KASBIT BUSINESS JOURNAL

Do credit rating determine the capital structure decision; The moderating role of firm size among PSX listed firms

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ARTICLE INFO

ABSTRACT

This study examined the impact of firm's credit rating on its capital structure with the moderating role of firm size among the listed non-financial firms on the Pakistan Stock Exchange (PSX). The sample included 73 firms covering the period from 2017 to 2020. Using the fixed effect panel mode, results revealed a negative significant impact of credit rating on a firm's capital structure. Moreover, the findings also revealed that firm size moderated the relationship between credit rating and capital structure. It recommended to the local authorities like SBP, SECP, and Finance ministry to work and create encouraging policies for the growth of Pakistan's bonds markets and enhancements of the credit rating agencies. Since this provides a low-cost alternative to firms for their financing decisions. Likewise, firms whose rating is close to the threshold of the speculative category may take some preventive measures to avoid further downgrading as they may miss out on the opportunity to use a low-cost channel of debt financing.

Introduction

Several studies have identified the significant of decisions in firms that raise question to the stability and effectiveness of capital structure (Khan, Imran, & Jehangir, 2018, Shoaib & Javid, 2015). According to Graham (2000) and Khan et al. (2018) choices of capital structure, firms uses the standard variables such as profitability, financial distress cost, taxes and tangibility. Other firms with

minimal risk also use less leverage and have an easier way for accessing the financial market with lower risk of insolvency (Graham, 2001; Khan et al., 2018). When it comes to capital structure and financial decisions, credit rating (CR) is among the most important considerations. Because of the diversity of debtors and creditors in the debt market, CR is an important tool for determining the credit worthiness of firms and regulatory authorities. Firms spend a lot of money to collect and validate credit

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ratings, and most of them use several rating agencies for creditworthiness. When it comes to the decisions making, 86% of financial managers paid close attention to credit rating (Khan et al. 2018). Apart from the supply side, the credit rating used to determine the appropriate pricing for securities and for increasing the average of investor's base. It also helps to reduces dependency on specialized financing sources (Judge & Korzhenitskaya, 2012).

Firms that have better credit ratings can raise more external capital specially in challenging situation such as recent financial crisis as compare to unrated firms (Khan et al. 2018). The relationship among credit rating and capital structure have been studied from several perspectives, when firms approach to different loan markets so at that time credit rating plays a key part in determining capital structure (Faulkender & Mitchell A, 2006). As compare to the high rated firms, low-rated firms face numerous challenges in approaching to the debt market due to their high cost of capital and limited financial securities. Furthermore, low-rated businesses bear the risk of untimely destruction in the scenario of a credit rating failure. Because of the rating, low rated firms can increase their debt at a higher cost than middle rated firms. Mid rated firms have an easier time

1) Inflation and interest rates are examples of external forces that reflect macroeconomic conditions and

2) Firm-specific internal characteristics include firm size, liquidity, profitability, non-debt tax shield, and tangibility (Serghiescu & Vaidean, 2014; Aktan et al., 2018).

According to research done on US enterprises between 1986 and 2001 by (Kisgen, 2006), credit rating has a direct impact on capital structure because of its distinct costs and advantages connected to each level of rating. However, although using similar methods, (Kemper & Rao, 2013) and (Kisgen, 2006) were unable to reach the same conclusion. Furthermore, Rogers et al. (2016) discovered that non-financial Latin American firms do not consider an approaching credit rating change to be a significant issue while deciding on its capital structure. Non-financial companies registered on the Saudi Arabian stock exchange, Tadawul, issue 1% to 2% less debt as compared to equity following a recent wide ratings change (Aktan et al., 2018). As indicated by earlier research, this study also reveals that the firms are less concerned when notch ratings

accessing for the debt market and are more difficult to liquidate in the event of deterioration than low rated firms. Credit rating agencies are important constant source of information for businesses, regulators, and investors, despite this academic study the importance and value of credit rating in a firm's financial decisions has ignored. Apart from credit rating, the capital structure of a firm also influenced by its profitability and liquidity (Khan et al., 2018).

Credit rating agencies have grown in power over the last decade, with investors, corporations, firms, and regulatory authorities accepting their ratings due to the significant impact firm's financial decision. According to Modigliani and Miller's introduction of irrelevant capital structure in 1958, it has become the most important area of research in finance. Since capital structure decisions are related to how the company finance its operations and long-term investments using a combination of debt and equity, they are important for maximizing shareholder returns and the firm's worth (Proence, Laureano, & Laureano, 2014; Aktan, Celik, Abdulla, & Alshakhoori, (2018). As a result, numerous researches are conducted to investigate the variables that influence CS decisions. These factors have categorized into two categories in traditional investigations.

change slightly. Additionally, it was discovered by Nguyena, Alperta, and Faff (2021) that firms have stronger market leverage when their bonds are considerably more liquid than their stock. Although, it has been highlighted that the relationship among bond-stock and market leverage relative liquidity is statistically significant and its economic relevance is only of modest scale. Since that credit ratings have an impact on access of firm to capital markets, particularly the bond market, this study has studied the impact of credit ratings on the relationship among relative liquidity and capital structure. However, credit scores have not been significantly correlated with anything.

In addition to the supply side, credit rating is used to determine the appropriate pricing for securities that raises the average investor base. It also helps in decreasing dependency on certain financial sources (Judge & Korzhenitskaya, 2011). In challenging conditions of recent financial crises of 2008, rating firms can more easily increase their capital structure as compared to the unrated firms (Khan et al, 2018). During the 2008 financial crisis, rated firms benefited, thus, unrated firms also decided to get themselves rated. A significant variety of issuers,

investors, intermediaries, financial institutions, and non-financial organizations utilize credit ratings to evaluate credit risk for their own purposes and use. While making investment decisions, investors use credit ratings to assess different issuers and debt issues as well as to estimate credit risk.

According to the (Abbasi & Malik, 2015) size has a key role in performance prediction. Greater profitability is demonstrated by larger companies, whereas smaller companies are unable to compete with larger companies in this area. (Chi, 2004) demonstrated that larger firms have a higher probability of securing loans from financial institutions. Due to their improved creditworthiness and decreased risk of bankruptcy, people may be able to borrow money at lower interest rates. (Gedajlovic & Shapiro, 1998) has been confirmed same aspect. They have verified the positive nature of the relationship between the firm's size and profitability. On the other hand, a study carried out by (Yi-chein & TZU-hui, 2005) came to different conclusions. Their research showed that a firm's size has no effect on its performance.

It has been discovered through several research that the size of the firm has the ability to modify the relationship between independent variables and capital structure. The amount of money needed increases with the size of the firm. Firms frequently use capital inflows because of the size of the required amount of cash to ensure that their operational operations proceed as expected (Yanti, Sastra, & Kurniawan, 2021). (Rauch, Wiklund, Lumpkin, & Frese, 2009) closely investigated number of studies that were carried out by using firm size as a moderator and deduced that the intensity of the effects of all environmental variables vary as firms' sizes change.

In past several studies have been conducted to examine the variables that affect the capital structure, including tangibility, profitability, liquidity, business risk, growth opportunities, age, sales growth, effective tax rate, non-debt tax shield, firm size, financial flexibility, share price performance, asset turnover ratio, state ownership, managerial ownership, institutional ownership, efficiency, inflation, gross domestic product, dividend pay-out ratio, growth of equity capital, and growth of debt capital. Given preceding arguments, our study examines the impact of credit rating on capital structure of listed non-financial firms of stock exchange Pakistan. In particular, we will investigate impact of moderate relationship of firm size among

the credit rating and capital structure for assessing the neutral assessment of firms' creditworthiness. The study's findings will help financial managers in recognizing the effect of changes in credit ratings on its costs of firm to seek outside financing as well as the steps that must be taken to prevent negative ratings and maintain highest positive credit ratings to be in a good position for raising fund. Current study contributes to the literature by examining the impact of credit ratings on capital structure for listed non-financial firms of Pakistan. While making investment decisions, credit ratings assist investors in determining the credit risk and assessing various debt problems and issuers.

Literature Review
2.1 Credit Rating
One of the most essential criteria in determining capital structure is credit rating. Several studies have found a link among capital structure of firm and its credit rating. High-rated firms have more leverage than unrated firms. Furthermore, the level of leverage in rated firms is determined by the rating level (Shaheen & Javid, 2014). Credit rating agencies attempt to decrease information gap in financial reports. Rating agencies rely on a variety of models and approaches to evaluate firm's creditworthiness. This rating is provided to public free of charge cost in order for them to make better investment decisions (khan et al. 2018). According to the (Graham & Harvey, 2001), firms who are about to get their credit ratings upgraded or downgraded borrow minimal debt relative to equity than those that are not. He argue that credit rating should be considered by directors of firm while choosing capital structure. According to (Baghai, Servaes, & Tamayo, 2014), stronger credit ratings are required for a variety of financial arrangements, such as commercial papers, because they only have an impact on a firm's ability to acquire external finance. Due to the huge distribution of default risk in relation to different rating categories, the costs associated with external borrowing significantly reduce as credit ratings improve. As a result, while creating an ideal capital structure, credit rating of firm is an important factor that must be considered; Baghai et al. (2014).

2.2 Capital structure
The CS is the combination of debt and equity of a firm, it uses to finance its assets. Numerous studies assess the variables that influence decisions about capital structure in which two key elements have been traditionally studied the first is external variables that are interest rate and rate of inflation represent macroeconomic circumstances and the

second is internal parameters that are firm specific included firm size, profitability, liquidity, non-debt tax shield and asset tangibility (Feda, 2020). As stated by Baghai et al. (2014) CS refers to the equity and debt mix that used to fund its operations or assets. An ideal CS for a firm would have a high ratio of stock to debt, which would support the firm's value. Therefore, every company's corporate fund unit has an important role in designing such a structure, especially in the current era of globalization where external factors like macroeconomic factors and credit ratings are main factors in influencing the financing decisions of firms and speculation at level of global. (Manso, 2013), claims that the economy is progressively recovering across regions and that businesses are thinking about refinancing risk by increasing cash flows in order to keep a strategic distance from future unexpected crises and to increase values in the stock market. Overall, these characteristics of a company have increased the importance of credit rating agencies in identifying a firm's financial limitations.

Kisgen (2006) claims that firm modifies its CS in view of the various credit rating levels; whereas in other places, Kisgen (2009) demonstrated how managers participate in capital structure behaviors like setting a minimum credit rating level target in addition to the possibility that the firm will reduce its debt as the rating is decreased. According to Kisgen and Strahan (2010), the ratings based limitations on bond investments have an effect for firms on the cost of debt financing. Moreover, when a firm is not rated, according to Boscha and Steffenb (2011), no funding will be given by non-bank investors, and loan shares will increase.

2.3 Theoretical Under-Pinning

2.3.1 Trade-Off Theory

According to this theory, the business sector try to balance the benefits and costs of leverage. (Ali et al. 2021) provided a theoretical framework in which, after deducting the costs of bankruptcy, the present value of the tax advantage added to the value of the unlevered firm gives the value of the leveraged firm. The rationale for the business ideal balance of leverage will be the balanced benefit of debt as compared to the cost of borrowing (Mayers & Majluf, 1984). The advantage of debt is represented by the interest tax shield, whereas the cost of debt is represented by the cost of bankruptcy or insolvency. They reveal that:

• Firm leverage and the price of financial distress are inversely related.
• Larger NDTS reduce the level of leverage of the firm.
• It has inverse relationship between company leverage to earnings volatility of the firm.

2.3.2 The Pecking Order Theory

Pecking Order Theory presented and built assumptions that funding decisions are dependent on hierarchy or pecking order (Mayers & Majluf, 1984). Debt is preferred over equity, and firms prefer internal funding over external financing. In other words, according to the pecking order theory of CS, internal cash flow is the primary alternative of finance for any company executive, followed by stock and debt. Due to the primary and ultimate choices of funds representing two types of equity, such as equity and internal cash flow, the pecking order theory argues that there is no most suitable capital structure. (Mayers & Majluf, 1984), developed and presented a theory in which perfect information exists among external investors and managers, allowing them to rank funding possibilities for their firms. External investors can estimate the actual value of assets, but finance managers know and identify the true worth of the firm's assets; as a consequently, the firm's managers do efforts in the best interests of the firm's stockholders. Moreover, the authors explained that companies will choose and compensate internally by cash flow to back their capital expenditure by giving two reasons:

• The cost of utilizing outside options of funds, i.e., Administrative cost, issue of share cost, and others.

• The firm will create the reserves from internal sources i.e., cash flow to avoid failure in selecting of NPV (positive) projects. Otherwise, quite often management fails to select a positive NPV investment project due to imperfect knowledge and avoid the corporate from relying on exterior funds.

2.4 Empirical Review

This section provides empirical evidence relating to the implications of such conceptions against the backdrop of the basic concepts that are discussed above. A firm's capital structure is very important for profitability since it allows the firm to meet the expectations of stakeholders. (Modigliani & Miller, 1958) were the first to establish and present the corporate finance theory of capital structure, they arguing that capital structure had no significant

impact on the firm's value or future performance. However, Ali, Hussain, Baig, Khan, Raza, & Murad, (2021) and many other researchers have proven the existence of some connections among CS and value of firm. (Modigliani & Miller, 1963) presented that their model is no more Their model is no more significant. when taxes are factored in, as tax breaks on debt interest payments generate a rise in firm value when stock is traded for debt. Similarly, the authors claimed that a firm's capital structure should be made up of debt in order to take advantage of tax breaks on interest payments. Although the Modigliani-Miller (MM) model is appropriate, in actuality, bankruptcy expenses exist that are directly proportionate to the firm's debt level. As a result, higher debt levels result in higher bankruptcy costs.

According to (Kisgen, 2006), credit ratings may come at a direct expense to firms. This is due to the fact that credit ratings may have an impact on a company's ability to access the financial market, as well as its operations, contracts, counterparties, and ability to attract certain types of investors and comply with certain disclosure rules and bond restrictions. Ratings can often be biased against high-performing companies that are combined with low-performing companies that have the same credit rating (for example, AA+, AA, and AA-). For increasing utility managers could exert a lot of effort to raise their credit rating in order to boost their reputation, which has an impact on their pay and job security. Decisions about the firm's CS and cost of capital would be significantly impacted by such behavior. It is important to remember that the mix of the capital structure may also have an impact on credit ratings. In 2016, (Andreasen & Valenzuela) looked at how financial transparency affected debt and firm ratings. They discovered that the degree to which financial openness affects credit ratings relies on the amount of financial development of the nation in which the corporation operates. (Huang & Shen, 2015), investigated how cross-country differences could influence capital structure choices following a change in a firm's rating. They discovered that the CS decision is affected in an unequal way by changes in credit ratings. They came to the conclusion that companies would change their leverage ratio following a rating drop, but not significantly change it following a rating increase. (Huang & Shen, 2015), also discovered that, regardless of whether the firms' ratings were upgraded or downgraded, capital structure modifications occurred more quickly in nations with superior financial and legal conditions than in other nations. Therefore, they suggested that the financial growth, legal, and institutional contexts in a particular nation are more important for the adjustment of the CS than credit ratings. (Khan, Imran, & Jehangir, 2018), when choosing the CS, firm must understand point of liquidation. Few research on the link among leverage and liquidity are available, these few studies imply that Liquidity and leverage have negative relationship.

Credit ratings provide information on a firm's chance of defaulting on its debts and its financial health, which eliminates the need for similar attempts to be repeated in the financial markets. With the use of CR, investors may assess the risk characteristics of the businesses using a single scale that acts as a standard and facilitates comparisons across various firms. Furthermore, because the credit rating agency has already done all the research, evaluating the risk characteristics of a company that assigned credit ratings is not difficult at all when entering into agreements. Credit ratings are given to firms and these ratings assist them in assessing & reducing their risk (Sindhu, et al., 2021). According to the (Attig, Ghoul, Guedhami, & Suh, 2013) that credit rating agencies combine both numerical and non-numerical data when assigning credit ratings to firms, and that they are professionals with the necessary structure and methods.

According to (Fukui, Mitton, & Schonlay, 2020) the asymmetric information and loan availability issues have a big impact on capital structure. Because of the diversity of lenders and borrowers, information asymmetry, and complexity in the financial system, credit ratings are frequently used by regulators, investors, and other stakeholders to assess the creditworthiness of firms. while examining the factors that determine capital structure (Faulkender & Mitchell A, 2006) and (Mittoo & Zhang, 2010 62 e that credit rating acts as the supply side of the firms' capital structure. As opposed to this, (Amrit & Anna, 2012) argue that credit ratings also assist in determining the intrinsic worth of the securities, expanding their pool of investors, and giving the firm flexibility. Credit rating agencies help us in reaching a conclusion for projection of the future, regarding the firm's capacity to pay its debts when it became due (Ali, Yousaf, & Naveed, 2020). The credit rating agencies make it very clear that their assessments are based on relative default risk, not absolute default risk. These opinions do not particularly pertain to any particular frame (Ali, Yousaf, & Naveed, 2020). Rating agencies explicitly state that their opinions are just that, but they are frequently used by firms, investors, and governments across the world to inform policy decisions.

H1: There is significant impact of credit rating on the firm's capital structure.

H2: Firm size moderates the relationship between credit rating and firm's capital structure.

2.5 Conceptual Framework
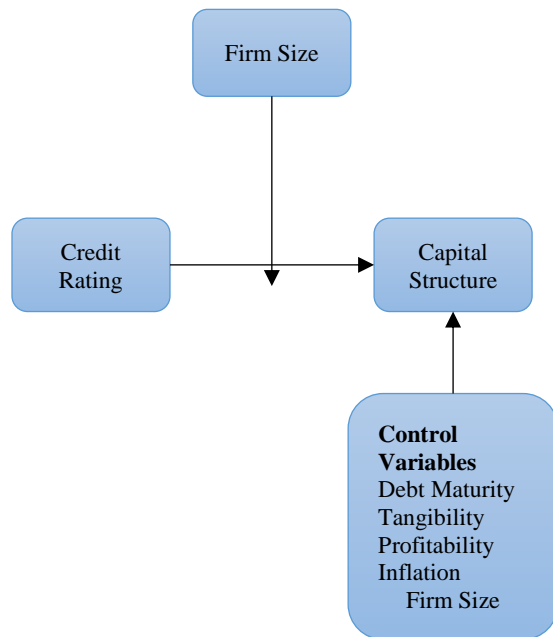
Fig_01: Conceptual framework

RESEARCH METHODOLOGY

3.1 Research Approach & Type

By collecting quantifiable data and using measurable, numerical, or computational tools, quantitative research is defined as an organized investigation of wonders. This research involves panel data of 73 non-financial PSX listed firms, which are undertaken for the purpose of finding the impact of credit rating on Capital structure. Only those firms whose data is available for all the studied variables are considered for the final analysis covering the time period from 2017 till 2020. The final sample considers a balanced panel of 73 listed non-financial firms over a period of four years. While for credit's ratings data will be collected from the Pakistan Credit Rating Agency (PACRA) website. For the purposes of this study, descriptive statistics, correlation, and regression is employed to analyze the data and STATA is used for Panel data analysis. Furthermore, whether fixed or random model is appropriate for the data, Hausman test is conducted, followed by the panel OLS regression technique.

3.2 Research Model

The following model is designed to examine the impact of credit ratings on capital structure.

$$CS_{it} = \alpha + \beta_1 \, CR_{it} + \beta_2 \, DMAT_{it} + \beta_3 \, FMSZ_{it} + \beta_4 \, TANGT_{it} + \beta_5 \, PROFT_{it} + \beta_6 \, INFL_{it} + \varepsilon \quad (1)$$

Where CS is capital structure of the firm, α is constant term, β_1 CR is credit rating of firm and there is five control variable as per previous study, in which β_2 DMAT is debt maturity, β_3 FMSZ is firm size, β_4 TANGT is tangibility of firm, β_5 PROFT is profitability of firm and β_6 INFL is inflation.

For analyzing the moderating role of firm size between credit rating and capital structure, econometric models have been developed as under,

$$CS_{it} = \alpha + \beta_1 \, CR_{it} + \beta_2 \, (FMSZ_{it}*CR_{it}) + \beta_3 \, DMAT_{it} + \beta_4 \, FMSZ_{it} + \beta_5 \, TANGT_{it} + \beta_6 \, PROFT_{it} + \beta_7 \, INFL_{it} + \varepsilon \quad (2)$$

In this model β_2 (FMSZ*CR) is defining the moderate relationship between credit rating and firm size, in which study will investigate the moderating relationship of firm size between the credit rating and CS and other control variables as followed.

3.3 Variable Description

Variable Description	Measurements	Sources

Capital structure	Market leverage (TDM) or Debt Ratio = (Debt in current liability +Long term debt) / MVA	Nguyen et al. (2021), Frank & Goyal, (2009) Zhou, (2016)
Credit Rating	The highest category AAA receives a value of 21 The lowest category "D" or "SD" receives a value of 1	Nguyena et al. (2021).
Firm Size	Natural logarithm of total sales	Nguyena et al. (2021).
Debt Maturity	Debt maturing in more than one year/total debts	Shah & Khan (2009).
Tangibility	Property, plant and equipment PPENT / Total assets	Nguyena et al. (2021).
Profitability	Operating income before depreciation / Total assets	Nguyena et al. (2021).
Inflation	Online (statistics.com.)	statistics.com.

Data Analysis and Discussion
2. Descriptive Analysis

This section presents descriptive statistics for the variables used in this study. For final analysis, STATA 13 is used. In Table 4.1the descriptive analysis of all the variables is presented below, which includes the mean, median, and standard deviation (SD).

Table 4.1: Descriptive Statistics

Measures	Mean	Median	SD	Obs	
Debt Ratio		0.531	0.534	0.196	249
Credit Rating	5.433	5.000	1.906	249	
Debt Maturity	0.303	0.267	0.209	249	
Firm's Size	16.624	16.339	1.340	249	
Tangibility	0.413	0.404	0.184	249	
Profitability	0.084	0.074	0.075	249	
Inflation	0.067	0.067	0.027	249	

Author's estimation

Table 4.1 above makes it clear that the mean value of debt ratio is 0.531% and center value is 0.534. The SD, which is 0.196%, is used to measure the variability in data of debt ratio for all 73 non-financial listed companies at the stock exchange Pakistan during the period from 2017 to 2020. Its quiet ratio is a signal of less risk. Additionally, a larger value of debt ratio indicates greater levels of debt and financial leverage, and vice versa. The mean value of CR is 5.433 and its center value is 5. Standard deviation which is 1.906% is a measure of the variability of data regarding credit rating for all 73 non-financial listed companies at stock exchange Pakistan during the period from 2017 to 2020. It is quiet negative and it is an indication of less risk. It is indicator of creditworthiness of companies.

Similarly, the mean value of debt maturity is 0.303% and median value is 0.267. The variability in data regarding debt maturity is high that is 0.209% for all 73 non-financial listed companies at stock exchange Pakistan during period from 2017 to 2020. In case of firm size, the mean value is 16.624 and median value is 16.339. The variability in data regarding firm's size is quite high as compared to other variables that is 1.340% for all 73 non-financial listed companies at stock exchange Pakistan during period from 2017 to 2020. Firms' size is measured by taking the log of the total sales of companies, which indicate that ability to pay the bond interest periodically and principle. It also helps to increase the bond ratings.

The mean value of tangibility is 0.413% and median value is 0.404. Standard deviations are used to assess the variability around means values that is 0.184% which is low for tangibility for all 73 non-financial listed companies at the stock exchange Pakistan throughout the period of 2017 to 2020. The average value of profitability is 0.084% and median value is 0.074. The variability around means value is

measured by SD, that is approximately equal to median value. The value of standard deviation is 0.075% for all 73 non-financial listed companies at stock exchange Pakistan throughout the period of 2017 to 2020. The mean value of inflation is 0.067% and median value is 0.067. The value of standard deviation is 0.027% for all 73 non-financial listed companies at stock exchange Pakistan throughout the period of 2017 to 2020.

4.2 Correlation Analysis

Table 4.2 shows the correlation analysis of all the variables that is used in the current research. Correlation is a statistical method for determining the degree or strength of the relationship between variables. Its ranges between -1 to +1, with -1 indicating the highest negative correlation and +1 indicating the highest positive correlation. Similarly, a range between 0 to 0.25 is regarded as weak correlation, whereas, degree of correlation among independent variables of 0.80 or more shows the problem of multicollinearity in the data. Multicollinearity can be reduced in a variety of methods, for as by removing highly correlated variables or using the first difference. Table 4.2 of correlation matrix result demonstrates that there are no issues with multicollinearity between the independent variables (IV). The correlation between all the IVs' is less than 80%. There is strong negative correlation found between debt ratio and profitability, which is 29.11% while moderate correlation found among debt ratio and firm size, which is 30.26%. The lowest correlation is found among debt maturity and firm size, which is 0.03%, credit rating and firm size, which is 60.63% and leverage and profitability, which is -7.55%. Moreover, the linear association among dependent and independent variables are investigated by the multiple linear regression analysis that further shows association between debt and all IVs' as regression analysis is considered more flexible and accurate than correlation analysis.

Table 4.2: Correlation Matrix

Variable	DBR	CR	DMAT	FMSZ	TANGT	PROFT	INFL
DBR	1						
CR	-0.2197	1					
DMAT	-0.0329	-0.1424	1				
FMSZ	0.3026	0.6063	0.0003	1			
TANGT	-0.0598	-0.2754	0.489	-0.1504	1		
PROFT	-0.2911	0.1873	-0.038	-0.0755	-0.1592	1	
INFL	0.0761	-0.0876	0.0345	-0.0979	0.0193	-0.257	1

Note: Table 4.2 (DBR) is the debt ratio, (CR) is credit rating, (DMAT) is debt maturity, (FMSZ) is the firm size, (TANGT) is tangibility, (PROFT) is profitability, and (INFL) is the inflation.

4.3 Empirical Analysis

The presentation and discussion of the current study's empirical findings are covered in this part. In order to check the type of appropriate technique, Hausman test is used. This test is used to estimate the type of estimates that are more appropriate in the regression analysis i.e. whether it's random effect method or fixed effect method. Table 4.4 shows the result of Hausman test.

Table 4.4: Hausman Test Results

Chi-Sq. Test	Chi-Sq. d.f.	Prob.	Decision
16.07	6	0.013	Fixed Model is more appropriate

According to Table 4.4, the Chi-square Test's P-value is less than 5% level of significance. Therefore, we reject Ho and come to the conclusion that the fixed effect model is more suitable in the context of the current study, for estimating the multiple linear regression model which is shown in Table 4.5 below.

Table 4.5: Regression Results

Variables	Coefficient	Std. Error	t-Statistics	P-Value	
Credit Rating	-0.025	0.014	-1.77	0.080	
Debt Maturity	0.188	0.102	1.83	0.071	
Firm Size	0.091	0.030	3.06	0.003	
Tangibility	-0.165	0.066	-2.48	0.016	
Profitability	-0.656	0.097	-6.74	0.000	
Inflation	0.008	0.154	0.05	0.957	

Table 4.5, shows that N = 249, with-in R^2 = 0.374%, F-stat = 17.08, Prob (F-stat) = 0.000

Table 4.5 reports that all variables have positive slope coefficients, apart from profitability, tangibility, and credit rating. The coefficient of determination (R^2) is 37.4%, its means that the 37.4% variations in the firm's capital structure are explained by the studied independent variables. The probability associated with the F-statistic is 0.000 it can support the validity, usefulness and statistically significant of random effect model. Equation 4.1present the numerical form of multiple linear regression model below.

CS = α -0.025 CR + 0.188 DMAT + 0.091 FMSZ – 0.165 TANGT – 0.656 PROFT +0.008 INFL + ε … (4.1) Equation 4.1 shows clearly that the slope of coefficient of credit rating (CR) is negative and statistically significant at 10% level of significance. If one-unit increase in credit rating, so capital structure will be reduced by 0.025. These results are similar to Nguyena *et al*, (2021) study. In this study's sample the mean and median value shows that most of the firms are on border line of investment bonds i.e. 5 score, the debt is decreasing. Thus, the study's result shows that firms behave cautiously in terms of their debt when using their debt or bonds ratings and do not increase their debt financing. Probable reason behind this inverse relationship could be that in Pakistani context bond markets are still in its early stages of development and firm may not only rely its debt financing decision on its credit ratings rather there could be other substantial factors. **Similar**

results have been reported by Aktan, Celik, Abdulla and Alshakhoori (2019) in their Saudi based study. Another probable reason for this inverse relationship is that in developing economies like Pakistan's, mostly the firms relay on banks for their external debt financing. Thus, it's more of the access to debt market that influences a firm's capital structure decision rather than the CR.

At the 10% level of significance, the slope coefficient of debt maturity (DMAT) is statistically significant and positive. If one-unit increase in profitability so capital structure will be increased by 0.188. The result of (Shah & Khan, 2009) reveled positive and statistically significant relationship that is founded among CS and debt maturity. The study result show that small firm use short term debt and there is no evidence available for growing firms. However long term assets positively correlate with debt maturity structure.

Looking at the tangibility (TANGT), it is negative and statistically significant at 10% level of significance. If one unit increase in tangibility, so capital structure will reduced by -1.65 percent. The result of Nguyena *et al*, (2021) reveled negative and statistically significant relationship that is founded among CS and TANGT. This result is consistent with the pecking order theory, which assume a beneficial connection among the tangibility and capital structure. Its means negative slope coefficient of

tangibility (TANGT) make feel investor uncomfortable and undervalue and it is not giving the guarantee of recovering the debts issued by lenders.

At the 1%, 5%, and 10% levels of significance, the slope coefficient of profitability (PROFT) is negative and statistically significant. If one-unit increase in profitability so capital structure will reduced by -0.656. The result of Nguyena *et al*, (2021) reveled negative and statistically significant relationship that is founded among CS and profitability. This observation shows that low profitability make

increase in debt in term of paying interest, which eat up the base line of capital structure. The slope coefficient of inflation (INFL) is positive and statistically insignificant. Thus, in this study's context, there is no relationship among inflation and a firm's CS.

4.4 Moderation Analysis
In this section, the discussion is linked to the moderating effect of firm size between the relationship of CR and CS.

Table 4.6: Moderation with Firm Size

Variables	Coefficient	Std. Error	t-Statistics	P-Value
Credit Rating	-0.318	0.159	-1.990	0.050
Debt Maturity	0.193	0.102	1.900	0.061
Firm Size*CR	0.017	0.009	1.850	0.069
Firm size	-0.009	0.071	-0.120	0.902
Tangibility	-0.158	0.063	-2.520	0.014
profitability	-0.620	0.099	-6.230	0.000
Inflation	0.053	0.146	0.370	0.715

$N = 249$, with-in $R2 = 0.374\%$, F-stat = 17.08, Prob (F-stat) = 0.000,

Table 4.6 reports that all variables have positive slope coefficients, apart from profitability, tangibility, and credit rating. The coefficient of determination ($R2$) is 37.4%, that's means 37.4% variations in debt ratio are explained by microeconomic and macroeconomic variables. The probability associated with the F-statistic is 0.000 that can certify to the validity, usefulness and statistical significance of the random effect model. The numerical form of the multiple linear regression model is shown in equation 4.2 below.

$CS = \alpha - 0.318$ CR + 0.017 (FMSZ* CR) + 0.193 DMAT - 0.009 FMSZ + 0.158 TANGT $-$ 0.620 PROFT + 0.053 INFL + ε … (4.2)

Equation 4.2 shows that the slope coefficient of interaction between the credit rating of firms and its size is positive and significant at 10%. This shows

that the relationship among CR of firms and its CS is stronger for large firms. Thus, large firm's capital structure decisions influenced more by their CR as compare to small firms. Besides, the interaction term, all other independent variables except for the firm size and inflation, are significant at 10 percent level of significance.

Table 4.5 report that slope coefficient of credit rating (CR) is negative and statistically significant at 10% level of significance. If one unit increase in credit rating, so CS will be reduced by 0.025. These results are similar to Nguyena et al, (2021) study. Thus, the study's result shows that firms behave cautiously in terms of their debt when using their debt or bonds ratings and do not increase their debt financing. Probable reason behind this inverse relationship could be that in Pakistani context bond markets are still in its early stages of development and firm may not only rely its debt financing decision on its credit ratings rather there could be other substantial factors.

However, after moderation the slope coefficient of interaction between the credit rating of firms and its size is positive and significant at 10%. This shows that the relationship among CR of firms and its CS is stronger for large firms. Thus, large firm's capital structure decisions influenced more by their CR as compare to small firms. Larger firms are typically seen as being less hazardous, having lower proportionate financial distress costs, and having greater access to financing markets. Also, this shows that big Pakistani firms have size advantage when it comes to raising debt particularly credit rating strength the relationship between firm size and its capital structure.

5.1 Conclusion and recommendations

This study has been conducted to examine the impact of credit rating on capital structure for the listed non-financial firms of Pakistan. For this purpose, data is collected for the tenure of 2017 to 2020. Among the 301 rated firms from the Pakistan credit rating agency (PACRA), our final sample consists of 73 listed non-financial firms as per the availability of the data for all the studied variables. The study employed Hausman test to check if fixed or random model is more appropriate for the final analysis.

Credit rating agencies have grown in power over the last decade, with investors, corporations, firms, and regulatory authorities accepting their ratings due to the significant impact of rating on a firm financial decision. In this perspective, the main objective of the current study is to examine the impact of credit rating on CS of listed non-financial firms of Pakistan using panel data. Furthermore, the objective is also to find out the impact of firm size on credit rating, we examine moderate relationship of firm size between credit rating and capital structure.

The results show that fixed effects are model is more appropriate for the study's data. Furthermore, the results of the current study revealed negative impact of credit rating on a capital structure of firm along with two firm level control variables i.e. tangibility and profitability. While positive association among capital structure and debt maturity, and inflation is reported. There is statistically significant impact found between credit rating at 5% level of significant, debt maturity and moderating effect of firm size, tangibility and profitability are significant at 10% level of significance and inflation is the only insignificant factor. The results of fixed effect model present that 37.45% variation in capital structure are explained by independent and control variables.

The probability value of the F-test for the random effect model identifies the validity and significance of the overall model that is zero. Hence, it is found that there is a statistically significant relationship among the independent and control variables, as well as a rather strong relationship. The study's findings are consistent with assumptions made by the agency theory, trade-off theory, and pecking order theory, which indicate that CS models derived from Western contexts can partially understand the financing behavior of listed non-financial firms in Pakistan and it also help corporate managers to make decisions for optimal capital structure.

The finding suggest that firms should pay more attention to their credit ratings as they influence their CS decisions. The study highlights that credit rating's potential to impact a company's debt ratio thus in turn it may affect the overall value of the company. Moreover, firms' whom rating is close to the threshold of speculative category may take some preventive measures to avoid further downgrading as they may miss out the opportunity to use a low cost channel of debt financing. It is also recommended to the local authorities like SBP, SECP and Finance ministry to work and create encouraging policies for the growth of Pakistan's bonds markets and enhancements of the credit rating agencies. Since, this provides a low cost alternate to firms' for their financing decisions.

Furthermore, instead of including firms from different industries, future research may examine the effect of credit ratings on capital structure with the variable of relative liquidity of bond and stock of a specific industry. This is because various industries may have a different appetite or limitation on the debt markets. Future research can be done with the variable of relative liquidity of bond and stock on SUKUK (Sharia-compliant bonds). Future studies may use the same empirical procedures with different local or international rating agencies and predict the outcome.

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