervalued (Al-Awadhi et al., 2020; Golubov and Konstantinidi, 2019; Ho et al., 2022; Park, 2019). If the market value of a firm is higher than its book value, the firm is overvalued and vice versa.

$$MBV_{i,t} = \frac{Market\ Value\ of\ Equity_{i,t}}{Book\ Value\ of\ Equity_{i,t}} \tag{10}$$

3.4.2 Independent and Control Variables

The explanatory variable used in this study is the capital structure of a firm. As discussed in the literature review section, association among firm performance and capital structure was studied in 1958 for the first time (Modigliani and Miller, 1958). Since then this topic has been one of the greenest areas for researchers. Despite a densely researched area, the relationship is still a puzzle and inconclusive (Ahmed and Afza, 2019; Kumar et al., 2017; Mardones and Cuneo, 2020). This study uses the frequently used proxies of capital structure by researchers, i.e., total debt to assets ratio (TDA) and total debt to equity ratio (TDE) or equity multiplier (EM) (Horngren et al., 2012; Libby et al., 2009).

$$TDA_{i,t} = \frac{Total\ Liabilities_{i,t}}{Total\ Assets_{i,t}} \tag{11}$$

$$EM_{i,t} = \frac{Total\ Assets_{i,t}}{Total\ Equity_{i,t}} \tag{12}$$

To test the relationship between two variables, other variables should be held constant so that the results are generated solely by the regressional experimentation of these two variables. For this purpose, researchers use control variables. Previous studies on association among firm performance and capital structure have mostly used firm size (Size), growth in total assets (GTA), growth in total market capitalization (GTM), firm age since its incorporation to date (Age), and tangibility of assets (Tangibility) as control variables (Abor, 2005; Ahmed and Afza, 2019; Fosu, 2013; Le and Phan, 2017). Using their methodology, this study also uses these variables as control variables. GTA is used when estimating for accounting measures and GTM is used when estimating for market measures.

$$Size_{i,t} = \ln(Net\ Fixed\ Assets_{i,t}) \tag{13}$$

$$GTA_{i,t} = \frac{Total\ Assets_{i,t} - Total\ Assets_{i,t-1}}{Total\ Assets_{i,t-1}} \tag{14}$$

$$GTM_{i,t} = \frac{Total\ Market\ Capitalization_{i,t} - Total\ Market\ Capitalization_{i,t-1}}{Total\ Market\ Capitalization_{i,t-1}} \tag{15}$$

$$Age_{i,t} = Difference\ between\ observation\ year\ and\ establishment\ year \tag{16}$$

The proxy used for firm size is the net fixed assets. This proxy is used as this thesis attempts to study whether firm size moderates association among firm performance and capital structure or not. A company can obtain huge amounts of loans if it has the value of its fixed assets is high. If a companys fixed assets are low then it is very difficult for the company to obtain huge amounts of loans. This proxy of firm size will serve the best solution for this study.

3.4.3 Moderating Variable

The most commonly used method of capital budgeting techniques for the evaluation of projects is the net present value (NPV) (Magni, 2009). According to the textbooks of corporate finance, it is theoretically considered to be the best method among capital budgeting techniques (Bierman and Smidt, 2012; Brealey et al., 2012; Copeland and Weston, 1988; Damodaran, 1999; Koller et al., 2000). Contrary to the so much praise for the NPV technique of capital budgeting in the textbooks of corporate finance, various researchers have criticized this method. They have raised questions about its practical use. Despite NPVs theoretical higher-ranking position over the internal rate of return (IRR) method of capital budgeting technique, these studies argue that firm managers prefer IRR over NPV practically (Berkovitch and Israel, 2004; Iqbal, 2017).

Adding to the literature in this area, Iqbal (2016) has identified two flaws in the NPV method of capital budgeting technique. Firstly, he argues that NPV is a positive function of project/firm size. The management of a firm always chooses such projects which increases the amount of NPV even if its IRR is lower as compared to other opportunity projects available thus making NPV biased towards bigger-sized projects. Secondly, the fundamental assumption of NPV is that every project is to be financed through debt while evaluating several projects.

The first flaw of NPV is its biasness toward bigger-sized projects/firms even though these investments are less efficient by other capital budgeting techniques. The second flaw of NPV is that it considers the cost of borrowing to be the opportunity cost during the evaluation of investments. Based on these two flaws, when linked together, it can be proposed that leverage (especially, debt to equity) negatively impacts firm performance (especially, return on assets) whereby firm size moderates this relationship.

Based on the above theoretical arguments, this study uses firm size as a moderator in association among firm performance and capital structure. Firm size is measured through the net fixed assets of the firm.

$$Size_{i,t} = \ln(Net\ Fixed\ Assets_{i,t}) \tag{17}$$

3.5 Research Design

This study has four objectives as discussed in Chapter No. 01. The first objective is to find out how closely accounting measures of firm performance and market measures of firm performance are related. The second objective is to study the association between capital structure and firm performance. The third objective is to study the moderating roles of firm size between the association of capital structure and firm performance. The last and fourth objective is to study the non-linear association between capital structure and firm performance.

3.5.1 Descriptive and Multicollinearity Analysis

Descriptive statistics has been used to provide a broader picture of the data of the proxy measures. As discussed earlier, firm performance is used as a multidimensional construct in the literature and various researchers have used different measures of firm performance (Boiral, 2002; Graham and Potter, 2015; Gupta and Gupta, 2020). According to Gentry and Shen (2010), there is a need to develop separate theories for these measures as these measures are mostly uncorrelated, whereas, in some cases, there exists a negative relationship between the various measures of firm performance. Building on these arguments, the first objective of this study is to find out how closely accounting measures of firm performance and market measures of firm performance are related. The first objective does not require any econometric model. It is met through a correlations matrix between the accounting measures of firm performance and market measures of firm performance.

3.5.2 Advantages, Constraints and Limitations of the Methods Adopted

According to the literature, there are various estimation techniques used by different researchers. Some of the major estimation techniques used in previous studies include pooled ordinary least squares model (Pooled OLS), fixed effects model (FEM), random effects model (REM), and generalized method of moments (GMM)

Boshnak (2023).These techniques are used based on their characteristics in a specific situation that is explained later. Dao and Ta (2020) performed a meta-analysis by reviewing 340 studies in 32 journals from 50 papers. These studies were published between 2004 and 2019 with their data ranging from 1998 to 2019. According to them, more than 40% of the studies have Pooled OLS as an estimation technique. Around 30% of the studies have used FEM, closely followed by REM with around 26% usage. Meanwhile, only 3% of the studies have used GMM as their estimation technique. Various studies have used a combination of the above-discussed methods of estimation (Abdullah and Tursoy, 2021; Ahmed and Afza, 2019; Chadha and Sharma, 2015; Detthamrong et al., 2017; Islam and Iqbal, 2022; Le and Phan, 2017). Following their methodology, this study also uses Pooled OLS, FE model, RE model, Difference GMM and System GMM techniques of estimation. All the analyses are performed in Stata version 13.

The most widely used estimation technique used to study association among firm performance and capital structure is Pooled OLS. This study also uses the same method of estimation in the first step. The estimations of OLS are consistent and unbiased if the residuals are independent of the explanatory variables. This method ignores the problem of heterogeneity and applies $\alpha_i = \alpha$ for all i. Despite its wide use, OLS does not consider the panel nature of data by ignoring firm-specific effects consequently resulting in an upward biased estimate of the dynamic term's coefficient (Le and Phan, 2017). In such situations, the fixed effects model and the random-effects model are more effective than the Pooled OLS. To decide a better choice between the FE model and the RE model, the Hausman specification test is used (Hausman, 1978). The FE model and the RE model transform the variables but this adjustment leads to downward biased estimates of β. To overcome these bias problems, the instrumental variables technique is used (Marrero, 2010).

In addition to these arguments, Roberts and Whited (2013) claim that endogeneity is the most alarming issue that arises in the studies of finance. The FE model and the RE model are unable to resolve the problems of autocorrelation and heteroscedasticity. This issue is generally resolved by the use of the generalized method of moments-difference approach (GMM-DIF) (Arellano and Bond, 1991;

Holtz-Eakin et al., 1988). Difference GMM eliminates the fixed effects by transforming all the independent variables and control variables usually by first-differencing the data (Roodman, 2009). This method of estimation also has its limitations. In an unbalanced panel in Difference GMM, the gap is enlargened by taking the difference between the contemporaneous observations and previous observations. Consequently, Difference GMM, if applied to an unbalanced panel data set may weaken the estimation results (Arellano and Bover, 1995; Blundell and Bond, 1998). They suggest overcoming this problem by the use of the System GMM (GMM-SYS) estimation technique. System GMM deals with these problems in two ways, i.e., (a) it adds more instruments to increase efficiency, and (b) instruments are made exogenous (uncorrelated) by changing the instruments. It builds a system of two equations i.e. (a) the original equation, and (b) a transformed equation. Unlike difference GMM, system GMM subtracts the average of all future observations from the contemporaneous one. Thus, it is computable for all observations regardless of the gaps in the data. Consequently, it minimizes data loss.

3.5.3 Estimation Methods

This study uses Hausman test to choose between the fixed effects model (FEM) and random effects model (REM). If the Hausman test suggests using REM, then it is used. But if the test suggests FEM then Breush Pagan Langrangian Multiplier Test is used to decide between Pooled OLS and FEM. If the LM test suggests using Pooled OLS, then it used. But if it suggests using FEM, then Durbin Test for Endogeneity is used to check the problem of endogeneity. If the test disapproves the presence of endogeneity, then FEM is used but if it confirms the presence of endogeneity, then it is dealt with as explained in detail.

This study uses a lag of the dependent variable (DV) as a regressor (IV) for checking endogeneity. If the lagged DV is significant, this is considered a sign of endogeneity. Another technique used to identify endogeneity is through Durbin and Wu-Hausman test. If the values of Durbin and Wu-Hausman tests for a specific model are significant, the model is considered to have the problem of endogeneity. Once endogeneity is confirmed, there are two methods to choose between the Difference GMM and the System GMM. According to Blundell and Bond (1998),

if the parameter of the lagged DV is tilted towards 1, i.e., the DV is persistent and close to being a random walk, the estimates of Difference GMM will biased and inefficient. They suggest using the System GMM in such a situation as the Difference GMM will yield biased estimates due to poor instruments, especially when T is short. According to Bond et al. (2001), to decide between the Difference GMM and the System GMM, a dynamic model is initially used by estimating through Pooled OLS and FE model. The coefficient of the lag of the DV through Pooled OLS is considered an upper limit while it is considered a lower limit obtained through FE model estimation. Then in the third step, the Difference GMM estimate results are obtained. The third step results are then compared with the results of the first two estimates. If the coefficient of the lagged DV is closer to the fixed effects estimate, this is more likely to be caused by weak instrumentation due to the downward biasness of the former estimate. To deal with this problem, the System GMM estimator is preferred. This study uses the methodology of Bond et al. (2001) for deciding between the Difference GMM and the System GMM.

3.5.4 GMM Diagnostics

Two types of diagnostics tests are used for GMM, i.e., (a) test for instruments validity, and (b) test for autocorrelation/serial correlation of the error term. To check the validity of the instruments, Hansen J test is used (Hansen, 1982). Failure of rejecting null hypothesis at 0.05 confidence interval supports instruments validity, whereas, at higher confidence intervals, especially beyond 0.25, is a sign of trouble. Furthermore, serial correlation/autocorrelation of the error term is also tested. It is implied that the moment conditions are properly specified and the error term is serially uncorrelated by failure of rejecting the null hypothesis at second order.

Chapter 4

Results and Discussions

This chapter dissertates the estimation methodologies applied, results, and their discussions. The scheme of this chapter is as follows. The first part describes descriptive statistics. The second part deals with correlation analysis.

The next part discusses the results based on the estimation techniques provided in the previous chapter followed by discussions in light of the literature. The final part of the chapter argues about what should be the best measure of firm performance.

4.1 Descriptive Statistics

Descriptive statistics provide an overall picture and feel of the data. Before performing any analysis, it is recommended to have a look at the descriptive measures of the data. Table 4.1. reports mean as a measure of central tendency, and standard deviation, maximum and minimum as measures of dispersion or variability.

The data are gathered from the non-financial firms listed on the Pakistan Stock Exchange (PSX) for a time frame of 21 years ranging between 1999 and 2019. A total of 285 firms were left as the final sample after removing the defaulting firms and firms with missing data. This makes a total of 5,985 firm-year observations. The details of data collection are explained in section 3.1. Even after removing the firms with missing data, 100% of the data for these 285 firms were not available.

Total available firm-year observations for each measure are provided as "Obs" in Table 4.1. All the variables, except age, are winsorized at 5^{th} and 95^{th} percentiles.

The unit of measurement of each variable is as follows. All the proxies of dependent and independent variables are ratios. Size is in PKR millions. Both the proxies of growth are measured as ratios and age is measured in number of years.

TABLE 4.1: Descriptive Statistics

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**	**Skewness**	**Kurtosis**
ROA	0.042	0.081	-0.119	0.206	0.075	2.779
ROE	0.097	0.192	-0.372	0.46	-0.435	3.48
ROS	0.027	0.104	-0.27	0.208	-1.023	4.842
PE	7.826	12.647	-13.621	42.465	1.075	4.389
ROSP	0.069	0.474	-0.815	0.981	0.088	2.393
MBVE	11.353	12.209	-0.138	46.679	1.611	4.893
TDA	0.581	0.228	0.184	1.074	0.183	2.566
EM	2.569	1.64	-0.664	6.779	0.777	3.912
Size	1163	5.61	10.808	17.209	0.06	2.33
GTA	0.122	0.193	-0.154	0.605	0.943	3.345
GTM	0.292	0.668	-0.533	2.042	1.138	3.667
Age	33.677	19.1	1	159	1.573	8.648

The results show that for the given sample, the highest mean return is of the market to book value of equity, whereas, the lowest mean return is of return on sales. The accounting measures of firm performance, i.e., ROA, ROE, and ROS have relatively closely related returns as compared to their counterparts. Their average returns are 4%, 10%, and 3% respectively. The market measures of firm performance have earned around 0.07, 8, and 11 times for return on share price, price to earnings ratio, and market to book value of equity respectively. The extremely high mean return of market to book value of equity can be explained as the market capitalization of several companies is very much higher due to their very high share prices. For example, in 2017, the share price of Unilever Pakistan

Foods Limited (UPFL) is Rs. 7,315 and the total number of shares outstanding is 61,576,000 thus having a market value of shares equal to Rs. 450,430,274,100, whereas, the book value of the shares outstanding is only Rs. 181,470,000. If calculated, the market-to-book value of equity for this company for 2017 is around 2,500 times that equals 250,000%. There are several other cases similar to this one (for example, BYCO in 2011, NESTLE in 2018, 2017; UPFL in 2017, 2013; JOPP in 2016, 2004; etc.). This fact is evident from the results of the descriptive statistics through its data range and the second-highest standard deviation in the sample data. The negative minimum value of the market to book value of equity is due to the negative value of shareholders equity due to accumulated losses. The negative book value of equity of some firms has led to the TDA maximum value above 1 and the EM minimum value below 0. These descriptive measures are also in line with other studies from Pakistan (Naseem et al., 2019).

In the initial sample, there were a total of 330 firm-year observations that reported negative total shareholders equity. The negative values of shareholders' equity are the reason for the minimum total debt to equity ratio below zero. The maximum value of total debt to assets ratio above one can also be explained due to the same fact. As discussed earlier, the data are winsorized at 5^{th} and 95^{th} percentiles, therefore, most of the outliers have been dealt with during the process, yet few remain.

4.2 Multicollinearity Analysis

One of the assumptions of multiple regression is that the regressors should be independent of each other. To check the multicollinearity, two measures are used, i.e., (a) pairwise correlations matrix, and (b) variance inflation factor (VIF). The pairwise correlations matrix is reported in Table 4.2. The matrix shows the degree of relatedness between two variables. A correlation coefficient above 0.7 shows a strong relationship, whereas a correlation coefficient below 0.7 is in an acceptable range (Ratner, 2009). The sample data of this study reports that all the regressors have correlation coefficients below 0.25 that are in the safe region and acceptable as collective regressors. The highest correlation coefficient is for total debt to assets

and total debt to equity ratios with 0.42. Even though it is still in the acceptable range, these measures are not used together in a single model as they are used as different proxies of the same variable, i.e., capital structure.

TABLE 4.2: Pairwise Correlations Matrix

Variables	**TDA**	**EM**	**Size**	**GTA**	**GTM**	**Age**
TDA	1					
EM	0.417***	1				
Size	-0.004	0.097***	1			
GTA	-0.038***	0.088***	0.073***	1		
GTM	-0.037**	-0.03**	-0.028**	0.072***	1	
Age	-0.122***	-0.041***	0.205***	0.044***	0.012	1

****p<.01, **p<.05, *p<.1*

The variance inflation factor is also a measure of multicollinearity between regressors of a multiple regression model. According to Johnston et al. (2018), the acceptable range of VIF is below 2.5, whereas, a VIF value between 2.5 and 5 is also acceptable in a relaxed approach. A VIF value between 5 and 10 is a cause for concern, whereas, a VIF value above 10 is a strong sign of a collinearity problem. In this study, all the VIF values are in the safe zone.

4.3 Multi-Dimensionality of Firm Performance

In literature, many researchers have been using arbitrarily either accounting or market measures or both implicitly assuming that they are highly correlated and thus, can be used interchangeably. To verify this assumption empirically, correlation metric between three market measures such as PE Ratio, ROSP and MBVE with three accounting measures such as ROA, ROE and ROS has been calculated. The measurement of each of these six variables is given below.

$$ROA_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Assets_{i,t}} \tag{4}$$

$$ROE_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Shareholders'\ Equity_{i,t}} \tag{5}$$

$$ROS_{i,t} = \frac{Net\ Income_{i,t}}{Total\ Sales_{i,t}} \tag{6}$$

$$PE_{i,t} = \frac{Share\ Price_{i,t}}{Earnings\ per\ Share_{i,t}} \tag{7}$$

$$ROSP_{i,t} = ln\frac{Share\ Price_{i,t}}{Share\ Price_{i,t-1}} \tag{8}$$

$$MBV_{i,t} = \frac{Market\ Value\ of\ Equity_{i,t}}{Book\ Value\ of\ Equity_{i,t}} \tag{9}$$

To investigate whether the interchangeable use of accounting and market measures as observed in many previous studies is justified or not, a correlation matrix between two market measures and three accounting measures has been worked out. Its results are given in table 4.3.

TABLE 4.3: Correlation Matrix for Accounting and Market Measures of Firm Performance

Variables	ROA	ROE	ROS	PE	ROSP	MBVE
ROA	1					
ROE	0.675***	1				
ROS	0.834***	0.518***	1			
PE	0.232***	0.187***	0.272***	1		
ROSP	0.216***	0.175***	0.16***	0.131***	1	
MBVE	0.373***	0.261***	0.244***	0.294***	0.246***	1

****p<.01, **p<.05, *p<.1*

Before looking at the table figures, it is noteworthy that according to Ratner (2009), a correlation coefficient between two measures, x and y, that is less than 0.3 shows a weak relationship; a correlation coefficient ranging from 0.3 to 0.7 shows a moderate relationship, and a correlation coefficient greater than 0.7 shows a strong relationship. Gentry and Shen (2010) also agreed that a correlation coefficient less than 0.3 shows a weak relationship implying that the two measures should not be used interchangeably. In the table, all 5 out of 6 correlation coefficients between accounting and market measures shown in rows 4 to 6 and in columns 1 to 3 are less than 0.3. The highest correlation is between ROA and MBVE which is also not greater than 0.4. Similarly, all correlation coefficients between the market measures themselves are also not greater than 0.3. These results clearly indicate that the two measures must not be used interchangeably. These results are also in line with previous research. For example, Venkatraman and Ramanujam (1986), Chakravarthy (1986), and Hillman (2005) concluded no correlation between accounting and market measures. Hoskisson et al. (1994), McGuire and Matta (2003), and Gentry and Shen (2010) came up with a positive but weak correlation and Keats and Hitt (1988) and Nelson (2003) pointed out a negative correlation between both types of measures.

It is also interesting to note that the intra-correlation between the two market measures is the lowest, 0.131, whereas between any two accounting measures shown in rows 1 to 3 and columns 1 to 2 is greater than 0.5. It means that market measures must not be used even intra-changeably, whereas ROA may be used intra-changeably with both ROE and ROS. However, intra-changeable use of ROE and ROS is not recommended as they are correlated only moderately.

Empirical results are quite revealing. The results of correlation analysis show only a weak correlation between accounting and market measures. It means that market and accounting measures must not be used interchangeably or arbitrarily. In other words, it goes against the claim of shareholder theory that maximization of market measures is pro-stakeholder.

4.4 Estimation Results

This part of the study deals with the results of different estimation techniques used in the study along with discussions in light of previous studies on the same topic. The estimation techniques used in this thesis are: (a) Pooled OLS model, (b) fixed effects model, (c) random-effects model, (d) one-step difference GMM model, (e) two-step difference GMM model, (f) one-step system GMM model, (g) two-step system GMM model, and (h) polynomial regression model.

A firm is valued upon the decision of its past and future investments. The most important decision regarding these investments is their financing. There are three options to finance any investment, i.e., (a) use of equity, (b) use of debt, and (c) use of a mix of debt and equity. As the core objective of every firm according to almost every researcher is the maximization of firm value, thus the decision regarding the choice of capital structure is one of the most studied areas of Corporate Finance (Kumar et al., 2017). Similarly many other scholars have also emphasized on capital structure playing a vital role in the performance of a firm (Abdullah and Tursoy, 2021; Abor, 2005; Ahmed and Afza, 2019; Ardalan, 2017; Baker and Wurgler, 2002; Cassar and Holmes, 2003; Chadha and Sharma, 2015; Dao and Ta, 2020; Dawar, 2014; Demirg-Kunt et al., 2020; Detthamrong et al., 2017; Fatima and Bashir, 2021; Fosu, 2013; Frank and Goyal, 2009; Islam and Iqbal, 2022; Le and Phan, 2017; Majumdar and Chhibber, 1999; Mardones and Cuneo, 2020; Modigliani and Miller, 1958; Mubeen et al., 2020; Myers, 1984; Ross, 1977; Salim and Yadav, 2012).

4.4.1 Firm Performance and Capital Structure

This section argues about the results of the estimation models where firm performance measures are used as the dependent variable and capital structure measures are used as the independent variable along with other control variables discussed in the methodology section. As there are various estimation techniques used in the literature, the first step is to identify the most suitable estimation techniques that fit the data of this study. Some of the major estimation techniques used in previous studies include Pooled OLS, FE model, RE model, and GMM. These techniques

are used based on their characteristics in a specific situation that is explained later. Dao and Ta (2020) performed a meta-analysis by reviewing 340 studies in 32 journals from 50 papers. These studies were published between 2004 and 2019 with their data ranging from 1998 to 2019. According to them, more than 40% of the studies have Pooled OLS as an estimation technique. Around 30% of the studies have used FEM, closely followed by REM with around 26% usage. Meanwhile, only 3% of the studies have used GMM as their estimation technique. Various studies have used a combination of the above-discussed methods of estimation (Abdullah and Tursoy, 2021; Ahmed and Afza, 2019; Chadha and Sharma, 2015; Detthamrong et al., 2017; Islam and Iqbal, 2022; Le and Phan, 2017). The scheme of this section is that the first portion discusses the tests for choosing the best estimation techniques to be used in this study. The second portion discusses the results of those estimation techniques as suggested by the results of the tests. The last portion discusses those results in the light of literature and corresponding theories.

4.4.1.1 Tests for Choosing the Best Estimation Techniques

Various estimation techniques have been used in previous studies to determine association among firm performance and capital structure. The most widely used method of estimation in the literature is pooled ordinary least squares model (Pooled OLS). Dao and Ta (2020) argue that around 40% of the past studies have used Pooled OLS estimation technique. This study also performs this technique of estimation.

The Hausman specification test is used in this study to choose between the fixed effects model (FEM) and random effects model (REM). The null hypothesis is that the random effects model is to be preferred over the fixed effects model. Rejection of the null hypothesis at a p-value lower than 0.05 supports REM, whereas, acceptance of the null hypothesis at a p-value higher than 0.05 supports FEM. Initially, twelve estimation models are used for each of the six proxies of firm performance (ROA, ROE, ROS, PE, ROSP, and MBVE) and both of the proxies of capital structure (TDA and EM). After estimating each of the twelve models, the results of the Hausman test are obtained which are presented in Table 4.3. To obtain the results

of the Hausman test, all models are estimated through the random effects model initially. It is to be noted that all the models include control variables as well along with the regressors. GTA is used as one of the control variables when estimation is done for accounting measures of firm performance and GTM is used as one of the control variables when estimation is done for the market measures of firm performance.

Table 4.4: Hausman Test

	ROA	**ROE**	**ROS**	**PE**	**ROSP**	**MBVE**
TDA	159.97***	203.07***	148.18***	6.69	114.46***	24.58***
EM	263.38***	757.64***	129.11***	10.65**	100.98***	44.36***

****p<.01, **p<.05, *p<.1*

The results of the Hausman test show that the null hypothesis is rejected in 10 models i.e., ROA when estimated through TDA and EM; ROE when estimated through TDA and EM; ROS when estimated through TDA and EM; ROSP when estimated through TDA and EM; MBVE when estimated through TDA and EM. Thus, FEM is to be preferred over REM in these 10 models. The two models where the null hypothesis is accepted are when PE is estimated through TDA and EM, which means that REM should be preferred over FEM.

Once the Hausman test recommends choosing FEM, the next step is to decide whether FEM is a better option for estimation or should the Pooled OLS estimation technique be used. The decision is made through Breusch Pagan Langrangian Multiplier Test.

Table 4.5: Breush Pagan Langrangian Multiplier Test

	ROA	**ROE**	**ROS**	**ROSP**	**MBVE**
TDA	3888.81***	1374.08***	1964.74***	0	8183.99***
EM	6052.23***	1636.35***	3858.63***	0	9766.95***

****p<.01, **p<.05, *p<.1*

The results of the Breusch Pagan LM test are obtained for 10 models. Two models are not tested as the Hausman test results show that REM should be used when PE is estimated through TDA and EM. Table 4.4 shows that out of 10 models, FEM should be preferred in 8 models. i.e., ROA when estimated through TDA and EM; ROE when estimated through TDA and EM; ROS when estimated through TDA and EM; MBVE when estimated through TDA and EM. Moreover, the results also show that Pooled OLS should be preferred when ROSP is estimated through TDA and EM. The results of the Pooled OLS for ROSP and REM for PE are discussed in the later section.

One of the major concerns in regression analysis is the absence of homoskedasticity. Before discussing the estimation results, the data must be free from heteroskedasticity, i.e., all the variables have a finite variance. The presence or absence of homoskedasticity is checked through Modified Wald Test for Groupwise Heteroskedasticity. The null hypothesis is that the data is homoscedastic. The acceptance of the null hypothesis with a p-value greater than 0.05 interprets that the data is free from the problem of heteroskedasticity, whereas, the rejection of the null hypothesis with a p-value less than 0.05 interprets the presence of the heteroskedasticity problem.

Table 4.6: Modified Wald Test for Groupwise Heteroskedasticity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	1E+32***	2.2E+32***	2.1E+32***	6E+32***
EM	4.9E+31***	1.6E+32***	2.8E+32***	2.3E+31***

****p<.01, **p<.05, *p<.1*

The results of Table 4.6 that there exists the problem of heteroskedasticity in all the models, i.e., the modeling errors do not have the same variance. Although the absence of homoskedasticity does not make the OLS estimation biased, the estimate is inefficient. The problem is dealt with by using the robust function in Stata.

The FE model and the RE model transform the variables but this adjustment leads to downward biased estimates of β. To overcome these bias problems, the instrumental variables technique is used (Marrero, 2010). In addition to these arguments, Roberts and Whited (2013) claim that endogeneity is the most alarming issue that arises in the studies of finance. The FE model and the RE model are unable to resolve the problems of autocorrelation and heteroscedasticity. This issue is generally resolved by the use of the generalized method of moments-difference approach (GMM-DIF) (Arellano and Bond, 1991; Holtz-Eakin et al., 1988). Difference GMM eliminates the fixed effects by transforming all the independent variables and control variables usually by first-differencing the data (Roodman, 2009). This method of estimation also has its limitations. In an unbalanced panel in Difference GMM, the gap is enlargened by taking the difference between the contemporaneous observations and previous observations. Consequently, Difference GMM, if applied to an unbalanced panel data set may weaken the estimation results (Arellano and Bover, 1995; Blundell and Bond, 1998). They suggest overcoming this problem by the use of the System GMM (GMM-SYS) estimation technique. System GMM deals with these problems in two ways, i.e., (a) it adds more instruments to increase efficiency, and (b) instruments are made exogenous (uncorrelated) by changing the instruments. It builds a system of two equations i.e. (a) the original equation, and (b) a transformed equation. Unlike difference GMM, system GMM subtracts the average of all future observations from the contemporaneous one. Thus, it is computable for all observations regardless of the gaps in the data. Consequently, it minimizes data loss.

This study uses two techniques for checking the problem of endogeneity. The first method uses a lag of the dependent variable (DV) as a regressor (IV) for checking endogeneity. If the lagged DV is significant, this is considered a sign of endogeneity. There is another use of the autoregressive models as well. Later on, these results are also used for deciding between difference GMM and system GMM. This is discussed in detail later in the same section.

Table 4.7: Autoregressive Models for Endogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROA	**ROA**	**ROE**	**ROE**	**ROS**	**ROS**	**MBVE**	**MBVE**
L.ROA	.566***	.652***						
	-0.016	-0.014						
L.ROE			.464***	.418***				
			-0.019	-0.019				
L.ROS					.551***	.645***		
					-0.021	-0.019		
L.MBVE							.837***	.826***
							-0.014	-0.014
TDA	-.074***		-.051***		-.097***		0.51	
	-0.005		-0.013		-0.008		-0.597	
EM		-.004***		-.024***		-.004***		.973***
		-0.001		-0.002		-0.001		-0.092
Size	0	0	.003**	.005***	.003***	.002***	-0.009	-0.102
	0	0	-0.001	-0.001	-0.001	-0.001	-0.064	-0.063

GTA	.033***	.03***	.1***	.126***	.06***	.056***		
	-0.005	-0.005	-0.013	-0.013	-0.006	-0.006		
GTM							5.938***	5.975***
							-0.198	-0.191
Age	0	0	0*	0**	0	0	.011**	.016***
	0	0	0	0	0	0	-0.005	-0.005
_cons	.055***	.016**	.035*	.036*	.023**	-.018*	-0.144	-1.113
	-0.007	-0.007	-0.021	-0.02	-0.01	-0.01	-0.905	-0.832
Observations	5022	5022	5022	5022	4934	4934	4659	4659
R-squared	0.508	0.483	0.258	0.292	0.506	0.477	0.716	0.732
F-stats	783.50***	672.30***	150.13***	192.52***	470.51***	389.94***	1051.38***	1058.96***

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 4.7 shows the estimation results of the autoregressive models where the lagged DV is also used as a regressor along with other independent variables and control variables. This table shows the results of only 8 models as it is evident from earlier tests that RE models should be used for PE and FE models should be used for ROSP when estimated through both TDA and EM.

These 8 models include the estimation of ROA, ROE, ROS, and MBVE through TDA and EM along with other control variables. In all the models, the measures of firm performance are significantly related to their lagged values which means that is a sign of an endogeneity problem.

The second technique used to identify endogeneity is through Durbin and Wu-Hausman test. If the values of Durbin and Wu-Hausman tests for a specific model are significant, the model is considered to have the problem of endogeneity.

Table 4.8: Durbin Test for Endogeneity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	268.951***	203.053***	199.464***	40.007***
EM	1.23067	220.936***	.107173	22.9498***

**** p<.01, ** p<.05, * p<.1*

The results of the Durbin test are shown in Table 4.8 and the results of the Wu-Hausman test are shown in Table 4.8. Both of these tests show the same results. Out of 8 models, 6 models have the problem of endogeneity, whereas, 2 models do not have the problem of endogeneity.

The models that have the problem of endogeneity are as follows: (a) ROA when estimated through TDA along with other control variables, (b) ROE when estimated through TDA along with other control variables, (c) ROE when estimated through EM along with other control variables, (d) ROS when estimated through TDA along with other control variables, (e) MBVE when estimated through TDA along with other control variables, and (f) MBVE when estimated through EM along with other control variables. In these models, it is preferred to use GMM estimation techniques for these models.

The models that do not have the problem of endogeneity are as follows: (a) ROA when estimated through EM along with other control variables, and (b) ROS when estimated through EM along with other control variables. In these models, it is preferred to use FE models for their estimation.

TABLE 4.9: Wu-Hausman Test for Endogeneity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	284.811***	211.896***	208.11***	40.3242***
EM	1.22943	231.437***	.107037	23.0401***

**** p<.01, ** p<.05, * p<.1*

Once endogeneity is confirmed, there are two methods to choose between the Difference GMM and the System GMM. According to Blundell and Bond (1998), if the parameter of the lagged DV is tilted towards 1, i.e., the DV is persistent and close to being a random walk, the estimates of Difference GMM will biased and inefficient. They suggest using the System GMM in such a situation as the Difference GMM will yield biased estimates due to poor instruments, especially when T is short. According to Bond et al. (2001), to decide between the Difference GMM and the System GMM, a dynamic model is initially used by estimating through Pooled OLS and FE model. The coefficient of the lag of the DV through Pooled OLS is considered an upper limit while it is considered a lower limit obtained through FE model estimation. Then in the third step, the Difference GMM estimate results are obtained. The third step results are then compared with the results of the first two estimates. If the coefficient of the lagged DV is closer to the fixed effects estimate, this is more likely to be caused by weak instrumentation due to the downward biasness of the former estimate. To deal with this problem, the System GMM estimator is preferred. This study uses the methodology of Bond et al. (2001) for deciding between the Difference GMM and the System GMM.

TABLE 4.10: Coefficients of Lagged DV to choose between System and Difference GMM

		L.ROA	**L.ROE**	**L.ROS**	**L.MBVE**
TDA	Pooled OLS	.566***	.464***	.645***	.837***
	Fixed Effects	.301***	.281***	.354***	.626***
	Difference GMM	.288***	.317***	.378***	.679***
EM	Pooled OLS		.418***		.826***
	Fixed Effects		.209***		.585***
	Difference GMM		.278***		.66***

**** p<.01, ** p<.05, * p<.1*

Table 4.10 shows the comparison of the coefficients of lagged DVs for Pooled OLS, FE Models, and Difference GMM models for choosing between difference GMM and system GMM. The coefficients of the lagged DVs of Pooled OLS models are considered as the upper bound limit. The coefficients of the lagged DVs of FE models are considered as the lower limit bound. If the values of the coefficients of the lagged DVs of difference GMM is above or near the coefficients of the lagged DVs of Pooled OLS, then difference GMM should be preferred, whereas, if the values of the coefficients of the lagged DVs of difference GMM is below or near the coefficients of the lagged DVs of Difference GMM, then system GMM should be preferred. As evident from the results presented in Table 4.9, the system GMM is the preferred estimation technique in all the models.

4.4.1.2 Estimation Results

This section discusses the results of estimation models. There are 12 models in total. The earlier section has already identified the preferred estimation techniques for each model. In the light of the last section, the preferred estimation techniques are as follows. Pooled OLS models should be preferred for estimating ROSP with

TDA and EM along with other control variables. RE models should be preferred for estimating PE with TDA and EM along with control variables. FE models should be preferred for estimating ROA and ROS with EM along with other control variables. Lastly, system GMM should be preferred for the remaining six models, i.e., (a) ROA when estimated through TDA along with other control variables, (b) ROE when estimated through TDA along with other control variables, (c) ROE when estimated through EM along with other control variables, (d) ROS when estimated through TDA along with other control variables, (e) MBVE when estimated through TDA along with other control variables, and (f) MBVE when estimated through EM along with other control variables. The current section presents the results of the estimated models in the discussed sequence.

The results of the estimations for accounting measures of firm performance are presented in Table 4.10. The models are named from 1 to 6. Model 1 shows the results of estimation when ROA is estimated by TDA through the two-step system GMM model. Model 2 shows the results of estimation when ROA is estimated by EM through the FE model. Model 3 shows the results of estimation when ROE is estimated by TDA through the two-step system GMM model. Model 4 shows the results of estimation when ROE is estimated by EM through the two-step system GMM model. Model 5 shows the results of estimation when ROS is estimated by TDA through the two-step system GMM model. Model 6 shows the results of estimation when ROS is estimated by EM through FE model. Moreover, three control variables are also used in these estimations, i.e., firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), age of the firm (measured as the number of years since inception till 2019).

This section describes the estimation results of the association between capital structure measures and firm performance measures. The first part of this section shows the results of estimation and discusses them when accounting measures of firm performance are estimated through capital structure measures. The second part of this section shows the results of estimation and discusses them when market measures of firm performance are estimated through capital structure measures.

TABLE 4.11: Estimation Results for Accounting Measures of Firm Performance

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	ROA	**ROA**	**ROE**	**ROE**	**ROS**	**ROS**
TDA	-.116***		-.094***		-.12***	
	(0.013)		(0.027)		(0.011)	
EM		-.007***		-.029***		-.004**
		(0.001)		(0.004)		(0.002)
Size	0.002	-.01***	.01***	.011***	.004***	-0.003
	(0.001)	(0.003)	(0.004)	(0.004)	(0.001)	(0.004)
GTA	.028***	.063***	.122***	.151***	.069***	.09***
	(0.006)	(0.006)	(0.017)	(0.018)	(0.008)	(0.008)
Age	-0.001	0	-.003***	-.003***	0	0
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
_cons	.087***	.193***	.07*	.068*	0.025	0.061
	(0.016)	(0.030)	(0.042)	(0.039)	(0.016)	(0.043)
L.ROA	.43***					
	(0.032)					
L.ROE			.361***	.319***		
			(0.031)	(0.030)		
L.ROS					.444***	
					(0.031)	
Observations	5022	5386	5022	5022	4934	5307
R-squared		0.072				0.049
F-stats	245.74***	47.12***	130.63***	162.56***	319.56***	33.06***
No. of Groups	312		312	312	312	
No. of Instruments	213		213	213	214	
AR(1)	-8.92***		-8.14***	-8.22***	-7.42***	
AR(2)	0.38		1.08	0.96	1.14	
Hansen	238.76*		237.97*	240.44*	242.63*	

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The explanatory power of the models for the determinants of firm performance is sometimes very low as evident from the empirical studies in Pakistan. Khan (2012) tested the relationship between capital structure and firm performance. The explanatory power of his model was found to be as low as 0.03. Abbas et al. (2013) conducted a study on the non-financial firms in Pakistan and reported the adjusted R-squared value as low as 0.06. Naseem et al. (2019) and Ahmed Sheikh et al. (2013) conducted studies on the textile sector and non-financial firms of Pakistan respectively and they have reported the explanatory power of their models as low as 0.11. Similarly, the explanatory power of the models also varies from 0.03 to 0.79.

The value of a firm is dependent upon the decisions of its past and future investments, and upon the decision of their financing whether by equity or debt, or by a mix of them. There are different views about the performance of an investment with regard to its source of financing. Firm performance is measured differently, therefore, it is necessary to choose an optimal capital structure to finance these investments, thus making financial mix one of the main areas of concern for the management. It can, therefore, be argued that capital structure is the main strategic concern that has ever been central in Corporate Finance. The core objective of the firm has always been the increase of shareholders wealth by increasing its value, therefore, firms should finance their projects in a way that minimizes their overall cost of financing. Because firm value is dependent upon financing decisions, capital structure plays a significant role in a firms success (Kumar et al., 2017). There is a vast literature available on the importance of capital structure decisions on the financial performance of a firm (Abdullah and Tursoy, 2021; Abor, 2005; Ahmed and Afza, 2019; Chadha and Sharma, 2015; Chechet and Olayiwola, 2014; Dao and Ta, 2020; Dawar, 2014; Demirg-Kunt et al., 2020; Detthamrong et al., 2017; Fosu, 2013; Hamid et al., 2015; Ibhagui and Olokoyo, 2018; Islam and Iqbal, 2022; Le and Phan, 2017; Majumdar and Chhibber, 1999; Mardones and Cuneo, 2020; Margaritis and Psillaki, 2007; Myers, 1984; Salim and Yadav, 2012; Vijayakumaran, 2017).

The Durbin test and Wu-Hausman test of endogeneity suggested using FE models for the estimation of ROA and ROS through EM along with other control variables.

The results of the estimation of accounting measures of firm performance through the capital structure measures are presented in Table 4.10. Moreover, three control variables are also used in these estimations, i.e., firm size (measured by the natural log of net fixed assets), growth (measured by the change in total assets), age of the firm (measured as the number of years since inception till 2019).

The results of this study for FE models show that there is a negative association between a firms capital structure, and its return on assets and return on sales. These results are in contradiction with few studies (Abdullah and Tursoy, 2021; Fosu, 2013; Vijayakumaran, 2017), but they are consistent with other studies (Ahmed and Afza, 2019; Chadha and Sharma, 2015; Dawar, 2014; Tran and Nguyen, 2017).

Combining the methodologies of various studies, the results of two-step GMM estimations are obtained. The first step was to determine the most appropriate estimation technique using various tests. The next step was to estimate the models using those estimation techniques. Using the methodology described in the last section, the results of the two-step GMM estimation technique are presented in Table 4.13. The table presents the results of the six models in the following manner: (a) ROA when estimated through TDA along with other control variables, (b) ROE when estimated through TDA along with other control variables, (c) ROE when estimated through EM along with other control variables, (d) ROS when estimated through TDA along with other control variables, (e) MBVE when estimated through TDA along with other control variables, and (f) MBVE when estimated through EM along with other control variables.

Two types of diagnostics tests are used for GMM, i.e., (a) test for instruments validity, and (b) test for autocorrelation/serial correlation of the error term. To check the validity of the instruments, Hansen J test is used (Hansen, 1982). Failure of rejecting the null hypothesis at 0.05 confidence interval supports instruments validity, whereas failure of rejecting the null hypothesis at higher confidence intervals, especially beyond 0.25, is a sign of trouble. Furthermore, serial correlation/autocorrelation of the error term is also tested. It is implied that the moment conditions are properly specified and the error term is serially uncorrelated by failure of rejecting the null hypothesis at second order. The results are reported after ensuring that all these conditions are satisfied. The number of observations for all models are

lower than the number of groups. The F-stats value for all models is significant. Looking at the AR(2) values of all the models, the null hypotheses are accepted implying that the moment conditions are correctly specified, and the error term is serially uncorrelated. Moreover, the Hansen test values fail to reject the null hypotheses at a 0.05 confidence interval thus supporting instruments validity. The values of Hansen test are also below the danger level that 0.25.

Model 1 estimates the impact of total debt to assets ratio over return on assets along with size (natural log of net fixed assets), growth in total assets, and age (from firm inception to 2019) as control variables. The estimation results show that leverage is negatively associated with firm performance. An increase of one unit in DTA brings a 0.116 unit decrease in ROA. Firm size shows no significant relationship with ROA. Growth in total assets is positively linked with ROA. One unit positive change is total assets bring a 0.028 increase in ROA. Similar to firm size, age also does not have any significant impact on ROA.

The results of Model2 show that there is a negative relationship between leverage and firm performance. The higher the leverage, the lower the performance of the firm measured by the price-to-earnings ratio. The Model 2, where ROA is the dependent variable, reports that a unit increase in leverage brings a 0.007 unit decrease in the return on assets. Among the three control variables, growth in total assets has a significant relationship with the ROA as a measure of firm performance, whereas, size of the firm has partial significant relationship with ROA and age does not play any significant role in fluctuating firm performance. As firm size has been calculated through the natural log of net fixed assets, therefore, a unit during its interpretation means the base of the natural log, i.e., e (also known as Eulers number or natural exponential function). The results of Model 2 exhibit that a unit increase in size brings a 0.01 unit decrease in ROA. A unit increase in age brings a 0.053 unit change in firm performance. The explanatory power of the model is weak with a value of around 7%. The fitness of the model is also represented by a significant F-stats value.

Model 3 estimates the impact of total debt to assets ratio over return on equity along with size (natural log of net fixed assets), growth in total assets, and age (from firm inception to 2019) as control variables. The estimation results show that

leverage is negatively associated with firm performance. An increase of one unit in DTA brings a 0.094 unit decrease in ROE. Firm size shows a significant positive relationship with ROE. An increase of one unit in firm size increases ROE by 0.01 units. Growth in total assets is positively linked with ROA. One unit positive change is total assets bring a 0.122 increase in ROA. Age is inversely related to ROA. One unit of age brings a 0.003 unit decrease in ROE.

Model 4 estimates the impact of the equity multiplier, as a measure of capital structure, over return on equity along with size (natural log of net fixed assets), growth in total assets, and age (from firm inception to 2019) as control variables. The estimation results show that leverage is negatively associated with firm performance. An increase of one unit in EM brings a 0.029 unit decrease in ROE. Firm size shows a significant positive relationship with ROE. An increase of one unit in firm size increases ROE by 0.011 units. Growth in total assets is positively linked with ROA. One unit positive change is total assets bring a 0.151 increase in ROA. Age is inversely related to ROA. One unit of age brings a 0.003 unit decrease in ROE.

Model 5 estimates the impact of total debt to assets ratio, as a measure of capital structure, over return on sales along with size (natural log of net fixed assets), growth in total assets, and age (from firm inception to 2019) as control variables. The estimation results show that leverage is negatively associated with firm performance. An increase of one unit in DTA brings a 0.12 unit decrease in ROS. Firm size shows a significant positive relationship with ROE. An increase of one unit in firm size increases ROE by 0.004 units. Growth in total assets is positively linked with ROA. One unit positive change is total assets bring a 0.069 increase in ROA. Lastly, age does not have any significant link with ROS.

Model 6 also reports a negative association between EM and ROS. Among the three control variables, growth in total assets has a significant relationship with both measures of firm performance, whereas, size of the firm has partial significant relationship with firm performance measures and age does not play any significant role in fluctuating firm performance. As firm size has been calculated through the natural log of net fixed assets, therefore, a unit during its interpretation means the base of the natural log, i.e., e (also known as Eulers number or natural exponential

function). According to the results, the value of the fixed assets has nothing to do with it returns on sales. Growth is positively related to ROS. A unit change in total assets brings 0.09 units of change in ROS. The explanatory powers of the model is weak with a value of around 5%. The fitness of the model is also represented by a significant F-stats value.

Table 4.12: Estimation Results for Market Measures of Firm Performance

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	PE	**PE**	**ROSP**	**ROSP**	**MBV**	**MBV**
TDA	-8.882***		-.052***		-2.397***	
	(1.242)		(0.014)		(0.546)	
EM		-0.05		-0.003		-.272**
		(0.177)		(0.002)		(0.108)
Size	.519***	.545***	-0.001	-0.001	0.016	0.022
	(0.183)	(0.186)	(0.002)	(0.002)	(0.077)	(0.076)
GTM	2.015***	2.109***	.632***	.632***	9.374***	9.446***
	(0.262)	(0.265)	(0.007)	(0.007)	(0.563)	(0.568)
Age	.053***	.07***	0	0		
	(0.017)	(0.018)	0.000	0.000		
L.MBVE					.731***	.74***
					(0.027)	(0.027)

L2.MBVE					.123***	.126***
					(0.025)	(0.025)
_cons	3.498	-2.483	-.049*	-.074***	0.405	-0.506
	(2.620)	(2.516)	(0.028)	(0.026)	(1.217)	(1.187)
Observations	4844	4844	4819	4819	4300	4301
R-squared			0.795	0.795		
F-stats			1915.11***	1936.55***	2168.48***	2317.29***
Wald	144.61***	95.75***				
No. of Groups					311	311
No. of Instruments					217	217
AR(1)					-7.71***	-7.63***
AR(2)					1	0.97
Hansen					243.2*	241.76*

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The results of estimation results between market measures of firm performance and selected measures of capital structure are reported in Table 4.11. Model 1 shows the results when PE is estimated through TDA along with other control variables. Model2 reports the association between PE and EM along with other control variables. The Hausman specification test suggested using RE models for the estimation of PE. Model 3 shows the results of the relationship between ROSP and TDA along with other control variables. The results of the estimation of ROSP through EM along with other control variables are reported in Model 4. Table 5 shows the results of the relationship between MBVE and TDA along with other control variables. The results of the relationship between MBVE and EM along with other control variables are reported in Model 6. The three control variables used in these estimations are firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), and age of the firm (measured as the number of years since inception till 2019).

The Hausman specification test suggested using RE models for the estimation of PE. The Breusch and Pagan Langrangian Multiplier test suggested using pooled OLS estimation techniques for ROSP. The estimation results for MBVE have been obtained through two-step GMM model as suggested by the pre-estimation diagnostic test.

The results of Model 1 show that there is a negative relationship between leverage and firm performance. The higher the leverage, the lower the performance of the firm measured by the price-to-earnings ratio. A one unit increase in leverage brings an 8.882 units decrease in the price-to-earnings ratio. All the control variables have a positive relationship with PE. As firm size has been calculated through the natural log of net fixed assets, therefore, a unit during its interpretation means the base of the natural log, i.e., e (also known as Eulers number or natural exponential function). The results of Model 1 exhibit that a unit increase in size brings a 0.519 unit increase in PE as per Model 1 and a 0.545 unit increase in PE as per Model 2. Growth is also positively related to PE. A unit change in market capitalization brings around 2 units of change in PE. Similarly, the age of the firm is also positively related to PE. A unit increase in age brings a 0.053 unit change in firm performance according to Model 1 and a 0.07 unit change in firm performance

according to Model 2. The significance of the explanatory variables is represented by the significant Wald values. Capital structure, when measured through EM, does not have any significant impact on ROSP.

The results of this study for RE models of price-to-earnings ratio show that there is a negative association between capital structure and what the investors are willing to pay for a firms one rupee of earning. These results are in contradiction with some studies (Chechet and Olayiwola, 2014; Hamid et al., 2015; Ibhagui and Olokoyo, 2018; Salim and Yadav, 2012), but they are consistent with other studies (Abdullah and Tursoy, 2021; Adair and Adaskou, 2015; Detthamrong et al., 2017; Margaritis and Psillaki, 2007). According to Abdullah and Tursoy (2021), the Germans consider the stock market more of a gamble than an investment. Reilly and Brown (2011) argue that some nations tend to show cultural aversion. These investors are risk avert and they consider investing in shares as a gamble rather than an investment. The situation of Pakistan does not seem different from that of Germany. This argument can be supported by the results of descriptive statistics in Table 4.1, where the deviation for the market measures of firm performance is the highest than their counterparts. All the control variables are also significantly related to PE.

Growth is significantly associated with returns on the share price. The proxy used for growth is the change in total market capitalization. The results of both Model 1 and Model 2 show that growth is positively linked to the price-to-earnings ratio. This fact can be explained theoretically and mathematically as PE is calculated by dividing the share price by the earnings per share. Therefore, it can be justified that there is a positive association between growth and firm performance. Some studies have found a positive relationship between the age of a firm and its performance. Agarwal and Gort (2002) believe that older companies learn from their experiences and they update their skills and practices to earn more profits than a new company. Contrarily, Kyereboah-Coleman (2007) has found a negative relationship between age and firm performance measures. In his study, the age of the firm has been used as a measure of the reputation of the firm. He argues that the negative relationship between age and performance is a sign that the poor do not need the reputation of a firm for a small credit. On the other hand, some studies reported an insignificant

relationship between age and firm performance (Ahmed and Afza, 2019). The result of this study is also aligned with the study of Agarwal and Gort (2002), who believe that older companies learn from their experiences and tend to update their skills and practices.

The results of Model 3 show that there is a negative relationship between leverage and firm performance. The higher the leverage, the lower the performance of the firm measured by the return on the share price. A one unit increase in leverage brings a 0.052 unit decrease in the return on the share prices. Among the control variables, only growth is significantly related to the performance of the firms, whereas, the relationship of firm size and age are not significantly related to firm performance. The explanatory power of the model is also very good with a value of around 80%. The fitness of the model is also represented by a significant F-stats value. Model 4 shows the results of pooled OLS estimation techniques when ROSP is estimated through EM along with control variables. Although the explanatory power and fitness of Model 4 are also similar to Model 3 as evident from its R-squared value and F-stats value, the regressor is insignificantly related to ROSP. Moreover, the only significant control variable is growth like Model 3. Capital structure, when measured through EM, does not have any significant impact on ROSP.

The results of this study for pooled OLS estimations of return of share price show that there is a negative association between capital structure and stock returns. These results are in contradiction with some studies (Chechet and Olayiwola, 2014; Hamid et al., 2015; Ibhagui and Olokoyo, 2018; Salim and Yadav, 2012), but they are consistent with other studies (Abdullah and Tursoy, 2021; Adair and Adaskou, 2015; Detthamrong et al., 2017; Margaritis and Psillaki, 2007). Abdullah and Tursoy (2021) have explained the negative relationship between capital structure and stock returns in non-financial listed firms in Germany. According to them, the Germans consider the stock market more of a gamble than an investment. The same argument is also presented by Reilly and Brown (2011) in Chapter 2 of their book. They argue that some nations tend to show cultural aversion. These investors are risk avert and they consider investing in shares as a gamble rather than an investment. The situation of Pakistan does not seem different from that of

Germany. This argument can be supported by the results of descriptive statistics in Table 4.1, where the deviation for the market measures of firm performance is the highest than their counterparts. Apart from TDA, growth is the only variable that is significantly associated with returns on the share price. The proxy used for growth is the change in total market capitalization. According to Sojeva (2015), the earnings per share may be high but the stock prices are lower due to the use of debt financing. He argues that the companies that prefer debt financing are at the stake of lenders for their investment and operating decisions. As debt investors are the most risk-avert investors, they retain the firms from investing in projects with even little risk. This overall process lowers the market share and even slows down the growth of the firms.

The results of both Model 3 and Model 4 show that growth is positively linked to stock returns. This fact can be explained theoretically and mathematically as market capitalization is calculated by multiplying the share price with the number of outstanding shares. Therefore, it can be justified that there is a positive association between growth and firm performance. Some studies have found a positive relationship between the age of a firm and its performance. Agarwal and Gort (2002) believe that older companies learn from their experiences and they update their skills and practices to earn more profits than a new company. Contrarily, Kyereboah-Coleman (2007) has found a negative relationship between age and firm performance measures. In his study, the age of the firm has been used as a measure of the reputation of the firm. He argues that the negative relationship between age and performance is a sign that the poor do not need the reputation of a firm for a small credit. On the other hand, some studies reported an insignificant relationship between age and firm performance. The result of this study is also aligned with the study of Ahmed and Afza (2019), who reported that the relationship between age and firm performance is insignificant.

Model 5 estimates the impact of total debt to assets ratio, as a measure of capital structure, over the market to book value of equity along with size (natural log of net fixed assets), and growth in total market capitalization as control variables. Although initially, the hypothesis was that leverage has a positive impact on market measures of firm performance, the estimation results show that leverage is

negatively associated with firm performance. An increase of one unit in DTA brings a huge 2.397 unit decrease in MBVE. Firm size shows no significant relationship with PE, whereas, growth in total market capitalization is positively linked with MBVE. One unit positive change is total assets bringing a 9.374 increase in MBVE. Lastly, age does not have any significant link with ROS. Model 6 estimates the impact of the equity multiplier, as a measure of capital structure, over the market to book value of equity along with size (natural log of net fixed assets), and growth in total market capitalization as control variables. As explained earlier, the initial hypothesis was that leverage has a positive impact on market measures of firm performance but the estimation results of this model also show that leverage is negatively associated with firm performance. An increase of one unit in EM brings a huge 0.272 unit decrease in MBVE. Firm size shows no significant relationship with MBVE, whereas, growth in total market capitalization is positively linked with MBVE. One unit positive change is total assets bringing a 9.446 increase in MBVE. Lastly, age does not have any significant link with MBVE.

There is a mechanical relationship between the leverage and accounting measures of firm performance. A company having more debt is riskier than a company having lower debt. A riskier firm will have to bear a high cost of debt than its counterpart to finance its operations by debt. The higher the cost of debt, the lower will be the net profitability of the firm and its financial performance measures. However, it is not always the case for every firm. There are various other reasons why there can be a negative relationship between debt and the financial performance of a firm. There are other theories that have tried to explain this negative relationship. For example, the pecking order theory proposes that a firm chooses to finance its operations through the financing option that has the lowest cost. Once that option is completely availed, then the firm chooses to move to the next level. This process is repeated if it needs funds for its investment and thus ultimately moves to the financing option that has the highest cost. Thus, the firms follow a specific pattern of the capital structure while financing their investments. The lowest cost is that of internal financing, therefore, preference should be given to internal financing over external financing (Myers, 1984). The negative relationship between debt financing and the financial performance measures of firms can be explained by the pecking

order theory. According to the theory, firm value declines as the company chooses external financing over internal financing because of the higher cost and information asymmetry of external financing over internal financing. Smith Jr and Warner (1979) argue that the most risk-avert investors are the debt holders as compared to other investors, therefore, they restrict the management of the company from investing in even slightly riskier investment opportunities that retain the firms from earning higher profits as compared to their counterparts (Baysinger and Hoskisson, 1989). The results of this study also support this empirical evidence as evident from the estimation results of the two-step GMM estimation models. All the six models support that there is a negative association among firm performance and capital structure throughout all their measures. Growth is positively related to all the measures of firm performance, whereas, size and age show a partial relationship. Size is partially positively linked to firm performance and age is partially negatively related to firm performance.

4.4.2 Firm Performance and Capital Structure with the Moderating Role of Size

The most commonly used method of capital budgeting techniques for the evaluation of projects is the net present value (NPV) (Magni, 2009). According to the textbooks of corporate finance, it is theoretically considered to be the best method among capital budgeting techniques (Bierman and Smidt, 2012; Brealey et al., 2012; Copeland and Weston, 1988; Damodaran, 1999; Koller et al., 2000). Contrary to the so much praise for the NPV technique of capital budgeting in the textbooks of corporate finance, various researchers have criticized this method. They have raised questions about its practical use. Despite NPVs theoretical higher-ranking position over the internal rate of return (IRR) method of capital budgeting technique, these studies argue that firm managers prefer IRR over NPV practically (Berkovitch and Israel, 2004; Iqbal, 2017).

Adding to the literature in this area, Iqbal (2016) has identified two flaws in the NPV method of capital budgeting technique. Firstly, he argues that NPV is a positive function of project/firm size. The management of a firm always chooses

such projects which increases the amount of NPV even if its IRR is lower as compared to other opportunity projects available thus making NPV biased towards bigger-sized projects. Secondly, the fundamental assumption of NPV is that every project is to be financed through debt while evaluating several projects. The first flaw of NPV is its biasness toward bigger-sized projects/firms even though these investments are less efficient by other capital budgeting techniques. The second flaw of NPV is that it considers the cost of borrowing to be the opportunity cost during the evaluation of investments. Based on these two flaws, when linked together, it can be proposed that leverage (especially, debt to equity) negatively impacts firm performance (especially, return on assets) whereby firm size moderates this relationship. Based on the above theoretical arguments, this study uses firm size as a moderator in association among firm performance and capital structure. Firm size is measured through the total assets of a firm.

This section argues about the results of the estimation models where firm performance measures are used as the dependent variable and capital structure measures are used as the independent variable along with the firm size as a moderating variable and other control variables discussed in the methodology section. As there are various estimation techniques used in the literature, the first step is to identify the most suitable estimation techniques that fit the data of this study. Some of the major estimation techniques used in previous studies include pooled ordinary least squares model (Pooled OLS), fixed effects model (FEM), random effects model (REM), and generalized method of moments (GMM). These techniques are used based on their characteristics in a specific situation that is explained later. Various studies have used a combination of the above-discussed methods of estimation (Abdullah and Tursoy, 2021; Ahmed and Afza, 2019; Chadha and Sharma, 2015; Detthamrong et al., 2017; Islam and Iqbal, 2022; Le and Phan, 2017). The scheme of this section is that the first portion discusses the tests for choosing the best estimation techniques to be used in this study. The second portion discusses the results of those estimation techniques as suggested by the results of the tests. The last portion discusses those results in the light of literature and corresponding theories.

4.4.2.1 Tests for Choosing the Best Estimation Techniques

Various estimation techniques have been used in previous studies to determine association among firm performance and capital structure. The most widely used method of estimation in the literature is pooled ordinary least squares model (Pooled OLS). Dao and Ta (2020) argue that around 40% of the past studies have used Pooled OLS estimation technique. This study also performs this technique of estimation.

The Hausman specification test is used in this study to choose between the fixed effects model (FEM) and random effects model (REM). The null hypothesis is that the random effects model is to be preferred over the fixed effects model. Rejection of the null hypothesis at a p-value lower than 0.05 supports REM, whereas, acceptance of the null hypothesis at a p-value higher than 0.05 supports FEM.

Initially, twelve estimation models are used for each of the six proxies of firm performance (ROA, ROE, ROS, PE, ROSP, and MBVE) and both of the proxies of capital structure (TDA and EM). After estimating each of the twelve models, the results of the Hausman test are obtained which are presented in Table 4.12.

To obtain the results of the Hausman test, all models are estimated through the random effects model initially. It is to be noted that all the models include control variables as well along with the regressors. GTA is used as one of the control variables when estimation is done for accounting measures of firm performance and GTM is used as one of the control variables when estimation is done for the market measures of firm performance.

Table 4.13: Hausman Test

	ROA	**ROE**	**ROS**	**PE**	**ROSP**	**MBVE**
TDA	172.47***	212.79***	171.59***	8.54	126.05***	25.94***
EM	252.96***	208.45***	124.62***	10.48*	109.72***	46.11***

**** p<.01, ** p<.05, * p<.1*

The results of the Hausman test show that the null hypothesis is rejected in 10 models i.e., ROA when estimated through TDA and EM; ROE when estimated through TDA and EM; ROS when estimated through TDA and EM; ROSP when estimated through TDA and EM; MBVE when estimated through TDA and EM. Thus, FEM is to be preferred over REM in these 10 models. The two models where the null hypothesis is accepted are when PE is estimated through TDA and EM, which means that REM should be preferred over FEM.

Once the Hausman test recommends choosing FEM, the next step is to decide whether FEM is a better option for estimation or should the Pooled OLS estimation technique be used. The decision is made through Breusch Pagan Langrangian Multiplier Test.

Table 4.14: Breush Pagan Langrangian Multiplier Test

	ROA	**ROE**	**ROS**	**ROSP**	**MBVE**
TDA	3888.62***	1375.88***	1872.89***	0	870.91***
EM	6061.54***	1721.91***	3854.34***	0	9818.62***

**** p<.01, ** p<.05, * p<.1*

The results of the Breusch Pagan LM test are obtained for 10 models. Two models are not tested as the Hausman test results show that REM should be used when PE is estimated through TDA and EM. Table 4.13 shows that out of 10 models, FEM should be preferred in 8 models. i.e., ROA when estimated through TDA and EM; ROE when estimated through TDA and EM; ROS when estimated through TDA and EM; MBVE when estimated through TDA and EM. Moreover, the results also show that Pooled OLS should be preferred when ROSP is estimated through TDA and EM. The results of the Pooled OLS for ROSP and REM for PE are discussed in the later section.

One of the major concerns in regression analysis is the absence of homoskedasticity. Before discussing the estimation results, the data must be free from heteroskedasticity, i.e., all the variables have a finite variance. The presence or

absence of homoskedasticity is checked through Modified Wald Test for Groupwise Heteroskedasticity. The null hypothesis is that the data is homoscedastic. The acceptance of the null hypothesis with a p-value greater than 0.05 interprets that the data is free from the problem of heteroskedasticity, whereas, the rejection of the null hypothesis with a p-value less than 0.05 interprets the presence of the heteroskedasticity problem.

TABLE 4.15: Modified Wald Test for Groupwise Heteroskedasticity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	8.2E+31***	3E+32***	9.9E+32***	6E+32***
EM	4.8E+31***	1.5E+32***	1E+33***	2.3E+31***

**** p<.01, ** p<.05, * p<.1*

The results of Table 4.14 show that there exists the problem of heteroskedasticity in all the models, i.e., the modeling errors do not have the same variance. Although the absence of homoskedasticity does not make the OLS estimation biased, the estimate is inefficient. The problem is dealt with by using the robust function in Stata.

The FE model and the RE model transform the variables but this adjustment leads to downward biased estimates of β. To overcome these bias problems, the instrumental variables technique is used (Marrero, 2010). In addition to these arguments, Roberts and Whited (2013) claim that endogeneity is the most alarming issue that arises in the studies of finance. The FE model and the RE model are unable to resolve the problems of autocorrelation and heteroscedasticity. This issue is generally resolved by the use of the generalized method of moments-difference approach (GMM-DIF) (Arellano and Bond, 1991; Holtz-Eakin et al., 1988). Difference GMM eliminates the fixed effects by transforming all the independent variables and control variables usually by first-differencing the data (Roodman, 2009). This method of estimation also has its limitations. In an unbalanced panel in Difference GMM, the gap is enlargened by taking the difference between the contemporaneous observations and previous observations. Consequently, Difference GMM, if applied

to an unbalanced panel data set may weaken the estimation results (Arellano and Bover, 1995; Blundell and Bond, 1998). They suggest overcoming this problem by the use of the System GMM (GMM-SYS) estimation technique. System GMM deals with these problems in two ways, i.e., (a) it adds more instruments to increase efficiency, and (b) instruments are made exogenous (uncorrelated) by changing the instruments. It builds a system of two equations i.e. (a) the original equation, and (b) a transformed equation. Unlike difference GMM, system GMM subtracts the average of all future observations from the contemporaneous one. Thus, it is computable for all observations regardless of the gaps in the data. Consequently, it minimizes data loss.

This study uses two techniques for checking the problem of endogeneity. The first method uses a lag of the dependent variable (DV) as a regressor (IV) for checking endogeneity. If the lagged DV is significant, this is considered a sign of endogeneity. There is another use of the autoregressive models as well. Later on, these results are also used for deciding between difference GMM and system GMM. This is discussed in detail later in the same section.

Table 4.16: Autoregressive Models for Endogeneity with Moderating Variable

	(1) ROA	(2) ROA	(3) ROE	(4) ROE	(5) ROS	(6) ROS	(7) MBV	(8) MBV
L.ROA	.561***	.652***						
	(0.016)	(0.014)						
L.ROE			.464***	.417***				
			(0.019)	(0.019)				
L.ROS					.539***	.644***		
					(0.021)	(0.019)		
L.MBVE							.836***	.826***
							(0.014)	(0.014)
TDA	0.038		-0.091		.166***		-7.988*	
	(0.033)		(0.105)		(0.047)		(4.595)	
EM		0.002		.041**		0.004		1.095
		(0.005)		(0.017)		(0.007)		(0.743)
ModA	-.008***		0.003		-.019***		.616*	
	(0.002)		(0.007)		(0.003)		(0.331)	
ModE		0		-.005***		-0.001		-0.009

		0.000		(0.001)		0.000		(0.052)
Size	.005***	0.001	0.001	.017***	.014***	.004**	-.361**	-0.08
	(0.001)	(0.001)	(0.004)	(0.003)	(0.002)	(0.001)	(0.167)	(0.129)
GTA	.033***	.03***	.1***	.124***	.061***	.056***		
	(0.005)	(0.005)	(0.013)	(0.013)	(0.006)	(0.006)		
GTM							5.945***	5.975***
							(0.198)	(0.191)
Age	0	0	0*	0**	0	0	.012**	.016***
	0.000	0.000	0.000	0.000	0.000	0.000	(0.005)	(0.005)
_cons	-0.01	0.002	0.058	-.122***	-.129***	-.039*	4.706**	-1.41
	(0.019)	(0.015)	(0.051)	(0.042)	(0.026)	(0.021)	(2.296)	(1.788)
Observations	5022	5022	5022	5022	4934	4934	4659	4659
R-squared	0.51	0.483	0.258	0.297	0.511	0.477	0.717	0.732
F-stats	762.93***	566.12***	125.09***	178.93***	494.89***	326.37***	873.85***	882.08***

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 4.15 shows the estimation results of the autoregressive models where the lagged DV is also used as a regressor along with other independent variables and control variables. ModA and ModE are the moderators. ModA is the product of firm size and TDA, whereas, ModE is the product of firm size and EM. This table shows the results of only 8 models as it is evident from earlier tests that RE models should be used for PE and FE models should be used for ROSP when estimated through both TDA and EM. These 8 models include the estimation of ROA, ROE, ROS, and MBVE through TDA and EM along with moderating variables and other control variables. In all the models, the measures of firm performance are significantly related to their lagged values which means that is a sign of an endogeneity problem.

The second technique used to identify endogeneity is through Durbin and Wu-Hausman test. If the values of Durbin and Wu-Hausman tests for a specific model are significant, the model is considered to have the problem of endogeneity.

Table 4.17: Durbin Test for Endogeneity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	252.469***	191.878***	182.015***	28.7454***
EM	.470552	195.074***	.440963	16.4009***

**** p<.01, ** p<.05, * p<.1*

The results of the Durbin test are shown in Table 4.16 and the results of the Wu-Hausman test are shown in Table 4.17. Both of these tests show the same results. Out of 8 models, 6 models have the problem of endogeneity, whereas, 2 models do not have the problem of endogeneity. The models that have the problem of endogeneity are as follows: (a) ROA when estimated through TDA along with other control variables, (b) ROE when estimated through TDA along with other control variables, (c) ROE when estimated through EM along with other control variables, (d) ROS when estimated through TDA along with other control variables, (e) MBVE when estimated through TDA along with other control variables, and

(f) MBVE when estimated through EM along with other control variables. In these models, it is preferred to use GMM estimation techniques for these models.

The models that do not have the problem of endogeneity are as follows: (a) ROA when estimated through EM along with other control variables, and (b) ROS when estimated through EM along with other control variables. In these models, it is preferred to use FE models for their estimation.

TABLE 4.18: Wu-Hausman Test for Endogeneity

	ROA	**ROE**	**ROS**	**MBVE**
TDA	266.316***	199.699***	189.124***	28.8908***
EM	.469902	203.167***	.440343	16.4367***

**** p<.01, ** p<.05, * p<.1*

Once endogeneity is confirmed, there are two methods to choose between the Difference GMM and the System GMM. According to Blundell and Bond (1998), if the parameter of the lagged DV is tilted towards 1, i.e., the DV is persistent and close to being a random walk, the estimates of Difference GMM will biased and inefficient. They suggest using the System GMM in such a situation as the Difference GMM will yield biased estimates due to poor instruments, especially when T is short. According to Bond et al. (2001), to decide between the Difference GMM and the System GMM, a dynamic model is initially used by estimating through Pooled OLS and FE model. The coefficient of the lag of the DV through Pooled OLS is considered an upper limit while it is considered a lower limit obtained through FE model estimation. Then in the third step, the Difference GMM estimate results are obtained. The third step results are then compared with the results of the first two estimates. If the coefficient of the lagged DV is closer to the fixed effects estimate, this is more likely to be caused by weak instrumentation due to the downward biasness of the former estimate. To deal with this problem, the System GMM estimator is preferred. This study uses the methodology of Bond et al. (2001) for deciding between the Difference GMM and the System GMM.

TABLE 4.19: Coefficients of Lagged DV to choose between System and Difference GMM

		L.ROA	**L.ROE**	**L.ROS**	**L.MBVE**
TDA	Pooled OLS	.561***	.464***	.539***	.836***
	Fixed Effects	.294***	.28***	.342***	.626***
	Difference GMM	.277***	.315***	.379***	.68***
EM	Pooled OLS		.417***		.826***
	Fixed Effects		.205***		.584***
	Difference GMM		.272***		.657***

**** p<.01, ** p<.05, * p<.1*

Table 4.18 shows the comparison of the coefficients of lagged DVs for Pooled OLS, FE Models, and Difference GMM models for choosing between difference GMM and system GMM. The coefficients of the lagged DVs of Pooled OLS models are considered as the upper bound limit. The coefficients of the lagged DVs of FE models are considered as the lower limit bound. If the values of the coefficients of the lagged DVs of difference GMM is above or near the coefficients of the lagged DVs of Pooled OLS, then difference GMM should be preferred, whereas, if the values of the coefficients of the lagged DVs of difference GMM is below or near the coefficients of the lagged DVs of Difference GMM, then system GMM should be preferred. As evident from the results presented in Table 4.20, the system GMM is the preferred estimation technique in all the models.

4.4.2.2 Estimation Results

This section discusses the results of estimation models. There are 12 models in total. The earlier section has already identified the preferred estimation techniques for each model. In the light of the last section, the preferred estimation techniques are as follows. Pooled OLS models should be preferred for estimating ROSP with TDA and EM along with the size as a moderator and other control variables. RE models

should be preferred for estimating PE with TDA and EM along with the size as a moderator and control variables. FE models should be preferred for estimating ROA and ROS with EM along with the size as a moderator and other control variables. Lastly, system GMM should be preferred for the remaining six models, i.e., (a) ROA when estimated through TDA along with the size as a moderator and other control variables, (b) ROE when estimated through TDA along with the size as a moderator and other control variables, (c) ROE when estimated through EM along with the size as a moderator and other control variables, (d) ROS when estimated through TDA along with the size as a moderator and other control variables, (e) MBVE when estimated through TDA along with the size as a moderator and other control variables, and (f) MBVE when estimated through EM along with the size as a moderator and other control variables. The current section presents the results of the estimated models in the discussed sequence.

The results of the estimations for accounting measures of firm performance are presented in Table 4.19. The models are named from 1 to 6. Model 1 shows the results of estimation when ROA is estimated by TDA using size as a moderator through the two-step system GMM model. Model 2 shows the results of estimation when ROA is estimated by EM along with the size as an interaction term through the FE model. Model 3 shows the results of estimation when ROE is estimated by TDA with firm size as a moderator through the two-step system GMM model. Model 4 shows the results of estimation when ROE is estimated by EM with size as a moderating variable through the two-step system GMM model. Model 5 shows the results of estimation when ROS is estimated by TDA with size as a moderator through the two-step system GMM model. Model 6 shows the results of estimation when ROS is estimated by EM along with firm size as an interaction term through FE model. Moreover, three control variables are also used in these estimations, i.e., firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), age of the firm (measured as the number of years since inception till 2019).

This section describes the estimation results of the association between capital structure measures and firm performance measures moderated by firm size. The first part of this section shows the results of estimation and discusses them when

accounting measures of firm performance are estimated through capital structure measures along with firm size moderating their relationship. The second part of this section shows the results of estimation and discusses them when market measures of firm performance are estimated through capital structure measures along with the firm size as the interaction term.

Table 4.20: Estimation Results for Accounting Measures of Firm Performance Including the Interaction Term

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	ROA	**ROA**	**ROE**	**ROE**	**ROS**	**ROS**
L.ROA	.423***					
	(0.034)					
L.ROE			.361***	.314***		
			(0.031)	(0.031)		
L.ROS					.424***	
					(0.033)	
TDA	0.154		-0.09		.452**	
	(0.198)		(0.575)		(0.198)	
ModA	-0.02		0		-.042***	
	(0.015)		(0.042)		(0.014)	
EM		0.005		0.059		0.01
		(0.010)		(0.062)		(0.016)
ModE		-0.001		-0.006		-0.001
		(0.001)		(0.004)		(0.001)
Size	0.014	-.008**	0.01	.027**	.028***	0

	(0.009)	(0.003)	(0.023)	(0.012)	(0.008)	(0.005)
GTA	.028***	.063***	.121***	.151***	.07***	.09***
	(0.006)	(0.006)	(0.017)	(0.018)	(0.008)	(0.008)
Age	-.001*	0	-.003***	-.003***	0	0
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
_cons	-0.066	.165***	0.07	-0.14	-.302***	0.025
	(0.113)	(0.038)	(0.317)	(0.149)	(0.112)	(0.055)
Observations	5022	5386	5022	5022	4934	5307
R-squared		0.073				0.05
F-stats	199.91***	37.71***	108.85***	135.85***	272.56***	26.41***
No. of Groups	312		312	312	312	
No. of Instruments	213		213	213	214	
AR(1)	-8.81***		-8.14***	-8.14***	-7.33***	
AR(2)	0.35		1.07	1.01	1.08	
Hansen	238.16*		237.92*	240.23*	239.69*	

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

There is a vast literature available on the importance of capital structure decisions on the financial performance of a firm (Abdullah and Tursoy, 2021; Abor, 2005; Ahmed and Afza, 2019; Chadha and Sharma, 2015; Chechet and Olayiwola, 2014; Dao and Ta, 2020; Dawar, 2014; Demirg-Kunt et al., 2020; Detthamrong et al., 2017; Fosu, 2013; Hamid et al., 2015; Ibhagui and Olokoyo, 2018; Islam and Iqbal, 2022; Le and Phan, 2017; Majumdar and Chhibber, 1999; Mardones and Cuneo, 2020; Margaritis and Psillaki, 2007; Myers, 1984; Salim and Yadav, 2012; Vijayakumaran, 2017). Combining the methodologies of various studies, the results of two-step GMM estimations are obtained. The first step was to determine the most appropriate estimation technique using various tests. The next step was to estimate the models using those estimation techniques. Using the methodology described in the last section, the results of the two-step GMM estimation technique are presented in Table 4.13. The table presents the results of the six models in the following manner: (a) ROA when estimated through TDA along with the size as a moderator and other control variables, (b) ROE when estimated through TDA along with the size as a moderator and other control variables, (c) ROE when estimated through EM along with the size as a moderator and other control variables, (d) ROS when estimated through TDA along size as a moderator and with other control variables, (e) MBVE when estimated through TDA along with the size as a moderator and other control variables, and (f) MBVE when estimated through EM along with the size as a moderator and other control variables.

Two types of diagnostics tests are used for GMM, i.e., (a) test for instruments validity, and (b) test for autocorrelation/serial correlation of the error term. To check the validity of the instruments, Hansen J test is used (Hansen, 1982). Failure of rejecting the null hypothesis at 0.05 confidence interval supports instruments validity, whereas failure of rejecting the null hypothesis at higher confidence intervals, especially beyond 0.25, is a sign of trouble. Furthermore, serial correlation/autocorrelation of the error term is also tested. It is implied that the moment conditions are properly specified and the error term is serially uncorrelated by failure of rejecting the null hypothesis at second order. The results are reported after ensuring that all these conditions are satisfied. The number of observations for all models are lower than the number of groups. The F-stats value for all models is significant.

Looking at the AR(2) values of all the models, the null hypotheses are accepted implying that the moment conditions are correctly specified, and the error term is serially uncorrelated. Moreover, the Hansen test values fail to reject the null hypotheses at a 0.05 confidence interval thus supporting instruments validity. The values of Hansen test are also below the danger level that 0.25.

Model 1 estimates the impact of total debt to assets ratio over return on assets along with size (natural log of net fixed assets) as a moderating variable, and growth in total assets and age (from firm inception to 2019) as control variables. The estimation results show that leverage is not significantly associated with firm performance. Firm size shows no significant relationship with ROA. Growth in total assets is positively linked with ROA. Similar to firm size, age also does not have any significant impact on ROA.

The Durbin test and Wu-Hausman test of endogeneity suggested using FE models for the estimation of ROA through EM along with the size as a moderator and other control variables. Moreover, two control variables are also used in these estimations, i.e., growth (measured by the change in total assets), and age of the firm (measured as the number of years since inception till 2019). The results of Model 2, before the inclusion of the interaction term, show that there is a negative relationship between leverage and firm performance. Now, after the inclusion of the interaction term, ModE (product of EM and size), the relationship between leverage (measured as EM) and firm performance (measured as ROA) has become insignificant. The relationship of the moderator is also insignificant. Based on this empirical evidence it can be argued that firm size moderates association among firm performance and capital structure as it has changed the negative relationship to insignificant between these two. Both the control variables show no change with the inclusion of interaction terms. Growth in total market capitalization has a positive impact on ROA and age has no significant impact on ROA regardless of whether the interaction term is included in the models or not.

Model 3 estimates the impact of total debt to assets ratio over return on equity along with size (natural log of net fixed assets) as a moderating variable, and growth in total assets and age (from firm inception to 2019) as control variables. The estimation results show that leverage is not significantly associated with firm

performance. Firm size shows no significant relationship with ROE. Growth in total assets is positively linked with ROE, whereas, age has a negative impact on ROE.

Model 4 estimates the impact of the equity multiplier, as a measure of capital structure, over return on equity along with size (natural log of net fixed assets) as a moderating variable, and growth in total assets and age (from firm inception to 2019) as control variables. The estimation results show that leverage is not significantly associated with firm performance. Firm size shows a positive relationship with ROE. Similarly, growth in total assets is positively linked with ROE, whereas, age has a negative impact on ROE.

Model 5 estimates the impact of total debt to assets ratio, as a measure of capital structure, over return on sales along with size (natural log of net fixed assets) as a moderating variable, and growth in total assets and age (from firm inception to 2019) as control variables. The estimation results show that leverage is positively associated with firm performance even though the relationship between them was negative before the inclusion of the interaction term. Firm size shows a positive relationship with ROS. Similarly, growth in total assets is positively linked with ROS, whereas, age has no significant impact on ROS.

The Durbin test and Wu-Hausman test of endogeneity suggested using FE models for the estimation of ROS through EM along with the size as a moderator and other control variables. The regressor used in Model 6 is EM as a proxy of capital structure. Moreover, two control variables are also used in these estimations, i.e., growth (measured by the change in total assets), and age of the firm (measured as the number of years since inception till 2019). The results before the inclusion of interaction term show that there is a negative relationship between leverage and firm performance. Now, after the inclusion of the interaction term, ModE (product of EM and size), the relationship between leverage (measured as EM) and firm performance (measured as ROS) has become insignificant. The relationship of the moderator is also insignificant. Based on this empirical evidence it can be argued that firm size moderates association among firm performance and capital structure as it has changed the negative relationship to insignificant between these two. Both the control variables show no change with the inclusion of interaction

terms. Growth in total market capitalization has a positive impact on ROS and age has no significant impact on ROS regardless of whether the interaction term is included in the models or not.

Table 4.21: Estimation Results for Market Measures of Firm Performance Including the Interaction Term

	(1) PE	(2) PE	(3) ROSP	(4) ROSP	(5) MBV	(6) MBV
L.MBVE					.734***	.741***
					(0.028)	(0.027)
L2.MBVE					.102***	.125***
					(0.024)	(0.024)
TDA	-6.572		.216**		47.2**	
	(9.250)		(0.106)		(22.876)	
ModA	-0.167		-.019**		-3.582**	
	(0.664)		(0.008)		(1.645)	
EM		0.737		.029*		-1.547
		(1.528)		(0.016)		(3.282)
ModE		-0.056		-.002**		0.091
		(0.107)		(0.001)		(0.233)
Size	0.613	.683**	.01**	0.005	2.052**	-0.197
	(0.405)	(0.292)	(0.005)	(0.003)	(0.939)	(0.572)
GTM	2.016***	2.111***	.631***	.632***	9.675***	9.453***

	(0.262)	(0.265)	(0.007)	(0.007)	(0.572)	(0.575)
Age	.053***	.07***	0	0		
	(0.017)	(0.018)	0.000	0.000		
_cons	2.198	-4.385	-.202***	-.152***	-27.622**	2.561
	(5.725)	(4.154)	(0.065)	(0.043)	(12.996)	(8.034)
Observations	4844	4844	4819	4819	4300	4301
R-squared			0.795	0.795		
F-stats			1616.17***	1575.42***	1174.89***	1984.56***
Wald	144.45***	95.81***				
No. of Groups					311	311
No. of Instruments					233	217
AR(1)					-7.83***	-7.64***
AR(2)					1.37	0.98
Hansen					254.86*	240.92*

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The results of estimation results between market measures of firm performance and selected measures of capital structure are reported in Table 4.20. Model 1 shows the results when PE is estimated through TDA along with other control variables and size as a moderator. Model 2 reports the association between PE and EM along with other control variables and size as a moderator. Model 3 shows the results of the relationship between ROSP and TDA along with other control variables and size as a moderator. The results of the estimation of ROSP through EM along with other control variables and size as a moderator are reported in Model 4. Model 5 shows the results of the relationship between MBVE and TDA along with other control variables and size as a moderator. The results of the relationship between MBVE and EM along with other control variables and size as a moderator are reported in Model 6. The three control variables used in these estimations are firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), and age of the firm (measured as the number of years since inception till 2019).

The Hausman specification test suggested using RE models for the estimation of PE. The regressor used in Model 1 is TDA as a proxy of capital structure, whereas, the regressor used in Model 2 is EM as a proxy of capital structure. The moderating variable used in Model 1 is ModA, whereas, the moderating variable used in Model 2 is ModE. ModA is the product of TDA and size, whereas, ModE is the product of EM and size. Moreover, two control variables are also used in these estimations, i.e., growth (measured by the change in total market capitalization) and age of the firm (measured as the number of years since inception till 2019).

Before including the interaction terms, the results of Model 1 show a negative association between leverage (TDA) and firm performance (PE). The results show that without interaction terms, leverage, when measured as TDA, has a negative impact on PE, but leverage, when measured as EM, does not have any significant impact on PE. Once the moderators are put in the models, the results of Model 2 remain the same but the results of Model 1 are changed to insignificant impact of TDA on PE from negative impact. From these results, it can be inferred that firm size plays a role of a partial moderator in association among firm performance and capital structure when measured through PE ratio. Both the control variables

show no change with the inclusion of interaction terms. Growth in total market capitalization has a positive impact on PE ratio and age has no significant impact on PE ratio regardless of whether the interaction term is included in the models or not.

The Breusch and Pagan Langrangian Multiplier test suggested using pooled OLS estimation techniques for ROSP. The results of the pooled OLS estimations techniques are presented in table 4.21. The regressor used in Model 1 is TDA as a proxy of capital structure, whereas, the regressor used in Model 2 is EM as a proxy of capital structure. ModA and ModE are the moderators. Moreover, three control variables are also used in these estimations, i.e., firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), age of the firm (measured as the number of years since inception till 2019).

The results of both Model 3 and Model 4 show that growth is positively linked to stock returns. This fact can be explained theoretically and mathematically as market capitalization is calculated by multiplying the share price with the number of outstanding shares. Therefore, it can be justified that there is a positive association between growth and firm performance. Some studies have found a positive relationship between the age of a firm and its performance. Agarwal and Gort (2002) believe that older companies learn from their experiences and they update their skills and practices to earn more profits than a new company. Contrarily, Kyereboah-Coleman (2007) has found a negative relationship between age and firm performance measures. In his study, the age of the firm has been used as a measure of the reputation of the firm. He argues that the negative relationship between age and performance is a sign that the poor do not need the reputation of a firm for a small credit. On the other hand, some studies reported an insignificant relationship between age and firm performance. The result of this study is also aligned with the study of Ahmed and Afza (2019), who reported that the relationship between age and firm performance is insignificant.

Model 5 estimates the impact of total debt to assets ratio, as a measure of capital structure, over price to earnings ratio along with size (natural log of net fixed assets) as a moderating variable, and growth in total market capitalization as a

control variable. The estimation results show that leverage is positively associated with firm performance even though the relationship between them was negative before the inclusion of the interaction term. Firm size shows a positive relationship with MBVE. Similarly, growth in total market capitalization is positively linked with MBVE.

Model 6 estimates the impact of equity multiplier, as a measure of capital structure, over price to earnings ratio along with size (natural log of net fixed assets) as a moderating variable, and growth in total market capitalization as a control variable. The estimation results show that leverage is not significantly associated with firm performance even though the relationship between them was negative before the inclusion of the interaction term. Firm size also shows no significant relationship with MBVE, whereas, growth in total market capitalization is positively linked with MBVE.

The inclusion of firm size as a moderator has brought up some very interesting results. The interaction plays a significant negative role in four out of twelve models. The higher the firm size when combined with higher levered firms lead to lower returns as compared to small firms with lesser debts. Even if the interaction term itself is significant only in 40% of the models, it has changed the behavior of the main regressors in more than 90% of the models. These are highlighted as follows:

1. Without the interaction term, in the pooled OLS models, the relationship between TDA and ROSP is negative. After the inclusion of the interaction term, this relationship converts to a positive relationship.

2. Without the interaction term, in the pooled OLS models, the relationship between EM and ROSP is insignificant. After the inclusion of the interaction term, this relationship converts to a positive relationship at a 10% significance level.

3. Without the interaction term, in the RE models, the relationship between TDA and PE is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

4. Without the interaction term, in the FE models, the relationship between EM and ROA is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

5. Without the interaction term, in the FE models, the relationship between EM and ROS is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

6. Without the interaction term, in the two-step system GMM models, the relationship between TDA and ROA is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

7. Without the interaction term, in the two-step system GMM models, the relationship between TDA and ROE is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

8. Without the interaction term, in the two-step system GMM models, the relationship between EM and ROE is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

9. Without the interaction term, in the two-step system GMM models, the relationship between EM and ROS is negative. After the inclusion of the interaction term, this relationship converts to a positive relationship.

10. Without the interaction term, in the two-step system GMM models, the relationship between TDA and MBVE is negative. After the inclusion of the interaction term, this relationship converts to a positive relationship.

11. Without the interaction term, in the two-step system GMM models, the relationship between EM and MBVE is negative. After the inclusion of the interaction term, this relationship converts to an insignificant relationship.

Big firms have more and easy access to debt as compared to small firms. According to Demirg-Kunt et al. (2020), the capital market acts as a "spare tire" for big firms even in times of financial crisis. This easy access to extra funds leads to the behavior and mindset of the managers of big firms where they prefer higher returns in absolute amount rather than the rate of return. Even if the return is low in

terms of the percentage of return to available funds, the investment is preferred if the overall absolute amount of return is high Iqbal (2016). Consequently, it can be argued that the mindset of the managers of small firms is to increase the rate of return due to limited access to capital markets and debts. However, the mindset of the managers changes as we move up the size of the firm due to easy access to capital markets and debts where their target is to increase the absolute amount of return even if the investment is less efficient in terms of rate of return.

4.4.3 Firm Performance and Capital Structure: Non-Linear Relationship

Since the seminal work of Modigliani and Miller (1958), economists have stressed the relationship between capital structure decisions and firm performance. Since then, various theories have been developed discussing the association between financing decisions and the financial performance of the firms. The most widely accepted theory among them is the Trade-off Theory both in its static form and dynamic form (Kraus and Litzenberger, 1973). The theory states that an initial rise in leverage leads to an improvement in firm value but after an optimal point it starts affecting negatively (Myers, 1984). Although some studies have empirically tested the trade-off theory (Frank and Goyal, 2009; Rajan and Zingales, 1995; Titman and Wessels, 1988), the majority of studies in this area still estimate a linear association among firm performance and capital structure. There are mixed results in this area. Some support the confirmation of trade-off theory, whereas, others reject its presence. Even the scholars who confirm the traded-off theory have disagreements between themselves. The supporters of the trade-off theory believe that to adopt the optimal capital structure the firms have to change their capital structure. This adjustment is called a mean reversion. According to some studies, mean reversion is a quick process and firms do not take long to adjust according to the optimal capital structure (Flannery and Rangan, 2006). Other supporters of the trade-off theory believe that mean reversion occurs very slowly "at a snails pace" (Fama and French, 2002; Jalilvand and Harris, 1984).

This section argues about the results of the estimation models where firm performance measures are used as the dependent variable and the non-linear capital structure measures are used as the independent variable and other control variables are discussed in the methodology section. As there are various estimation techniques used in the literature, the first step is to identify the most suitable estimation techniques that fit the data of this study. Some of the major estimation techniques used in previous studies include pooled ordinary least squares model (Pooled OLS), fixed effects model (FEM), random effects model (REM), and generalized method of moments (GMM). The scheme of this section is that the first portion discusses the tests for choosing the best estimation techniques to be used in this study. The second portion discusses the results of those estimation techniques as suggested by the results of the tests. The last portion discusses those results in the light of literature and corresponding theories.

4.4.3.1 Tests for Choosing the Best Estimation Techniques

The Hausman specification test is used in this study to choose between the fixed effects model (FEM) and random effects model (REM). The null hypothesis is that the random effects model is to be preferred over the fixed effects model. Rejection of the null hypothesis at a p-value lower than 0.05 supports REM, whereas, acceptance of the null hypothesis at a p-value higher than 0.05 supports FEM. Initially, twelve estimation models are used for each of the six proxies of firm performance (ROA, ROE, ROS, PE, ROSP, and MBVE) and both of the proxies of capital structure (TDA2 and EM2). After estimating each of the twelve models, the results of the Hausman test are obtained which are presented in Table 4.21. To obtain the results of the Hausman test, all models are estimated through the random effects model initially. It is to be noted that all the models include control variables as well along with the non-linear regressors TDA2 is the squared term of TDA and EM2 is the squared term of EM. GTA is used as one of the control variables when estimation is done for accounting measures of firm performance and GTM is used as one of the control variables when estimation is done for the market measures of firm performance.

Table 4.22: Hausman Test

	ROA	**ROE**	**ROS**	**PE**	**ROSP**	**MBVE**
TDA	159.6***	286.54***	140.39***	11.82**	124.85***	26.87***
EM	160.04***	177.61***	158.13***	19.17***	131.26***	44.81***

**** p<.01, ** p<.05, * p<.1*

The results of the Hausman test show that the null hypothesis is rejected in all models which means that FEM should be preferred over REM. Once the Hausman test recommends choosing FEM, the next step is to decide whether FEM is a better option for estimation or should the Pooled OLS estimation technique be used. The decision is made through Breusch Pagan Langrangian Multiplier Test.

Table 4.23: Breush Pagan Langrangian Multiplier Test

	ROA	**ROE**	**ROS**	**PE**	**ROSP**	**MBVE**
TDA	3841.12***	1397.66***	1946.06***	399.89***	0	8206.46***
EM	4714.92***	1606.15***	2896.37***	429.94***	0	9708.48***

**** p<.01, ** p<.05, * p<.1*

The results of the Breusch Pagan LM test are obtained for all models. Table 4.22 shows that out of 12 models, FEM should be preferred in 10 models, and pooled OLS should be preferred in 2 models. i.e., ROSP when estimated through TDA and EM.

One of the major concerns in regression analysis is the absence of homoskedasticity. Before discussing the estimation results, the data must be free from heteroskedasticity, i.e., all the variables have a finite variance. The presence or absence of homoskedasticity is checked through Modified Wald Test for Groupwise Heteroskedasticity. The null hypothesis is that the data is homoscedastic. The

acceptance of the null hypothesis with a p-value greater than 0.05 interprets that the data is free from the problem of heteroskedasticity, whereas, the rejection of the null hypothesis with a p-value less than 0.05 interprets the presence of the heteroskedasticity problem.

TABLE 4.24: Modified Wald Test for Groupwise Heteroskedasticity

	ROA	**ROE**	**ROS**	**PE**	**MBVE**
TDA	8.7E+31***	4.6E+32***	5.3E+32***	1.7E+34***	2E+05***
EM	4.1E+31***	1.6E+32***	7.8E+32***	1.7E+34***	2.4E+31***

**** p<.01, ** p<.05, * p<.1*

The results of Table 4.23 show that there exists the problem of heteroskedasticity in all the models, i.e., the modeling errors do not have the same variance. Although the absence of homoskedasticity does not make the OLS estimation biased, the estimate is inefficient. The problem is dealt with by using the robust function in Stata.

The FE model and the RE model transform the variables but this adjustment leads to downward biased estimates of β. To overcome these bias problems, the instrumental variables technique is used (Marrero, 2010). In addition to these arguments, Roberts and Whited (2013) claim that endogeneity is the most alarming issue that arises in the studies of finance. The FE model and the RE model are unable to resolve the problems of autocorrelation and heteroscedasticity. This issue is generally resolved by the use of the generalized method of moments-difference approach (GMM-DIF) (Arellano and Bond, 1991; Holtz-Eakin et al., 1988). Difference GMM eliminates the fixed effects by transforming all the independent variables and control variables usually by first-differencing the data (Roodman, 2009). This method of estimation also has its limitations. In an unbalanced panel in Difference GMM, the gap is enlargened by taking the difference between the contemporaneous observations and previous observations. Consequently, Difference GMM, if applied to an unbalanced panel data set may weaken the estimation results (Arellano and Bover, 1995; Blundell and Bond, 1998). They suggest overcoming this problem by

the use of the System GMM (GMM-SYS) estimation technique. System GMM deals with these problems in two ways, i.e., (a) it adds more instruments to increase efficiency, and (b) instruments are made exogenous (uncorrelated) by changing the instruments. It builds a system of two equations i.e. (a) the original equation, and (b) a transformed equation. Unlike difference GMM, system GMM subtracts the average of all future observations from the contemporaneous one. Thus, it is computable for all observations regardless of the gaps in the data. Consequently, it minimizes data loss.

This study uses two techniques for checking the problem of endogeneity. The first method uses a lag of the dependent variable (DV) as a regressor (IV) for checking endogeneity. If the lagged DV is significant, this is considered a sign of endogeneity. There is another use of the autoregressive models as well. Later on, these results are also used for deciding between difference GMM and system GMM. This is discussed in detail later in the same section.

Table 4.25: Autoregressive Models for Endogeneity with Moderating Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	ROA	**ROA**	**ROE**	**ROE**	**ROS**	**ROS**	**PE**	**PE**	**MBV**	**MBV**
L.ROA	.564***	.626***								
	(0.016)	(0.014)								
L.ROE			.461***	.418***						
			(0.019)	(0.019)						
L.ROS					.548***	.616***				
					(0.021)	(0.019)				
L.PE							.307***	.316***		
							(0.021)	(0.020)		
L.MBVE									.836***	.827***
									(0.014)	(0.014)
TDA	-.041**		-.231***		-.043*		5.46*		3.173	
	(0.018)		(0.052)		(0.026)		(3.237)		(2.182)	
EM		.007***		-.024***		.011***		1.759***		.605**
		(0.002)		(0.006)		(0.003)		(0.248)		(0.244)
TDA2	-.028*		.149***		-.046**		-10.139***		-2.234	
	(0.015)		(0.049)		(0.023)		(2.505)		(2.087)	

EM2		-.002***		0		-.002***		-.298***		0.057
		0.000		(0.001)		0.000		(0.039)		(0.038)
Size	0	0	.004**	.005***	.003***	.002***	0.124	0.096	-0.018	-0.092
	0.000	0.000	(0.001)	(0.001)	(0.001)	(0.001)	(0.111)	(0.111)	(0.065)	(0.063)
GTA	.031***	.027***	.108***	.126***	.058***	.052***				
	(0.005)	(0.005)	(0.013)	(0.014)	(0.006)	(0.006)				
GTM							2.754***	2.828***	5.935***	5.981***
							(0.272)	(0.274)	(0.198)	(0.192)
Age	0	0	0**	0**	0	0	.033***	.039***	.012**	.016***
	0.000	0.000	0.000	0.000	0.000	0.000	(0.010)	(0.010)	(0.006)	(0.005)
_cons	.048***	0.008	.073***	.036*	0.011	-.033***	2.579	0.163	-0.713	-0.821
	(0.009)	(0.008)	(0.023)	(0.021)	(0.012)	(0.010)	(1.760)	(1.536)	(0.936)	(0.856)
Observations	5022	5022	5022	5022	4934	4934	4651	4651	4659	4659
R-squared	0.509	0.49	0.26	0.292	0.507	0.484	0.144	0.137	0.716	0.733
F-stats	663.28***	574.07***	152.53***	168.44***	429.02***	333.62***	114.82***	91.52***	879.16***	950.62***

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 4.24 shows the estimation results of the autoregressive models where the lagged DV is also used as a regressor along with other independent variables and control variables. TDA2 and EM2 are the main regressors. TDA2 is the square of TDA, whereas, EM2 is the square of EM. This table shows the results of only 10 models as it is evident from earlier tests that pooled OLS models should be used for the remaining 2 models. In all the models, the measures of firm performance are significantly related to their lagged values which means that is a sign of an endogeneity problem.

The second technique used to identify endogeneity is through Durbin and Wu-Hausman test. If the values of Durbin and Wu-Hausman tests for a specific model are significant, the model is considered to have the problem of endogeneity.

Table 4.26: Durbin Test for Endogeneity

	ROA	**ROE**	**ROS**	**PE**	**MBVE**
TDA	293.115***	221.606***	224.416***	4.92849**	34.9436***
EM	1.2253	227***	.011655	.435307	15.5319***

**** p<.01, ** p<.05, * p<.1*

The results of the Durbin test are shown in Table 4.25 and the results of the Wu-Hausman test are shown in Table 4.26. Both of these tests show the same results. Out of 10 models, 6 models have the problem of endogeneity, whereas, 4 models do not have the problem of endogeneity. The models that have the problem of endogeneity are as follows: (a) ROA when estimated through TDA along with other control variables, (b) ROE when estimated through TDA along with other control variables, (c) ROE when estimated through EM along with other control variables, (d) ROS when estimated through TDA along with other control variables, (e) MBVE when estimated through TDA along with other control variables, and (f) MBVE when estimated through EM along with other control variables. In these models, it is preferred to use GMM estimation techniques for these models.

The models that do not have the problem of endogeneity are as follows: (a) ROA when estimated through EM along with other control variables, (b) ROS when

estimated through EM along with other control variables, (c) PE when estimated through TDA along with other control variables, and (d) PE when estimated through EM along with other control variables. In these models, it is preferred to use FE models for their estimation.

TABLE 4.27: Wu-Hausman Test for Endogeneity

	ROA	**ROE**	**ROS**	**PE**	**MBVE**
TDA	312.07***	232.159***	235.409***	4.92613**	35.1709***
EM	1.22381	238.095***	.011638	.434646	15.5626***

**** p<.01, ** p<.05, * p<.1*

Once endogeneity is confirmed, there are two methods to choose between the Difference GMM and the System GMM. According to Blundell and Bond (1998), if the parameter of the lagged DV is tilted towards 1, i.e., the DV is persistent and close to being a random walk, the estimates of Difference GMM will biased and inefficient. They suggest using the System GMM in such a situation as the Difference GMM will yield biased estimates due to poor instruments, especially when T is short. According to Bond et al. (2001), to decide between the Difference GMM and the System GMM, a dynamic model is initially used by estimating through Pooled OLS and FE model. The coefficient of the lag of the DV through Pooled OLS is considered an upper limit while it is considered a lower limit obtained through FE model estimation. Then in the third step, the Difference GMM estimate results are obtained. The third step results are then compared with the results of the first two estimates. If the coefficient of the lagged DV is closer to the fixed effects estimate, this is more likely to be caused by weak instrumentation due to the downward biasness of the former estimate. To deal with this problem, the System GMM estimator is preferred. This study uses the methodology of Bond et al. (2001) for deciding between the Difference GMM and the System GMM.

TABLE 4.28: Coefficients of Lagged DV to choose between System and Difference GMM

		L.ROA	**L.ROE**	**L.ROS**	**L.MBVE**
TDA	Pooled OLS	.564***	.461***	.548***	.836***
	Fixed Effects	.3***	.275***	.348***	.625***
	Difference GMM	.288***	.311***	.377***	.668***
EM	Pooled OLS		.418***		.827***
	Fixed Effects		.211***		.587***
	Difference GMM		.278***		.654***

**** p<.01, ** p<.05, * p<.1*

Table 4.27 shows the comparison of the coefficients of lagged DVs for Pooled OLS, FE Models, and Difference GMM models for choosing between difference GMM and system GMM. The coefficients of the lagged DVs of Pooled OLS models are considered as the upper bound limit. The coefficients of the lagged DVs of FE models are considered as the lower limit bound. If the values of the coefficients of the lagged DVs of difference GMM is above or near the coefficients of the lagged DVs of Pooled OLS, then difference GMM should be preferred, whereas, if the values of the coefficients of the lagged DVs of difference GMM is below or near the coefficients of the lagged DVs of Difference GMM, then system GMM should be preferred. As evident from the results presented in Table 4.20, the system GMM is the preferred estimation technique in all the models.

4.4.3.2 Estimation Results

This section discusses the results of estimation models. There are 12 models in total. The earlier section has already identified the preferred estimation techniques for each model. In the light of the last section, the preferred estimation techniques are as follows. Pooled OLS models should be preferred for estimating ROSP with

TDA and EM along with the non-linear terms and other control variables. FE models should be preferred for estimating ROA and ROS with EM and estimating PE with TDA and EM along with the non-linear terms and other control variables. Lastly, system GMM should be preferred for the remaining six models, i.e., (a) ROA when estimated through TDA along with the non-linear term and other control variables, (b) ROE when estimated through TDA along with the non-linear term and other control variables, (c) ROE when estimated through EM along with the non-linear term and other control variables, (d) ROS when estimated through TDA along with the non-linear term and other control variables, (e) MBVE when estimated through TDA along with the non-linear term and other control variables, and (f) MBVE when estimated through EM along with the non-linear term and other control variables.

The Breusch and Pagan Langrangian Multiplier test suggested using pooled OLS estimation techniques for ROSP. The Durbin test and Wu-Hausman test of endogeneity suggested using FE models for the estimation of ROA and ROS through EM along with the non-linear regressor and other control variables, and estimation of PE through TDA and EM along with the non-linear regressor terms and other control variables. The remaining estimations are conducted using the two-step system GMM. The first step was to determine the most appropriate estimation technique using various tests. Two types of diagnostics tests are used for GMM, i.e., (a) test for instruments validity, and (b) test for autocorrelation/serial correlation of the error term. To check the validity of the instruments, Hansen J test is used (Hansen, 1982). Failure of rejecting the null hypothesis at 0.05 confidence interval supports instruments validity, whereas Failure of rejecting the null hypothesis at higher confidence intervals, especially beyond 0.25, is a sign of trouble. Furthermore, serial correlation/autocorrelation of the error term is also tested. It is implied that the moment conditions are properly specified and the error term is serially uncorrelated by failure of rejecting the null hypothesis at second order. The results are reported after ensuring that all these conditions are satisfied. The number of observations for all models are lower than the number of groups. The F-stats value for all models is significant. Looking at the AR(2) values of all the models, the null hypotheses are accepted implying that the moment conditions are correctly

specified, and the error term is serially uncorrelated. Moreover, the Hansen test values fail to reject the null hypotheses at a 0.05 confidence interval thus supporting instruments validity. The values of Hansen test are also below the danger level that 0.25.

The results of the estimations for accounting measures of firm performance are presented in Table 4.28. The models are named from 1 to 6. Model 1 shows the results of estimation when ROA is estimated by TDA and its squared term through the two-step system GMM model. Model 2 shows the results of estimation when ROA is estimated by EM and its squared term through the FE model. Model 3 shows the results of estimation when ROE is estimated by TDA and its squared term through the two-step system GMM model. Model 4 shows the results of estimation when ROE is estimated by EM and its squared term through the two-step system GMM model. Model 5 shows the results of estimation when ROS is estimated by TDA and its squared term through the two-step system GMM model. Model 6 shows the results of estimation when ROS is estimated by EM and its squared term through FE model. Moreover, three control variables are also used in these estimations, i.e., firm size (measured by the natural log of net fixed assets), growth (measured by the change in total market capitalization), age of the firm (measured as the number of years since inception till 2019).

This section describes the estimation results of the non-linear association between capital structure measures and firm performance measures. The first part of this section shows the results of estimation and discusses them when accounting measures of firm performance are estimated through the squared capital structure measures. The second part of this section shows the results of estimation and discusses them when market measures of firm performance are estimated through the squared capital structure measures.

Table 4.29: Non-Linear Estimation Results for Accounting Measures of Firm Performance

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	ROA	**ROA**	**ROE**	**ROE**	**ROS**	**ROS**
L.ROA	.43***					
	(0.033)					
L.ROE			.363***	.321***		
			(0.033)	(0.031)		
L.ROS					.426***	
					(0.035)	
TDA	-0.094		-.89**		-0.037	
	(0.112)		(0.428)		(0.128)	
TDA2	-0.018		.671*		-0.072	
	(0.093)		(0.358)		(0.110)	
EM		.012***		-.036*		.027***
		(0.004)		(0.021)		(0.006)
EM2		-.003***		0.001		-.005***
		0.000		(0.003)		(0.001)
Size	0.001	-.011***	.012***	.011***	.004***	-0.004
	(0.002)	(0.003)	(0.004)	(0.004)	(0.001)	(0.004)

GTA	.027***	.057***	.154***	.154***	.065***	.08***
	(0.007)	(0.006)	(0.026)	(0.021)	(0.009)	(0.008)
Age	-0.001	0	-.003***	-.003***	0	0
	0.000	0.000	(0.001)	(0.001)	0.000	(0.001)
_cons	.083***	.183***	.246**	.077*	0.005	0.04
	(0.031)	(0.030)	(0.103)	(0.044)	(0.035)	(0.042)
Observations	5022	5386	5022	5022	4934	5307
R-squared		0.091				0.079
F-stats	210.34***	48.65***	102***	134.76***	249.55***	34.01***
No. of Groups	312		312	312	312	
No. of Instruments	213		241	213	214	
AR(1)	-8.90***		-8.16***	-8.23***	-7.28***	
AR(2)	0.37		1.17	0.99	1	
Hansen	238.46*		252.88	240.16*	236.90*	

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The pre-estimation diagnostic tests suggested the use of system GMM for determining the relationship between ROA and the non-linear measure of TDA. The results of Model 1 show that there is an insignificant non-linear relationship between TDA and ROA. The relationship of ROA with firm size (measured through the natural log of net fixed assets) and age are also insignificant. The only significant relationship between ROA and control variables is that of growth. It can be argued on the basis of the results of Model 1 that there is no significant non-linear association among firm performance and capital structure.

The pre-estimation diagnostic tests suggested the use of FE model for determining the relationship between ROA and the non-linear measure of EM. The results of Model 2 show that there is a negative non-linear relationship between EM and ROA. Firm size (measured through the natural log of net fixed assets) is also negatively related to ROA, whereas, growth in total assets is positively associated with ROA. Moreover, the relationship between ROA and age (measured in number of years since the firms inception) is insignificant. It can be argued on the basis of the results of Model 2 that there is a negative non-linear association among firm performance and capital structure.

The pre-estimation diagnostic tests suggested the use of system GMM model for determining the relationship between ROE and the non-linear measure of TDA. The results of Model 3 show that there is a positive non-linear relationship between EM and ROA. Firm size (measured through the natural log of net fixed assets) and growth in total assets are also positively related to ROA, whereas, the relationship between ROA and age (measured in the number of years since the firms inception) is negative. It can be argued on the basis of the results of Model 3 that there is a positive non-linear association among firm performance and capital structure.

Model 4 shows the results of the non-linear estimation between ROE and EM. The two-step system GMM model has been used as preferred by the pre-estimation diagnostic tests. The results negate the presence of any non-linear association among. Among the control variables, age is negatively related to firm performance. Younger firms perform better than elder firms. However, growth and size are positively linked with firm performance. Larger firms outperform smaller firms.

Similarly, a firm with more growth in its assets performs better than a firm with a lower growth rate.

Model 5 presents the estimation results of the non-linear relationship between ROS and TDA. This model also uses the two-step system GMM technique as suggested by the pre-estimation diagnostic tests. The results of this model are almost similar to the results of the previous model except that age has an insignificant relationship with a firms return on sales. The results do not support the presence of any non-linear association among firm performance and capital structure. Moreover, growth and size are positively associated with firm performance. Whereas, age does not influence firm performance.

The pre-estimation diagnostic tests suggested the use of the FE model while estimating the relationship between ROS and EM. Model 6 presents the results of this estimation. The results show that the explanatory power of the model is not very strong at around 8%, however, the results support the presence of a negative non-linear association among firm performance and capital structure as supported by the Trade-off Theory. The estimation results do not support any significant relationship of firm performance with size and age, whereas, growth is positively associated with firm performance.

Table 4.29 presents the results of the estimation of the market measures of performance of the firms and their capital structure. In total six market measures of firm performance are used. The models are named from 1 to 6.

Table 4.30: Non-Linear Estimation Results for Market Measures of Firm Performance

	(1) PE	(2) PE	(3) ROSP	(4) ROSP	(5) MBV	(6) MBV
L.MBVE					.736***	.74***
					(0.027)	(0.027)
L2.MBVE					.108***	.125***
					(0.023)	(0.025)
TDA	3.375		0.021		-9.455	
	(5.853)		(0.060)		(11.555)	
TDA2	-10.23**		-0.061		5.87	
	(4.569)		(0.048)		(9.782)	
EM		1.813***		0.007		0.118
		(0.484)		(0.005)		(0.935)
EM2		-.273***		-.002**		-0.061
		(0.070)		(0.001)		(0.145)
Size	0.593	0.588	-0.001	-0.001	0.046	0.017
	(0.446)	(0.444)	(0.002)	(0.002)	(0.086)	(0.078)

GTM	2.041***	2.144***	.632***	.632***	9.629***	9.429***
	(0.261)	(0.264)	(0.007)	(0.007)	(0.557)	(0.564)
Age	0.111	.143*	0	0		
	(0.073)	(0.073)	(0.000)	(0.000)		
_cons	-2.761	-7.932*	-.065**	-.083***	1.862	-0.859
	(4.544)	(4.476)	(0.032)	(0.026)	(2.704)	(1.414)
Observations	4844	4844	4819	4819	4300	4301
R-squared	0.036	0.029	0.795	0.795		
F-stats	22.46***	20.73***	1534.92***	1550.39***	1689.99***	1951.95***
No. of Groups					311	311
No. of Instruments					233	217
AR(1)					-7.80***	-7.62***
AR(2)					1.19	0.98
Hansen					254.48*	240.52*

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1*

The results of Model 1 show the non-linear estimation of PE through TDA. The pre-estimation diagnostic indicate the use of the FE model for this estimation. The explanatory power of the model is very weak at around 4%. The results show that there is a negative non-linear association among firm performance and capital structure. These results are supported by the trade-off theory. Among the control variables, the only significant relationship is between growth and firm performance. There is a positive relationship between growth and firm performance. However, age and size are insignificantly related to firm performance.

The results of Model 2 show the non-linear estimation of PE through EM. The pre-estimation diagnostic indicate the use of the FE model for this estimation. The explanatory power of the model is very weak at around 3%. The results of Model 2 are in contradiction with the results of Model 1. The results show that there is a positive non-linear association among firm performance and capital structure. These results are in contradiction to the proposition of trade-off theory. Among the control variables, the only significant relationship is between growth and firm performance. There is a positive relationship between growth and firm performance. Even though age shows a positive association with firm performance, the relationship is significant at a weaker level. Moreover, the relationship between size and firm performance is insignificant.

The estimation technique used to find the association between ROSP and TDA is Pooled OLS as suggested by the pre-estimation diagnostic tests. The results are presented in Model 3. The results show a very good explanatory power of around 80%. The main regressor does not have any significant relationship with firm performance. The only significant relationship between firm performance and control variables is that of growth which shows a positive relationship with ROSP. The other two control variables do not have any significant relationship.

The estimation technique used to find the association between ROSP and EM is Pooled OLS as suggested by the pre-estimation diagnostic tests. The results are presented in Model 4. The results show a very good explanatory power of around 80%. EM has a negative non-linear relationship with firm performance. This result is supported by the trade-off theory. The only significant relationship between firm performance and control variables is that of growth which shows a

positive relationship with ROSP. The other two control variables do not have any significant relationship.

Model 5 shows the results of the estimation of MBVE through TDA. The results are estimated through the two-step system GMM as suggested by the pre-estimation diagnostic tests. The results show that there is no significant non-linear association among firm performance and capital structure. Among the control variables, the only significant relationship is between growth and firm performance which shows a positive association. Size does not show any significant relationship with firm performance.

Model 6 shows the results of the estimation of MBVE through EM. The results are estimated through the two-step system GMM as suggested by the pre-estimation diagnostic tests. The results show that there is no significant non-linear association among firm performance and capital structure. Among the control variables, the only significant relationship is between growth and firm performance which shows a positive association. Size does not show any significant relationship with firm performance.

The most widely accepted theory of the capital structure is the Trade-off Theory both in its static form and dynamic form (Kraus and Litzenberger, 1973). The theory states that an initial rise in leverage leads to an improvement in firm value but after an optimal point it starts affecting negatively Myers (1984). Although some studies have empirically tested the trade-off theory (Frank and Goyal, 2009; Rajan and Zingales, 1995; Titman and Wessels, 1988), the majority of studies in this area still estimate a linear association among firm performance and capital structure. There are mixed results in this area. Some support the confirmation of trade-off theory, whereas, others reject its presence. Due to these mixed results, this study also tests whether the non-financial firms of Pakistan also follow the optimal capital structure or they follow some other theory.

The results of the two-step system GMM estimation show that the non-linear capital structure measures are insignificant in all six models. Based on these results, it can be argued that the selected non-financial Pakistani listed firms do not support the trade-off theory. This can be because firms may prefer internal financing over external financing or they may be following some other patterns.

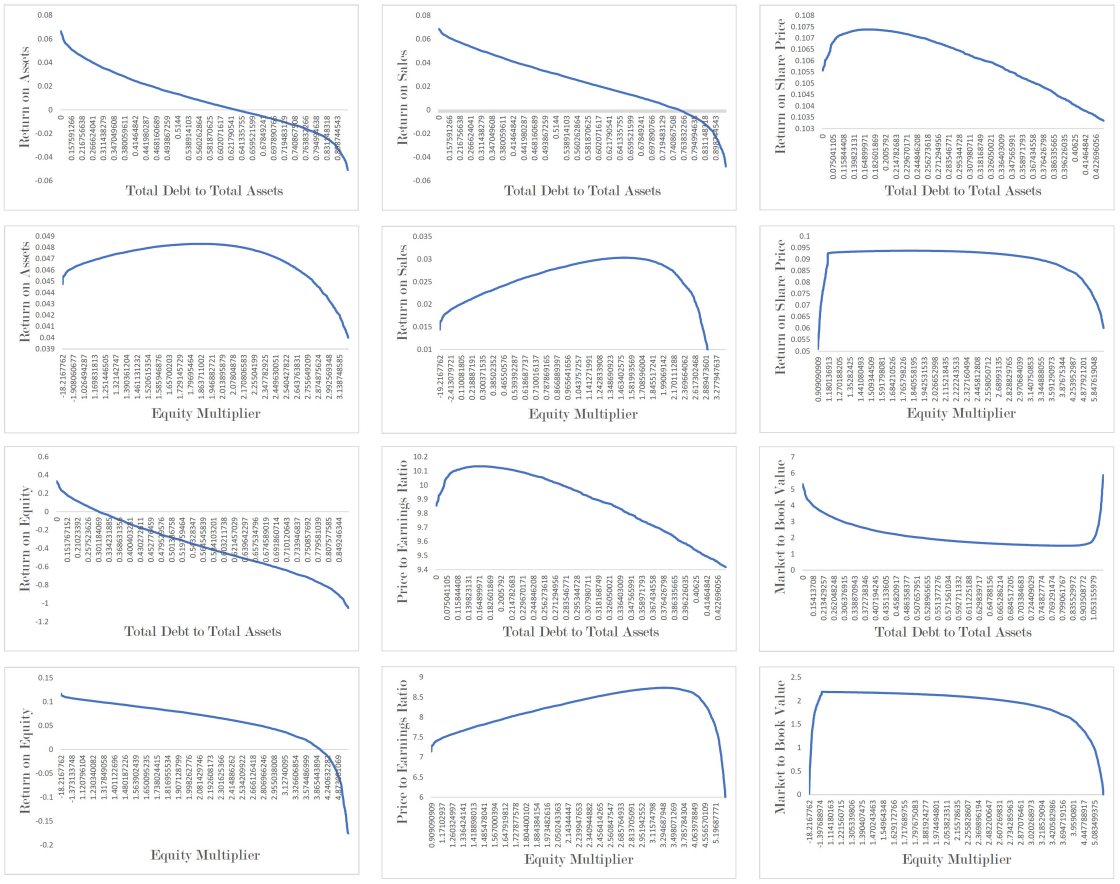

FIGURE 4.1: Non-linear Estimated Relationship between Capital Structure and Firm Performance

Figure 4.1 shows the estimated behavior of firm performance towards capital strucutre while using the non-linear regression models. Out of 12 models, the trade off theory is supported by 7 estimations, while 1 model shows reverse results and 4 models do not support trade-off theory.

4.5 Discussion of the Results

Capital structure plays a significant role in the performance of a firm. It is perhaps one of the oldest researched relationships in the area of Corporate Finance. The discussion of this relationship whether capital structure affects the firm performance or not can be traced back to Durand's Financial Leverage Approach (Durand, 1952) and Modigliani and Millers' MM Theorem (Modigliani and Miller, 1958). Initially, it was believed by the researchers that firm performance is not affected by a change in the capital structure of the firm. They argued that it does not matter whether a

firm finances its investments either through debt or equity or a mix of both. Later studies empirically contradicted these arguments where they showed that capital structure plays a significant role in firm performance. After these pioneer studies, several theories were proposed that tried to theoretically explain the relationship between capital stricture and firm performance. Most of the theories propose that there is a positive relationship between firm performance and the use of debt in capital structure. This theoretical proposition is mostly argued and supported due to the tax advantage of debt over equity. Among the theories of capital structure, the most widely accepted theory is the trade-off theory (Kraus and Litzenberger, 1973).

The beauty of the research is that when research answers some questions, it always gives rise to certain other questions. The same is the case with the studies regarding association among firm performance and capital structure. Despite such a densely researched area, the empirical results of the association between capital structure and firm performance is mixed. Therefore, there are researchers that propose that there is still a need to explore this relationship in detail so that it can be answered that why is association among firm performance and capital structure bi-directional (Ahmed and Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). To answer this question, the methodology is changed from the traditional approach based on recent studies.

The most prominent problem is that almost all the theories of capital structure support a positive relationship between firm performance and the use of debt. However, the results of the empirical studies that report either a negative relationship or an insignificant relationship outnumber the empirical studies that report a positive relationship (Dao and Ta, 2020). Thus there is a need for a study that can theoretically explain the negative association among firm performance and capital structure. There is also a need to follow an individual variable approach where the measures of firm performance need to be checked individually and then find their relationship with capital structure measures. Gentry and Shen (2010) argue that it is not necessary that the measures of firm performance as used by researchers are correlated with each other. Their results report that the different measures of firm performance are not correlated. They argue that firm performance

is a multi-dimensional construct, therefore, researchers should focus on developing separate theories for each measure as a single theory cannot have the power to explain all its aspects. Similarly, the methodology can also be strengthened by incorporating an interaction term which can help in the explanation of association among firm performance and capital structure.

For this purpose, this study has tried to incorporate these three changes in the methodology as compared to previous studies. Firstly, this study finds a relationship between the various measures of firm performance. Secondly, this study incorporates size as an interaction term that helps to explain the negative association among firm performance and capital structure. Thirdly, and perhaps most importantly, this study draws the attention of researchers to the development of a theory that explains the negative association among firm performance and capital structure to what the study suggests as a "mindset change theory".

The results of this study support the argument of Gentry and Shen (2010). The financial aspect of firm performance is not a uni-dimensional construct. The measures of firm performance as used by various researchers are not correlated. The results report that the relationship between accounting measures of firm performance have a strong correlation in Pakistani non-financial listed firms. However, the relationship between market measures of firm performance is very weak. These measures of firm performance are neither linked to each other nor to the other accounting measures of firm performance. Therefore, it is suggested that future researchers should not use these proxies interchangeably, rather they should treat them individually.

Estimation of the association between capital structure and firm performance is done through 36 models. Out of these 36 models, 12 models estimate a direct relationship between performance of the firms and their capital structure, 12 models estimate a association among firm performance and capital structure moderated by firm size, and 12 models estimate a non-linear association among firm performance and capital structure.

One of the most known puzzles in the field of Corporate Finance is the zero-leverage puzzle. It is very strange to know that certain firms have a very low level of debt in comparison with the predicted values by the theories of capital structure (Graham,

2000; Miller, 1977). Strebulaev and Yang (2013) conducted a study on the zero-leverage puzzle. Their study includes the non-financial listed firms in the US from 1962 to 2009. According to them, after 1980, the number of firms following the zero-leverage policy is growing rapidly. From 4.3% of the companies with zero leverage in their capital structure, the number has come closer to 20% after 2000. Firms with less than 5% of their assets financed through debt are considered to be almost zero-leverage (AZL). More than one-third of the firms are in the AZL category in 2009. They argue that these are not any outliers or a short-term effect rather this is their policy. The findings of their study are very startling. The performance of the firms that follow zero-leverage policy is better than the firms with debt in their capital structure. The firms following the zero-leverage policy maintain higher cash balances, their market-to-book values are higher, and they pay higher dividends and taxes as compared to the firms that have used debt along with equity to finance their investments. Graham (2000) argues that despite such rich literature that is available on association among firm performance and capital structure, there are unanswered questions. One such question is why so many firms appear to be under-levered. Researchers in the future are required to explore it. It is in contradiction with the traditional theories of capital structure to note that the firms with a very low level of debt are more stable and profitable than the firms that follow a relaxed approach in using debt in their capital structure. The results of this study report that the use of debt is negatively related with the accounting measures of firm performance in all the six models used. In the estimation of market measures of firm performance through capital structure, the results show that the use of leverage in capital structure is negatively related with firm performance in 4 out of 6 models. The relationship between the remaining 2 models is insignificant. The two hypotheses of the study regarding a direct relationship are: (a) there is negative relationship between capital structure and accounting measures of firm performance, and (b) there is a mixed relationship between capital structure and market measures of firm performance. Both these hypotheses are accepted based on the results.

The association among firm performance and capital structure needs to be explored as their relationship is not clear despite so many studies in this area (Ahmed and

Afza, 2019; Kumar et al., 2017; Li et al., 2019; Mardones and Cuneo, 2020). Almost all the theories relating to the effect of capital structure and firm performance have theoretically explained their direct relationship. However, mixed empirical results have been found. One of the suggested future directions for researchers in the literature includes exploring the roles of moderators and mediators in their relationship. This study also incorporates this suggestion and tests whether firm size moderates association among firm performance and capital structure or not. Demirg-Kunt et al. (2020) tested the changes in capital structure during the financial crisis of 2008. They argue that even in times of financial crisis, they have not witnessed any significant decrease in the debt level of large companies. On the other hand, small companies have witnessed a significant decrease in their debt level. They call the capital markets as "spare tire". According to them, large firms have easy access to capital markets and they can secure a loan easily due to their large size of fixed assets, whereas, small firms do not have easy access to the capital markets and they cannot easily secure loans due to their small size of fixed assets. These arguments also lead to the proposition that there is a association among firm performance and capital structure and the size of the firm moderates this relationship. The inclusion of firm size as a moderator has brought up some very interesting results. The interaction plays a significant negative role in four out of twelve models. The higher the firm size when combined with higher levered firms lead to lower returns as compared to small firms with lesser debts. Even if the interaction term itself is significant only in 40% of the models, it has changed the behavior of the main regressors in more than 90% of the models. Therefore, it can be argued on the basis of these findings that firm size moderates association among firm performance and capital structure . The moderating effect of size is negative indicating that the impact of capital structure on firm performance of big-size firms is more negative than that of small-size firms. These results suggest a new theory that is named as mind-set change theory to explain the negative association among firm performance and capital structure. This theory states that if firm managers finance a new project by equity only, then their objective remains to maximize the amount as well as the rate of return. However, if they have the option to finance a project by debt, then their objective changes; it becomes to

maximize the amount of return in the neglect of rate of return on the total invested amount as explained further in the text.

Various studies have investigated the capital structure policies of firms. Most of the researchers have used the terminology of "financial conservatism". These studies have tried to explore the determinants of capital structure policy. The findings of these studies are quite startling. One such study in this area is by Graham (2000). In his seminal article, he argues that the firms that use prefer equity over debt are more profitable and they have high liquidity due to lower financial distress costs. According to Strebulaev and Yang (2013), financial conservatism in its extreme form is termed as a "zero-leverage puzzle". In its extreme form, the firms following the financial conservatism policy have zero level of debt and all the investments are financed through equity. As opposed to the traditional theories of capital structure, financially conservative firms pay higher dividends, make profitable investments, and generate more profits as compared to their counterparts (Byoun and Xu, 2013; Moon et al., 2015). Yasmin and Rashid (2019) argue that almost all the theories of the capital structure suggest the use of debt to earn extra profits, however, it is empirically found that firms maintain a lower level of leverage. It was believed earlier that financial conservatism is found only in the American firms but later on it was witnessed that it is global phenomenon. Yasmin and Rashid (2018) have explored the financial conservatism policy in Pakistani firms. The number of firms following the financial conservatism policy in Pakistan has doubled in 15 years (Yasmin and Rashid, 2019). They find that smaller firms outperform big firms in accounting measures of firm performance. Small firms earn more profit, pay higher dividends, have higher cash flows, have higher cash balances, and have a lower rate of risk as compared to big firms. Although their results are similar to the findings of this study, however, their theoretical explanation is very different from this study. They argue that Pakistani non-financial firms are financially conservative because they follow the pecking order theory where they generate most of the funds internally. Whereas, by including size as an interaction term, this study finds that size plays an important role as a moderator for firms in choosing their capital structure. As big firms have more and easy access to the financial markets, especially, debt based sourcing, they care about higher absolute return even if the

rate of return is lower. On the other hand, small firms have limited access to the financial markets, therefore, their target is to generate more rate of return rather than an absolute amount of return. This defines the mindset of the management of the firms. This is the reason that small firms and firms that are financially conservative are more profitable than large and financially non-conservative firms.

Since the seminal work of Modigliani and Miller (1958), economists have stressed the relationship between capital structure decisions and firm performance. Since then, various theories have been developed discussing the association between financing decisions and the financial performance of the firms. The most widely accepted theory among them is the Trade-off Theory both in its static form and dynamic form (Kraus and Litzenberger, 1973). The theory states that an initial rise in leverage leads to an improvement in firm value but after an optimal point it starts affecting negatively (Myers, 1984). Although some studies have empirically tested the trade-off theory (Frank and Goyal, 2009; Rajan and Zingales, 1995; Titman and Wessels, 1988), the majority of studies in this area still estimate a linear association among firm performance and capital structure. There are mixed results in this area. Some support the confirmation of trade-off theory, whereas, others reject its presence. Even the scholars who confirm the traded-off theory have disagreements between themselves. The supporters of the trade-off theory believe that to adopt the optimal capital structure the firms have to change their capital structure. This adjustment is called a mean reversion. According to some studies, mean reversion is a quick process and firms do not take long to adjust according to the optimal capital structure (Flannery and Rangan, 2006). Other supporters of the trade-off theory believe that mean reversion occurs very slowly "at a snails pace" (Fama and French, 2002; Jalilvand and Harris, 1984). This study also tests whether the management of the non-financial listed Pakistani firms follows the trade-off theory or they follow some other pattern. In a total of 12 models, the trade-off theory is supported in 3 models and contradicted in 1 model. The remaining 8 models negate either the support or contradiction of trade-off theory. Following table summarizes the results of the hypotheses tested.

TABLE 4.31: Summary of Hypotheses

No.	Hypothesis	Decision
H_1	Measures of firm performance are not correlated	Market measures and accounting measures should not be used inter-changeably. Market measures must not be used even intra-changeably. ROA may be used intra-changeably with ROE and ROS. However, intra-changeable use of ROE and ROS is not recommended as they are correlated only moderately.
H_2	Leverage has a negative impact on firm performance.	TDA and EM are negatively related with all three accounting measures of firm performance. TDA is negatively related to market measures of firm performance, whereas, EM is negatively to MBV while its relationship with PE and ROSP is not significant.
H_3	Firm size negatively moderates the association among the firm performance and capital structure.	Firm size negatively moderates the relationship between TDA-ROS, TDA-ROSP, TDA-MBVE. Firm size positively moderates the relationship between EM-ROSP. Firm size has no significant moderation effect among other relationships between CS and FP measures.
H_4	There is a negative non-linear impact of capital structure on firm performance.	EM has a negative non-linear relationship with ROA, ROS, PE and ROSP. Similarly, TDA also has a negative non-linear relationship with PE, while positive non-linear relationship with ROE. No other significant non-linear relationship is found between CS measures and FP measures.

Chapter 5

Conclusion and Recommendations

5.1 Conclusion

Investments are financed by equity, debt or a mix of both. Research has shown that firm performance is affected by financing decisions, which makes it one of the main areas of concern for management. It can, therefore, be argued that capital structure is the main strategic concern that has ever been central in Corporate Finance. The most widely accepted corporate objective function is the maximization of firm value. As firm value is dependent upon financing decisions, capital structure plays a significant role in a firms success.

Numerous studies in the literature discuss association among firm performance and capital structure. Their empirical evidence shows mixed results. Contrary to the theoretical explanations for their positive relationship, hardly any theory discusses their negative relationship despite its empirical evidence. These studies may be improved by studying the measures of firm performance separately and by studying the moderating roles of other variables. This study is one such attempt to incorporate both of them. This study uses firm size as a moderator of association among firm performance and capital structure. NPV is considered to be the best capital budgeting technique. Despite its wide acceptance, some researchers have critically evaluated NPV and have identified several flaws in it. One of the major

flaws is that NPV is biased towards bigger-sized projects as it focuses on absolute return instead of the rate of return. The other reason to select the firm size as a moderator is that big firms have more and easy access to debt as compared to small firms. The capital market acts as a "spare tire" for big firms even in times of financial crisis. Based on these arguments, firm size is used as a moderator to association among firm performance and capital structure.

This study has a fourfold contribution. Firstly, most of the theories of capital structure explain its positive impact on firm performance, whereas, none of these theories explain the negative impact of capital structure on firm performance. This study argues empirically and logically that there is a need for a new theoretical proposition that can address the negative association among firm performance and capital structure. Secondly, most of the studies in the literature have used a combination of different measures as proxies for firm performance. This study classifies firm performance into market measures and book measures because firm performance is not a uni-dimensional construct. Thirdly, to the best of my knowledge, there is only one study that has used size as a moderator to association among firm performance and capital structure, but they have not provided any logical argument for using firm size as a moderator. This is the first study to use size as a moderator between capital structure and firm performance with logical reasoning. Fourthly, This study explores the non-linear impact of capital structure on the performance of non-financial firms in Pakistan to test whether they follow the optimal capital structure or not.

This study uses a sample of 285 non-financial listed firms on PSX from 1999 to 2019. Data earlier than 1999 were not available on open sources to the best of my knowledge and data after 2019 is not used because of the fluctuations in the stock markets due to the COVI-19 outbreak that may have led to inefficient results. Two measures are used as proxies of capital structure, i.e., return on assets and equity multiplier. The measures of firm performance have been classified into two categories, i.e., accounting measures of firm performance and market measures of firm performance. Moreover, size, growth, and age are used as control variables and firm size is also used as a moderator in association among firm performance and capital structure. The required diagnostic tests are conducted to identify the

problems in the data and to choose the preferred estimations techniques. 36 models are estimated in total, 12 each for a direct relationship between capital structure, size as a moderator to their relationship, and non-linear relationship between them.

The results show that the measures of firm performance are not correlated, therefore, there is a need to study these measures separately. There is a moderate to strong correlation between the accounting measures of firm performance but there is a very weak correlation between the market measures of firm performance. These measures cannot be interchangeably used and they should be studied separately. Therefore, separate theories should be developed for these measures as a single theory cannot explain them collectively. The discussion section also argues logically that the preferred measure of firm performance should be ROA instead of other measures. Before the start of the study, it was expected that there will be a negative association among accounting measures of firm performance and capital structure, and a positive association among market measures of firm performance and capital structure. However, the results show that there is a negative association among capital structure and almost all the measures of firm performance. The number of studies showing a negative association among firm performance and capital structure exceeds the number of studies showing a positive relationship between them yet hardly any theory has been developed to explain this effect. This study identifies a need for one such explanation. One of the possible explanations may be that it is easier for big firms to secure loans as compared to small firms due to their large size of fixed assets. Therefore, the managers of large firms focus on increasing the absolute amount of return even if the rate of return is lower. Contrarily, managers of small firms try to maximize the rate of return instead of the absolute amount of return due to limited access to capital markets. This can be referred to as a "mindset change theory" (Islam and Iqbal, 2022). This explanation is also supported by the empirical results of this study. Size, when used as a moderator to association among firm performance and capital structure, changed the results of their relationship in 11 out of 12 models. It can, therefore, be argued from these results that the mindset of the managers of large firms is to increase the absolute amount of returns even if the rate of return is lower comparatively. Among 12 models of the non-linear estimations, five models support the choice

of optimal capital structure by the selected non-financial firms listed on PSX as proposed by the trade-off theory.

Empirical results are quite revealing. The results of correlation analysis show only a weak correlation between accounting and market measures. It means that market and accounting measures must not be used interchangeably or arbitrarily. In other words, it goes against the claim of shareholder theory that maximization of market measures is pro-stakeholder.

5.2 Policy Implications

According to some researchers, market metrics of firm performance are based on future expectations, whereas, accounting metrics of firm performance are based on previous performance. The findings of this study have broader implications both for non-financial firms and policymakers. The implications are suggested only for Pakistan as the results cannot be generalized to other countries without investigation. It is helpful for the management to think about whether an adjustment in the capital structure improves only the market expectations or does it change the real performance of the firm. The non-financial firms in Pakistan should realize that firm performance only deteriorates with an increase in debt level. Even if the absolute amount of return is high, the rate of return will still be low which means that big firms are not utilizing their funds efficiently. Policymakers may encourage equity financing while debt financing may be discouraged to improve the rate of returns at an aggregate level in the economy. On the basis of the findings of this study it is, recommended that firms should prefer equity financing over debt financing. Moreover, the measures of firm performance are not correlated, therefore, these measures should be studied separately instead of using them interchangeably.

5.3 Limitations of the Study

This study attempted to explore association among firm performance and capital structure with the moderating roles of firm size by using comprehensive measures.

However, this study still has certain limitations that may be considered by future studies whose detail is given in section 5.3.

1. This study has used the data of only non-financial firms listed on the Pakistan Stock Exchange. Therefore, the results of this study may not be generalized to the financial sector of Pakistan.

2. The number of observations has been reduced to the nonavailability of certain firm-year observations data whose detail is provided in section 3.1.

3. Data were gathered from 1999 to 2019 for 21 years. Data were not available before 1999 and data after 2019 were not used due to the COVID-19 pandemic which could distort the results.

5.4 Recommendations for Future Studies

A single study cannot incorporate every detail and aspect of the area of study. There always remains room for improvement in every research. This study also has some suggestions based on its limitations that may be incorporated by future studies in this area. These recommendations are highlighted as follows.

a A pre and post-economic crisis 2008 analyses can be separated and compared as they may provide different results than the current study that may be useful for the stakeholders.

b Future studies may also use interest rate levels (including both positive and negative interest rates) and other factors to explain the differences in absolute amount of leverage instead of using ratios that could eventually have an impact on companies financial decisions for different time periods, i.e., before and after the "subprime" crisis in 2008.

c A granger causality test might be conducted to check whether capital structure behaves only as an explanatory variable of firm performance or if they have a cause and effect relationship.

d A cross-country study may also be conducted to check whether the negative association among the accounting metrics of firm performance and capital structure as found in this study is consistent in both developed and developing economies.

e Islam prohibits the use of loans on interest (Riba). One of the possible reasons as explained by many Islamic Scholars is that interest is prohibited in Islam as it harms the overall society. This study also supports the said argument up to a certain extent that return on assets has an inverse association with firm performance. Therefore, the focus of this thesis may also be extended to Islamic Finance.

f There is a large body of literature available on negative association among firm performance and capital structure. A meta-analysis of these negative studies may also be conducted with their rational explanations for such behavior.

g Other variables may be used as moderating variables instead of firm size. Some more measures of capital structure and firm performance may be used for robustness.

h Other proxies of firm size may also be used as moderators such as natural log of total sales.

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