Impact of Capital Structure, Corporate Governance, Macroeconomic Factor on Financial Distress of Shariah Compliant Firms in Pakistan

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Abstract

Purpose:

Capital structure choice, corporate governance practices and the economic condition of the country are some of those factors that may influence the firm's financial health. This study evaluates the effect of capital structure, corporate governance, and macroeconomic factors on firm financial distress of Shariah compliant firms in Pakistan.

Design:

This empirical analysis contains 238 listed Shariah non-financial firms of Pakistan during the period of 2015 to 2022.

Findings:

The study finds a negative linkage between capital structure, macroeconomic factor and firm financial distress of Shariah compliant firms. The corporate governance index is positively correlated with the firm's financial distress.

Conclusion and Implications:

The outcomes of this study have practical implications for managers, investors, authorities, and researchers. Managers should be aware of debt financing and governance practices because it is one of the major causes of firm financial distress. Managers should also embrace the financial position and governance structure as their top agenda because financial position and governance quality helps to establish good relationships with various stakeholders which helps to facilitate a firm's access to alternative sources of finance and decrease the firm usage of debts, hence reducing the probability of firm financial distress. Investors should consider their financial position when making investment decisions because a strong financial position decreases default risk which serves as potential protection for investments.

Keywords: Capital structure; corporate governance; shariah compliant; financial distress.

JEL Classification: G32, G33, G34

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1.   Introduction

A state of "Financial distress" arises when a firm faces difficulty in paying its financial obligations (Khoja et al., 2019; Rafatnia et al., 2020). The start of the liquidation process, the implementation of limiting strategies, or the reorganization of a distressed firm is considered the beginning of its corporate death by the pioneers of the financial distress estimation models (Altman et al., 2015; Beaver et al., 2011). Firm financial distress may stagnate the growth of business organizations and, in turn, the economy (Altman et al., 2015). According to Khoja et al. (2019), and Rafatnia et al. (2020), financial distress occurs for several reasons, including increasing fixed cost expenses, fewer liquid assets, poor financing decisions and unpredictable s or vulnerable revenues due to economic instability. A company reaches the financial distress stage when creditors' claims are not resolved well in time as per commitment (Farooq et al., 2018; Habib et al., 2020).

Rapid economic shifts, including capital market collapses, political uncertainty, and law and order challenges, are significant macroeconomic variables that can drive firms into financial distress. The PSX shows severe stock exchange crises in 2008, 2012, 2014, and 2017, triggered by global financial upheavals and domestic political instability. The inherent volatility of the Pakistani equity market exacerbates investment uncertainty (Ghufran et al., 2016). Considering this economic instability, accurately forecasting financial distress becomes essential for providing firms with early warning signals.

There are limited studies examining the correlation between capital structure and firm financial distress in developing markets. Variations in market structures, legal standards, and accounting practices pose challenges for applying economic forecast models from developed countries to emerging markets (Zulkarnain & Shamsher, 2004). The connection concerning financial distress and capital structure generally aligns with the trade-off theory. According to Myers (1977) trade-off theory, firms should aim to establish an optimal capital structure. While leveraging debt provides tax benefits, excessive debt enhances the risk of financial distress. Therefore, a firm striving to maximize its value must find a balance between equity and debt that optimally weighs the advantages and disadvantages of debt.

The existing literature on probability of bankruptcy and its theoretical foundations is somewhat ambiguous. Thus, it is essential to identify the factors influencing financial distress based on their prominence in past research. Adnan Aziz and Dar (2006) conducted an empirical analysis of 98 financial distresses, highlighting the significance of financial ratios, such as profitability ratio, liquidity ratio, firm leverage ratio, and cash flow ratios, in forecasting bankruptcy. According to the research work of Shumway (2001), expand on this by incorporating market factors, including size of firm, volatility, and the who the standard deviation of previous returns, demonstrating their relevance in forecasting the likelihood of default. Despite the crucial role of economic uncertainty in anticipating probability of default, earlier studies in Pakistan, such as those by Ijaz et al. (2013)

and Rashid and Abbas (2011), overlooked this factor in their analyses of Pakistani firms.

Shariah-compliant companies are anticipated to have a lower debt-to-equity ratio by default (Yildirim et al., 2018). Shariah-compliant businesses are unexpected to benefit as much from the debt tax shield as their non-compliant counterparts because of this restriction enforced on them (Ur Rehman et al., 2022; Yildirim et al., 2018). The study anticipated that enterprises that adhere to Shariah would perform differently when financing through debt. Researchers establish that: 'when a firm borrows more, they may likely go into financial distress' (Waqas & Md-Rus, 2018).

Keeping in view this gap, the purpose of current study is to evaluate the relationship between capital structure, corporate governance and macroeconomic factors along with firm-specific factors to forecast financial distress among Pakistani Shariah compliant firms. This research will provide corporate managers and other stakeholders with a better understanding of the impact of internal and external factors on financial distress, thereby enhancing their decision-making processes.

2.   Literature Review

The study of bankruptcy prediction has its origins in the 1930s, with early research focusing on use of ratio analysis to forecast business failure. Until the mid-1960s, the emphasis was predominantly on univariate analysis, which involved examining single factors or ratios (Bellovary et al., 2007). Various definitions of financial distress have been employed in the literature, utilizing financial ratio analysis to calculate changes in accounting ratios, stock returns, or using Z-score models advanced by Altman (1968) to predict corporate bankruptcy. In these models, firms with inverse Z-scores are deemed at risk of bankruptcy. Altman (1968) pioneering multivariate study remains influential and widely used in contemporary research.

The company's capital structure impacts the firm's financial commitments and may fall into a financial distress state. Businesses decide on their debt level in a market without friction by assessing the cost and benefits of additional debt (Myers, 1984). When companies find debt financing offers more favorable outcomes, they change their capital structures by lowering the equity capital proportion or issuing additional debt. Myers (1984) trade-off theory proposed that tax shields reduce the interest paid on debts; hence, higher taxes increase the benefits of debt financing. Since the amount of total outstanding debt usually causes default, businesses should be aware that raising their debt ratio may likely increase their likelihood of financial distress (Abdioğlu, 2019; Collin-Dufresne & Goldstein, 2001). Therefore, businesses must balance the benefits of debt financing through tax shield with the anticipated consequences of financial distress (Kim, 1978).

Previous research, such as that by Turaboglu et al. (2017), has analyzed the relationship between firm probability of default and financial structure choice among firms in the Borsa Istanbul 100 (BIST 100). Using the Altman Z-score and Springate S-score to evaluate the probability of default, they found an inverse correlation between firm probability of default variables and financial structure variables. Specifically, an enhancement in the debt ratio leads to higher financial distress, which results in a lower financial failure score. Additionally, they observed that larger firm size and higher fixed asset ratios are associated with increased financial failure scores. Similarly, (Akpinar, 2017) investigated the variables influencing firm probability of default risk in Turkish manufacturing companies listed on Borsa Istanbul from 2010 to 2014. Their study concluded that firm leverage ratio, firm size, and dividend payments enhance firm probability of default risk (i.e., reduce the Z score), whereas profitability, firm age, firm value, and intellectual capital have a negative effect on firm probability of default risk.

Extensive empirical literature has examined the impact of governance mechanisms on the likelihood of financial distress since the 1980s. Bad corporate governance can enable management to engage in self-serving behavior or allow shareholders to prioritize their interests over those of minority shareholders, leading to financial distress (La Porta et al., 2000). Agency theory advocates for the prevalence of independent directors in the board mechanism to ensure effective management control and mitigate financial distress risks. Manzaneque et al. (2016), between 2007 and 2012, researchers examined how corporate governance procedures affected the probability of a company financial crisis in Spanish-listed companies. The research indicates that features of corporate governance, such as board member shareholdings, the number of independent directors, and board size, reduce the probability of financial default. However, a corporation's possibility of financial distress is unaffected by block holders, institutional ownership, ownership concentration, or CEO duality.

Farooq et al. (2020) evaluated the impact of corporate governance index on the financial performance of non-financial Pakistan Stock Exchange firms from 2010 to 2018. The Altman Z-score calcifies bankruptcy risk, whereas the corporate governance index measures financial distress. They demonstrate that corporate governance adversely correlates with the probability of firm default in non-financial businesses (manufacturing firms). Another proxy for corporate governance is CEO duality. For instance, Jensen (1993) notes that although it is common for American corporations to have the same individual serve as CEO and chairperson of the board (CEO duality), these two roles should be different. Otherwise, conflicts of interest could develop due to CEOs acting in their best interests when performing the duties of a chairman, which include, among other things, presiding over board meetings and managing the hiring, assessing, rewarding, and removing of the CEO. Klein (2002) argued that separating the abovementioned functions helps the board's monitoring function.

Macroeconomic variables affect a company's sustainability; these external factors are typically beyond the sector's control (Bachmann et al., 2013; Inekwe et al., 2018). The interest

rate, inflation, and GDP are the key macroeconomic variables that contribute to the outcome of financial performance. GDP provides a measure of overall economic performance, and any decrease in GDP leads to downturns and other financial crises (Chiaramonte & Casu, 2017; Mensah, 1984). Liu (2009) evaluated the association between macroeconomic conditions and company default in the United Kingdom and determined that monetary policy shocks and macroeconomic conditions had a substantial effect. Harada and Kageyama (2011) analyzed the macroeconomic component of Japan's bankruptcy seeing many macroeconomic and financial variables.

Theoretically, growth in total output (GDP) is expected to have the opposite impact on financial distress. Thus, we predict an inverse relationship between total production and financial distress (Altman, 1983). During recessions, businesses typically see a decline in demand, a fall in sales income, and a rise in unsold inventory. Their profit margin consistently decreases throughout recessions due to fixed and certain unavoidable costs, resulting in financial distress. Consequently, financial distress is anticipated to increase with a decline in GDP, and we might expect a negative association.

3.   Methodology

The sample under investigation consists of non-financial listed firms from Pakistan extending a decade (2015-2022). The selection of time is specifically justified by the launch of the All-Share Index by the Pakistan Stock Exchange (PSX). The index marked the formal recognition and tracking of Shariah-compliant companies in Pakistan, providing a reliable benchmark for analyzing their compliance with Islamic laws. The chosen period captures the complete trajectory of selected firms since the index's inception, allowing for a comprehensive evaluation of their behavior under varying macroeconomic conditions. The sample will comprise non-financial sector of the Pakistan Stock Exchange (PSX). Data were collected from each sample's financial statements, including the r most recent eight years of operations between 2015 and 2022 of 238 Shariah- compliant listed companies. Data from 2015 to 2022 was utilized to construct ratios. This study relies mainly on secondary data from Thomson Reuters Eikon[1], the financial statement analysis reported by the State Bank of Pakistan (SBP)[2], which is considered highly credible, and the Thomson Reuters DataStream[3] for firm-specific data. Macroeconomic information was taken from the World Development Indicator (WDI).

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[1] Thomson Reuters Eikon is a study database that provides financial professionals with access to market data, financial news, basic data, statistics, trading, and communication tools.

[2] The State Bank of Pakistan focuses its financial statement analysis on secondary data gathered from accessible yearly audited financial statements of non-financial enterprises listed on the Pakistan Stock market.

[3] Thomson Reuters DataStream is a research database that provides historical financial information on a variety of financial assets.

The method used to choose the sample size is consistent with the methodologies employed in other studies (Yildirim et al., 2018; Waqas & Md-Rus, 2018; Farooq et al., 2018; Rafatnia et al., 2020; Dawood et al., 2023). There has also been a prior study of capital structure and corporate governance. For instance, Girerd-Potin et al. (2011) utilized data from 322 European firms covering the periods 1999 to 2007; Jiraporn et al. (2012) from 1992 to 2004 used data from 1,264 firms; Bouslah et al. (2018) 204 firms considering the periods 1991-2012; Metcalf et al. (2016) utilized data from 105 firms covering the periods 2002-2007. Similar data are obtained from emerging countries like Pakistan in this study.

The following are the selection criteria for the data sample:
1.   The period between the years 2015 and 2022
Compared to previous empirical research, this time frame must be deemed sufficient.
2.   Non-financial corporations
Financial institutions often must comply with strict regulatory financial standards, and the results would be biased. Moreover, the financial institutions in these sample countries would not comply with Sharia law.
3.   Companies need to maintain financial data for at least three years
This dissertation utilizes at least three yearly observations in sequence. Companies with less than three years of financial information are eliminated.

3.1   *Motivation for the Selection Procedure*

This section describes our methodology for identifying Sharia-compliant companies and their non-compliant peers. This study examines the economic challenges faced by Sharia-compliant and non-compliant enterprises. The respective firms' history (tracking list) is necessary for such an analysis. However, the SC list exists only for the "current" market, i.e., the last All Shariah Share Index screening update. The list is dynamically changing due to the All Share Shariah Index screening procedure applied regularly (Waris et al., 2018).

3.2   *Measurement and Justification of Variables*

The prediction of financial distress has been a focal point of research for over four decades, spearheaded by Beaver (1966) and Altman (1968), who developed accounting-based models to assess corporate defaults using financial statement data. Altman's Z-Score model, as refined by Lin et al. (2016), remains a cornerstone in evaluating default probability, with higher scores denoting reduced bankruptcy risk. Its enduring applicability is demonstrated in studies by Awartani et al. (2016), Charalambakis and Garrett (2016), and García and Herrero (2021). Consequently, this research employs the Altman Z-Score as a proxy for probability of default, evaluated as:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.0X_5 \longrightarrow \quad (1)$$

Where X1 to X5 represent working capital to total assets, retained earnings to total assets, EBIT to total assets, equity market value to total liabilities market value, and sales to total assets, respectively.

Capital structure, a critical determinant of default risk, is commonly assessed through book and market debt ratios. Myers (1977) highlights the reliability of the book debt ratio in reflecting a firm's current value, while Graham (2000) emphasizes the dynamic nature of market-based assessments. This study adopts the book debt ratio, calculated as total debt divided by total assets, due to its alignment with the trade-off theory. Higher debt ratios are hypothesized to increase default likelihood, consistent with previous findings (Matemilola et al., 2018; Yildirim et al., 2018).

Governance structure, a multifaceted construct, necessitates comprehensive evaluation through indices that capture its multidimensional nature (Aggarwal et al., 2009; Bebchuk et al., 2009). Following Liao et al. (2015), this study utilizes principal component analysis (PCA)[4] to construct a governance index, consolidating individual governance dimensions into a single metric. The researcher examines the relationship between macroeconomic conditions and financial distress by analyzing fundamental macroeconomic factors. The macroeconomic elements are expected to influence the general market conditions in which businesses operate. We hypothesize an empirical relationship between firms' financial distress and macroeconomic factors. Theoretically, growth in total output (GDP) is anticipated to have the opposite effect on financial distress. Thus, we predict an inverse relationship between total production and financial distress (Altman, 1983). During recessions, businesses typically experience a decline in demand, a decrease in sales income, and an increase in unsold inventory. Their profit margin consistently decreases throughout recessions due to fixed and certain unavoidable costs, resulting in financial distress.

The factors considered for the study are those already established in the literature and may impact the firm-specific factor affecting the capital structure and corporate governance structure. Country-specific factors like tax laws, legal systems, and financial institutions affect businesses' capital structure governance framework (Fan et al., 2012). As a result, this study incorporates factors frequently found in the literature into the model (Alves et al., 2015; Fan et al., 2012;

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[4] The principal component analysis (PCA) methodology is a variable reduction procedure where each principal component is linear collection of all the observed variables with the successive levels of their respective variances. These principal components are not correlated and are equal to the number of observed variables being analyzed, which helps avoid the problem of multicollinearity. The first component extracted in a PCA accounts for the highest percentage of the variance in the observed variables.

Handoo & Sharma, 2014; Matemilola et al., 2018; Öztekin, 2015; Waqas & Md-Rus, 2018). These include size, fixed assets, profitability, potential growth and non-debt tax shield. These variables were discussed in the following subsections.

Table 1
Description of Variable

Symbol	Variable	Definition	Source of Data
FD	Financial Distress	Altman-Z Score is computed using the Altman default risk model (Altman, 1968).	World scope
CS	Capital Structure	Book value of total debt over book value of total assets	Thomson DataStream
GOV	Corporate Governance	Corporate governance index	
BIND		(1) Board independence, which is the percentage of independent directors on the board or the number of independent directors sitting on the board divided by the total number of directors on the board	Firm annual report
DUALITY		(2) CEO duality, where the dummy variable equals one if there is a separation between the roles of CEO and chairperson of the board, and otherwise zero	Firm annual report
B SIZE		(3) Board size, where the dummy variable equals one if the board size is less than the median size of the board of the sample and otherwise zero	Firm annual report
BHOWN		(4) Blockholders' ownership, which is the percentage of shares owned by blockholders whose ownership is over 5% of a firm's equity	Firm annual report
INOWN		(5) Institutional ownership, which is the percentage of shares owned by the largest institutional owner	Firm annual report
MF	Macroeconomic Factors		
GDP	Gross Domestic Product	the growth rate of real GDP	IFS by IMF
CV	Control Variables		
SIZE	Firm Size	Total assets (Log)	Thomson DataStream
FA	Fixed Assets	Fixed Assets/Tangibility is calculated by the sum of Property, Plant, and Equipment (PPE) [Net] and divided by Total Assets (TA)	Thomson DataStream

To be continued…

Symbol	Variable	Definition	Source of Data
PROF	Profitability	Profitability is calculated by earnings before interest, tax, depreciation, and amortization (EBITDA) divided by Total assets (TA)	Thomson DataStream
GO	Growth opportunity	Growth opportunity is calculated as the sum of the market value of equities and total debts divided by total assets in the book.	Thomson DataStream
NDTS	Non-debt tax shield	Non-debt tax shield calculated by division of depreciation and total assets (TA)	Thomson DataStream

3.3   Model Specification

The study employs the Generalized Panel Moments of Method (GMM) estimating method to account for omitted variables, measurement errors, and reverse causality. This GMM technique is commonly applied to dynamic models where the data set includes short T time series and large N cross-sectional observations. The firm-fixed effects across the firms must account for time-invariant and observable variations. Ordinary Least Square (OLS) coefficients are biased to determine the parameters in a dynamic model that contains a lagged dependent variable and firm-specific effects. If the coefficient of the lagged dependent variable is skewed, then the coefficients of the other variables may also be suspect (Flannery & Hankins, 2013). Additionally, an instrumental variable estimator should be considered where there are endogenous issues with some explanatory variables and firm-specific effects to resolve these problems. Due to its ability to resolve endogeneity difficulties with explanatory variables, the GMM is the proper technique (Blundell & Bond, 1998; Matemilola et al., 2018). Furthermore, Arellano and Bond (1991) dynamic panel models propose a model that uses all linear moment restrictions to improve the estimation of the parameters, so all predictor variables in the model, except from the lagged dependent variable, are assumed to be exogenous. However, some explanatory variables may instead be acted as endogenous based on theory. The Arellano and Bond (1991) model suggests converting the model to a first difference setting, where the lagged variables serve as instruments for the endogenous difference. Next, sequential moment conditions are utilized, and GMM is used to estimate the parameters (Bun & Windmeijer, 2010).

To ensure the reliability and validity of the Generalized Method of Moments (GMM) estimators, we will conduct two specific tests: the Sargan test for over-identifying restrictions and a test for serial correlation in the disturbances. These tests are recommended by Arellano and Bond (1991) to verify the appropriateness of the GMM model. The Sargan test evaluates the overall validity of the instruments by analyzing whether the moment conditions used in the estimation process hold. The null hypothesis is that the instruments are independent of the error terms; failing to reject this null hypothesis indicates that the instruments are valid, and the model

is accurately specified. The second test assesses the adequacy of the estimator by examining the serial correlation of the error terms. The null hypothesis here is that there is no serial correlation. The Arellano and Bond GMM procedure evaluates first-order serial correlation (AR1) and second-order serial correlation (AR2). The anticipated outcome is to reject the null hypothesis of no first-order serial correlation (AR1) while failing to reject the null hypothesis of no second-order serial correlation (AR2). This outcome would indicate that the model is well-specified and does not suffer from serial correlation issues. Several researchers (Bouslah et al., 2018; Matemilola et al., 2018; Yildirim et al., 2018) have utilized the GMM method in studies of capital structure and corporate governance concerning default risk. Given that financial distress can affect capital structure and vice versa, the system GMM is preferred to address endogeneity and reverse causation issues.

The equation for model specification is written as follows:

$$FD_{it} = \lambda FD_{it-1} + \beta_1 CS_{it} + \beta_2 CG_{it} + \beta_3 MF_{it} + \beta_4 CV_{it} + \mu_{it} \longrightarrow \qquad (2)$$

Where:

FD $\quad$ =is the Financial Distress (Altman Z Score),

CS_{it} $\quad$ = is a measure of Capital Structure (Debt/Equity Ratio) for the firm I in period t,

CG_{it} $\quad$ = is a measure of Governance Index (Board Independence, CEO Duality, Board Size, Blockholder, Institutional Ownership) for the company i in period t,

MF_{it} $\quad$ = is a evaluate of Macroeconomic Factors (GDP growth rate) for the company I in period t,

CV_{it} $\quad$ = is a set of Control Variables (Size, Fixed Assets, Profitability, Growth Opportunity, and Non-Debt tax shield) for the company I in period t,

α_t $\quad$ = Year fixed effects

λ_i $\quad$ = adjustment parameter

μ $\quad$ = Error term

If the Generalized Method of Moments (GMM) approach was used, the number of instruments and the number of groups are key indicators to assess the validity of the model. The output of the GMM model reports that the number of instruments used was 41. This is a crucial consideration, as too many instruments relative to the number of groups can overfit the model and weaken the Hansen or Sargan test results. Similarly, the number of groups in the dataset was 50, as indicated in the estimation output. The groups typically represent the individual entities (e.g., firms) included in the panel dataset. It is essential to ensure that the number of instruments does not exceed the number of groups to maintain the robustness of the results. Overfitting with excessive instruments can lead to biased test statistics and invalidate model assumptions.

The theoretical framework underpinning the development of this model is rooted in the trade-off theory and agency theory, integrated within the principles of Islamic finance. Agency theory explains the potential conflicts between shareholders and managers, emphasizing the influence of governance framework in mitigating financial distress by aligning management decisions with shareholder interests. The trade-off theory equivalate the balance of tax benefits

of debt and the costs of financial distress, highlighting the capital structure's influence on firm performance. Islamic finance principles prohibit excessive leverage, interest-based transactions, and speculative activities, fostering a unique operational environment for Shariah-compliant firms. The model incorporates these theoretical foundations to analyze the interaction between corporate governance, capital structure, and financial distress while accounting for the constraints and ethical considerations specific to Shariah-compliance. This comprehensive framework provides a robust foundation for understanding the financial dynamics of Shariah-compliant companies.

The significant influence of the COVID-19 pandemic on financial distress during the 2020–2022 period is accounted for by including a pandemic dummy variable i in the model. The variable is coded as 1 for observations corresponding to years 2020-2022 and 0 otherwise. Furthermore, year fixed effects are incorporated into the model to control for time specific shocks, such as the impact of pandemic, ensuring that the results are not biased by external factors. Lastly, separate robustness checks are conducted by excluding pandemic years to compare results with or without pandemic influence. This helps to validate whether the findings are consistent across different sub-samples.

4.   Empirical Results

Table 2 presents the mean, minimum, maximum, and standard deviation of all firms in the sample. Shariah-compliant firm shows that the mean value of a firm's financial distress is 3.15, with the minimum and maximum ranges from -6.35 to 26.26. The results show that the sampled firms fall between those in distress and those in safe positions because, based on Altman's model, firms whose z-score is below 1.81 are classified as distressed firms, while those whose calculated z-score is larger than 2.99 are classified as safe. A firm's minimum capital structure value is 0.009, while the maximum is 23.15. This minimum and maximum range indicates that firms patronize debt markets to finance their activities. Also, the average value of the debt ratio (a proxy for capital structure) is 0.70, indicating that most firms utilize debt financing, resulting in a high debt ratio. CGI means the value for total firms is 0.01. Also, the minimum and maximum values of CGI lie between -3.31 to 3.74. Furthermore, the mean value of GDP is 4.22, which reflects that a high GDP is less inclined towards a firm's financial distress. The disparity between the minimum and maximum value of GDP is -1.3 and 6.6, reflecting Pakistan's huge difference in GDP. The mean value of fixed assets for a Shariah-compliant firm is 0.46, and the minimum and maximum value is 0.00 to 0.23. Firms with more valuable fixed assets enjoy more collateral value and are less likely to default. the mean value of Shariah-compliant firms is 0.110 with the minimum and maximum range of -3.19 to 1.13. The mean value is 1.33, whereas the minimum and maximum range is 0.13 to 12.60.

Table 2
Descriptive Statistics

Variable	Mean	Overall Std. Dev.	Min	Max
FD	3.158	3.46	-6.35	26.16
CS	0.516	0.30	0.02	4.13
CGI	0.070	0.97	-3.31	3.74
GDP	4.22	2.46	-1.3	6.6
Size	9.81	0.78	6.66	12.10
FA	0.46	0.23	0.00	1.36
Prof	0.110	0.14	-3.19	1.13
GO	1.33	1.24	0.13	12.60
NDTS	0.029	0.02	-0.13	0.35
Obs.	1904	1904	1904	1904

Note: Refer to Table 2 for symbols and definitions of variables.
This Table presents the measurement standards of variables, means, standard deviation, minimum, and maximum values for the panel data set of 345 total firms in the sample for the period 2015 to 2022. The total 345 samples were considered as selected list of sample size from the Pakistan Stock Exchange (PSX).

Table 3, shows that the measurement of the Kaiser-Meyer-Olkin (KMO) is (0.825), indicating suitability of the data for factor analysis. Values above 0.8 are considered excellent. Similarly, Bartlett's Test of Sphericity is significant ($p < 0.001$), confirming that correlations between variables are sufficient for PCA.

Table 3
KMO and Bartlett's Test of Sphericity

Component	Eigenvalue
Kaiser-Meyer-Olkin (KMO)	0825
Bartlett's Test of Sphericity (p-value)	0.001

In table 4, the components explain approximately 59% of the total variance, which is satisfactory in social sciences. Component 1 has the highest eigenvalue (3.765), capturing the largest proportion of variance.

Table 4
Total variance explained

Component	Eigenvalue	% of variance	Cumulative %
1	3.765	37.65	37.65
2	2.142	21.42	59.07
3	1.012	10.12	69.19
4	0.835	8.35	77.54

4.1   *Correlation Matrix*

Table 5 shows the correlation matrix between the variables for Shariah-compliant firms. The results revealed positive correlations of corporate governance index (CGI), gross domestic product (GDP), size, (Size), growth opportunity (GO), profitability (Prof), and non-debt tax shield (NDTS) with financial distress (FD) of shariah -compliant companies. In contrast, this study found negative correlations between capital structure (CS), fixed assets (FA), and financial distress (FD) of Sharia-compliant companies.

Table 5
Correlation results for capital structure, corporate governance, macroeconomic factor, and financial distress of Shariah compliant listed firms

Variable	FD	CS	CGI	GDP	Size	FA	Prof	GO	NDTS
FD	1.00								
CS	-0.39	1.00							
CGI	0.02	-0.00	1.00						
GDP	0.07	-0.02	-0.03	1.00					
Size	0.07	-0.00	0.37	-0.02	1.00				
FA	-0.33	0.17	-0.11	-0.01	-0.06	1.00			
Prof	0.53	-0.15	0.07	0.06	0.27	-0.15	1.00		
GO	0.65	0.17	-0.02	0.06	0.05	-0.14	0.47	1.00	
NDTS	0.00	0.15	-0.01	-0.02	0.06	0.27	0.19	0.12	1.00

Notes: Table 5 reflects the correlation coefficient between the variables described in Table 3.1 above. The data set is a panel comprising 1904 firm-year observations for 238 listed non-financial sectors of Shariah-compliant companies? in Pakistan is covering the period 2015 to 2022.

The analysis reveals a limited degree of association among the most controlled variables, primarily due to the low correlation coefficients observed among the independent variables. Additionally, the findings indicate a minimal likelihood of encountering multicollinearity issues, which strengthens the reliability of the results. While correlation analysis provides insights into

the extent of relationships between the variables, it may not adequately capture the underlying causal relationships. Figure 4.1 presents a straightforward empirical demonstration of the relationship among firm financial distress, capital structure, corporate governance, macroeconomic factors, and control variables.

The results suggest little risk of multicollinearity problems. Although the correlation analysis shows the degree of association between the variables, the correlation analysis may not be sufficient to establish a fundamental relationship among the variables. Thus, advanced econometric analysis is desired to ascertain a causal relationship between the probability of default and the other control variables. Therefore, the panel (GMM) statistical technique is used in the next section to establish the correlation between the likelihood of default measure and the other independent variables.

4.2   *Variance Inflation Factor (VIF)*

This study also conducted a variance inflation (VIF) test for further clarity. VIFs were applied as an overall diagnostic measure of collinearity. In addition, the test signified an extensively improved method compared to a simple correlation matrix. It is important to note that this test provides an added advantage because VIF values specify coefficients in which collinearity may be a problem (Casella et al., 2006). Based on the existing literature, the multicollinearity problem persists if the VIF value exceeds 5. Table 6 presents VIF estimates for all variables, which revealed that the recorded VIF estimate for each variable did not exceed 5, suggesting no multicollinearity problem in this study. The overall mean value was 1.35, which indicated that the current study was not exposed to any potential multicollinearity problem.

Table 6
Variance Inflation Factor (VIF)

Variable	1/VIF	VIF
CS	0.582	1.74
CGI	0.926	1.08
GDP	0.982	1.02
Size	0.866	1.15
FA	0.606	1.65
Prof	0.839	1.19
GO	0.619	1.61
NDTS	0.574	1.74
Mean value of VIF		1.35

4.3   *Estimation Results*

The estimation results demonstrate that the econometric specifications are adequately specified, as indicated by passing diagnostic tests such as the Sargan test of over-identifying restrictions and the second-order autocorrelation test. Notably, the firm financial distress variable exhibits a significant and positive coefficient at the 1% significance level. This result underscores the persistence of financial distress over time, corroborating previous research findings (Abdioğlu, 2019; Badayi et al., 2020).

The empirical findings are reported in Table 7. The capital structure is statistically significant (with a coefficient of -5.16 and standard error of 0.000) at 1% and negatively related to the financial distress of Shariah-compliant firms. This result confirms our hypothesis that higher debt leads to a lower Altman Z score, indicating that Sharia-compliant firms are driven into financial distress(Yildirim et al., 2018). Our result is consistent with (Traczynski, 2017), who found that firm leverage ratio is the major determining factor in a firm's probability of financial distress. The result is also consistent with (Cathcart et al., 2020) finding that leverage leads to a higher probability of financial distress in SMEs than in large corporations.

The relationship measurement of corporate governance index is positively and significantly (with a coefficient of 0.1174 and standard error of 0.000) at 1% associated with firm financial distress; as the quality of governance index enhances, observing and supervision of managers align managers' interests with the shareholder's interest. This result confirms our hypothesis that a higher corporate governance index leads to a high Altman Z score (a proxy for firm financial distress), indicating that Sharia-compliant firms are less inclined toward financial distress (Farooq et al., 2018). According to Table 4.3, GDP enters negatively and significantly (coefficient -0.0367 and p-value 0.00) at 1% with probability of default. The inverse correlation indicates that the lower the GDP growth rate, the higher the Altman z-score (proxy of firm probability of default), eventually decreases the probability of firm financial distress of Shariah-compliant firms (Rafatnia et al., 2020; Dawood et al., 2023). Shariah-compliant firms are required to adhere to Islamic principles, which prohibit excessive leverage and speculative activities. Consequently, these firms typically maintain lower debt levels and rely more on equity financing, leading to stronger balance sheets and higher Altman-Z scores.

Table 7

The effect of capital structure, corporate governance, and macroeconomic factor on firm financial distress of shariah compliant companies

Variable	DV=Financial Distress			
	Coef.	Std. Err.	t-Stat	Prob
FD (-1)	0.1892***	0.0227	8.30	0.000
CS	-5.1661***	0.6419	-8.05	0.000
CGI	0.1174**	0.0551	2.13	0.033
GDP	-0.0367***	0.0105	-3.48	0.000
Size	-2.9937***	0.2533	-11.82	0.000
FA	-1.5844***	0.2603	-6.09	0.000
Prof	1.6864**	0.7196	2.34	0.019
GO	1.6093***	0.1294	12.43	0.000
NDTS	0.2852	1.6043	0.18	0.859
Cons	24.942***	2.4992	13.15	0.000
Year effects	Yes			
Industry effects	Yes			
Observation	1904			
Number of firms	238			
AR1	-3.7284 (0.000)			
AR2	-1.1308 (0.2581)			
Sargan test (p-value)	0.3294			

Notes: The table displays the regression results analyzing the relationship between capital structure (CS), corporate governance index (CGI), gross domestic product (GDP) as a proxy for macroeconomic factors, and firm financial distress (FD) among Shariah-compliant firms in Pakistan. Financial distress is represented by Altman's (1968) z-score. Capital structure is identified as the total debt/total assets ratio. Size is measured as the log of total assets. Fixed refers to property, plant, and equipment ratio, net of total assets. Profitability is measured as the earnings before interest, taxes, depreciation, and amortization to total assets ratio. Growth opportunity is determined as the sum of market value of equity and total debt/total assets. NDTS represents the ratio of depreciation to total assets. The two-step system GMM is employed as the primary estimation method to address heteroscedasticity and biased estimates. The AR2 test assesses second-order serial correlation, and standard errors are presented in parentheses. Significance levels are denoted by ***, **, and * for 1%, 5%, and 10%, respectively. The sample comprises 238 firms over 8 years, yielding a total of 1,904 observations.

Firm size demonstrates a significant negative relationship with the Altman Z-score (coefficient -2.9937, p-value 0.00) at a 1% level, indicating that larger Shariah-compliant firms, often burdened by higher financial leverage, face increased financial distress. Similarly, fixed assets negatively affect the Altman Z-score (coefficient -1.5844, p-value 0.00), as they tie up liquidity, elevate depreciation costs, and reduce financial flexibility, exacerbating distress risks during downturns.

In contrast, profitability shows no significant relationship with financial distress, reflecting the unique financing structures of Shariah-compliant firms. Growth opportunities, however, have a significant positive association with the Altman Z-score (coefficient 1.6093, p-value 0.00), highlighting the resilience of firms with strong market performance. Non-debt tax shields also show no significant impact on financial distress, aligning with prior research suggesting that their influence may differ in Shariah-compliant firms due to distinct financial practices.

5.   Conclusion

This study answered the research question through empirical examination of the effect of capital structure, governance framework, and macroeconomic factors on the likelihood of financial distress of listed Shariah-compliant firms in Pakistan. The research work is divided into several sections to answer the main research question. First, the association between capital structure and the probability of firm financial distress was empirically examined. The results show that debt-to-equity (a proxy for capital structure) is positively related to the financial distress of listed Shariah-compliant non-financial firms. This result empirically affirms the trade-off theory proposition that firms may likely be unable to settle debt obligations when they borrow excessively, which may lead to financial distress.

Secondly, corporate governance's effect on the firm's financial distress was empirically tested. Following the implications of a low governance quality index, there is a higher probability that firms will fall into financial distress of Shariah-compliant non-financial listed firms. This relationship is - weak, because governance structures are associated with inadequate oversight mechanisms, which can lead to poor decision-making and enhance the likelihood of a firm's default. Companies with weaker corporate governance structures were more probably to be involved in opportunistic behavior, such as earnings manipulation or excessive leverage, which can increase the probability of default. Thirdly, the research findings highlight the significant effect of GDP growth rate on the firm financial distress. This can result in higher revenue and profitability, reducing the probability of firm financial distress.

This study considered only listed Shariah-compliant firms in Pakistan. A significant portion of non-listed companies were delisted from this study due to the non-availability of data. The obtained data in this study were limited to a general period irrespective of pre-and post-COVID effects. The findings underscore the critical role of sound corporate governance in

mitigating financial distress. Policymakers should strengthen corporate governance frameworks by ensuring strict compliance with governance codes and enhancing transparency and accountability within firms. This could include incentivizing firms to use more equity financing or retained earnings and less debt, perhaps through tax policies or subsidies for equity investment.

Future research could address this limitation by extending the analysis to include small and medium-sized enterprises (SMEs) and unlisted companies. Replicating this study in different countries, particularly in other emerging markets or developed economies, would facilitate comparative analysis and help determine whether the observed relationships are universally applicable or specific to Pakistan's context. Additionally, incorporating more variables, such as firm-specific characteristics (e.g., firm age, gender diversity, and ownership structure) and external factors (e.g., technological advancements, market competition, political factors, corporate social responsibilities etc.) could provide a more nuanced understanding of financial distress.

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