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Effect of Leverage on Firm Value and How the Contextual Variables Affect This Relationship: A Case of Pakistan

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ABSTRACT

The purpose of this study is to investigate capital structure in the Pakistani corporate sector in light of the interest rate gap with other countries and emerging Islamic banking in the country. The study investigates the effect of leverage on firm value (Tobin's Q) and how other variables impact this relationship. The study used the System-GMM-Fixed effect model for linear analysis and fixed effect panel threshold regression model by Hansen (1999) for quadratic analysis using data from non-financial firms listed on the Pakistan Stock exchange for the period 2005 to 2019. The results show that there is a negative relation between leverage and the value of the firm. In contrast, debt and non-debt tax shields have a positive relationship with the value of the firm. The study also found that there is quadratic nature of leverage with the value of the firm. The study supports Trade-off theory, pecking order theory, while it doesn't support agency theory.

Keywords: Leverage, firm value, optimal capital structure, panel threshold analysis.

INTRODUCTION

Firms are concerned with their financing resources if it is for normal operations or specific projects. The source can be debt or equity or the mix of both or maybe some internal sources. The second thing that comes into mind is the cost of these funds, which the firms want to get through for generating capital, and then the pros and then the advantages and disadvantages of the cost. Capital structure decision is one of the important decisions made by financial managers, especially in the area of corporate finance. It provides a base for many other decisions like project financing, dividend policy, issue of long-term securities, financing of mergers, buyouts, and so on.

Managers have several objectives, like maximizing the wealth of shareholders, value of a firm, lowering the cost of capital, and diverting bankruptcy agency problems, etc. In 1958, Modigliani and Miller (1958) presented an irrelevance proposition which states that capital structure does not affect firm value under restrictive assumptions, which means the firm value is irrelevant to capital structure or financing decision. After that, an intensive investigation was made on the topic of capital structure (the mix of debt and equity capital). The Modigliani-Miller (M&M) proposition is the first theory about capital structure. In addition to the original Modigliani and Miller paper, other important contributions were made, which include a study by Stiglitz (1969) and many more. The second irrelevance proposition states that "given a firm's investment policy, the dividend payout a firm chooses to follow will affect neither the current price of its shares nor the total return to its shareholders" (Miller and Modigliani, 1961).

In 1963 M&M proposed tradeoff theory which differentiates the value of a firm on the basis of leverage means the value of a leveraged firm and the value of the unleveraged firm. According to this theory adding more debt will increase the interest tax shield. The interest expense can reduce the amount of tax the firm has to pay. While they also consider the presence of bankruptcy cost as a result of increased debt. Jensen and Meckling (1976) argued that there is an optimal level of debt associated with minimum agency cost, as such type of conflicts leads to agency problem and further to agency cost, and is called "Agency Theory." Jensen (1986) argued that debt may reduce the agency cost by reducing the availability of free cash flow to the managers. In 1984, Myers and Majluf presented "Pecking order theory" The pecking order theory considers choosing the internal or external source of finance to fund their assets or projects, i.e., first internal, then external. The signaling theory (Ross 1977; Heinkel, 1982) states that firms with favorable prospects with raise new funds through debt financing while firms with unfavorable prospects will try to raise new capital through equity financing. Ross (1977) shows how debt could be used as a costly signal to separate the good from the bad firms. Another theory in capital structure is "The market timing theory," by Baker and Wurgler (2002), which says that firms issue new stock when their share price is overvalued, and they repurchase their shares when their share price is undervalued. According to Fama (1980), managers prefer less leverage financing because they want to minimize the risk and to protect their undiversified human capital. Recently many studies argued that macroeconomic factors impact the firm capital structure decision, i.e., inflation rate, etc

This study will focus on macroeconomic factors and the corporate environment and how they affect the capital structure decisions in the Pakistani industry and then the value of the firm. It will investigate the level of leverage and relation of leverage with firm performance. The main motivation behind this study is Cheng and Tzeng (2014), who argue that leverage

has a positive relationship with firm value in a low-interest economy (Taiwan), but we are going to see what will happen if there is a high-interest rate and cost of debt is high. The reason we choose the Pakistani sector is the nature and condition of the Pakistani banking sector and corporate environment. In the last two decades interest rate in Pakistan has risen too much; the average interest rate for lending is 11.5% from the Year 2005-2019. At the same time, the interest rate in Taiwan drops from 8.7% to 3.8% from 1991 up to 2009. On the other hand, after 2001, Islamic banking in Pakistan has emerged very fast, and according to recent reports, the Islamic banking industry in Pakistan reported 29% growth for the year 2020, which is the highest in history, while the overall banking sector recorded 14.5% growth in the same year. Along with the high cost of debt, the banks in Pakistan are reluctant to provide long-term debts due to immature security and collateral system, that's why all these hurdles make debt very costly for Pakistani firms, and many businesses are going for partnership and lease type loans under Islamic finance. World Bank data shows a huge decrease in credit to Pakistan's private sector by banks in the last two decades. Figure 1 shows a graphical representation of the lending data for Pakistan, while figure 2 & 3 shows interest rate historical data for Taiwan and Pakistan.

Another factor that makes this study interesting is the tax system of the corporate environment of Pakistan. Many firms in Pakistan in Pakistan are controlled by families or groups of people who have stakes in multiple businesses. Also, the tax system in Pakistan is not much developed. People are escaping from tax-paying, especially the industries, and there are many incentives and tax exemptions given to different sectors by the government.

Keeping in mind all these problems, our study analyzed the leverage level of all the non-financial firms in Pakistan and investigated how the debt impact value of frim and how the other factors influence this relationship.
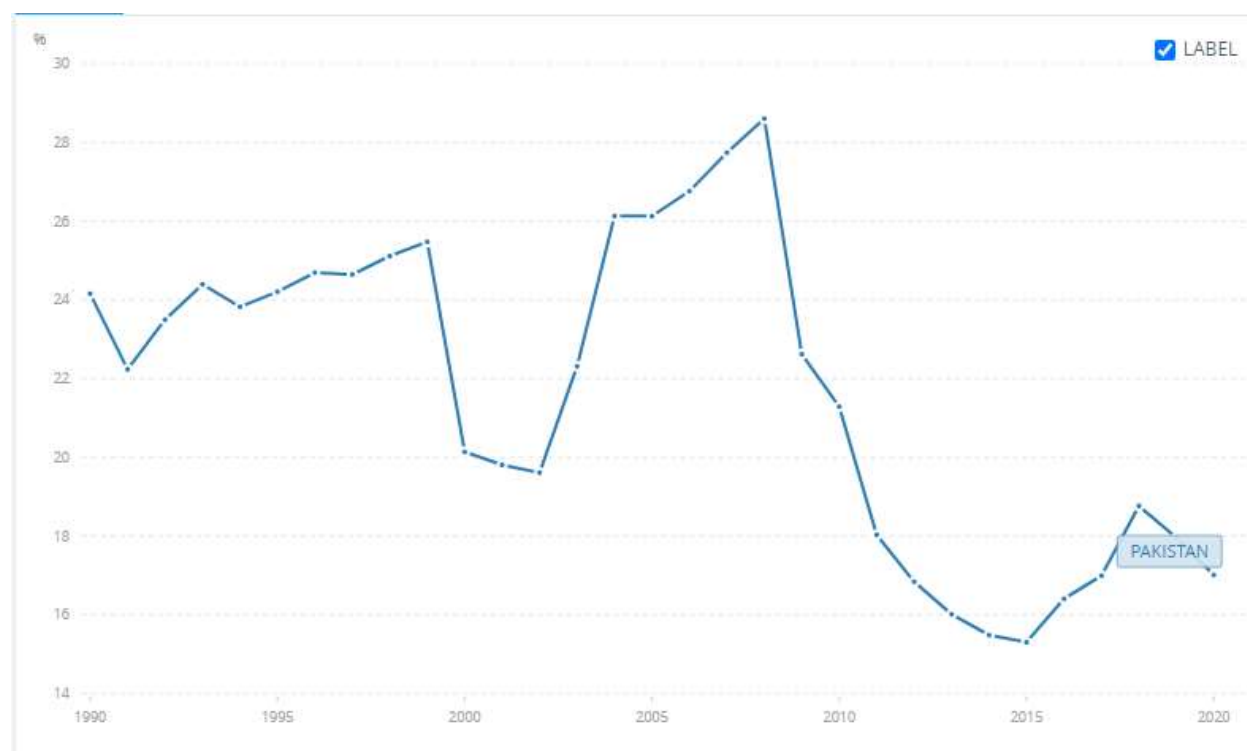
Source: World Bank Data

Figire1. Domestic credit to the private sector as percent (%) of GDP in Pakistan (1990-2020).

LITERATURE REVIEW

After the emergence of many capital structure theories like M&M's (1958) proposition theory, Tradeoff theory, pecking order theory, and market timing theory, etc., many researchers conducted studies to check the practical implications of these theories. M&M's (1958) proposition theory states that the firm value and weighted average cost of capital (WACC) are irrelevant to the financial structure of the firm other things remain constant. Jermias (2008) found that the use of debt financing not only provides a tax shield to the firm but it also improves efficiency because of restrictive covenants imposed by the lenders. In comparison, Phillips and Sipahioglu (2004) and Qureshi (2007) found an inverse association between the level of debt and firm value.

After that, M&M 1963 considered the tax shield effect and modified their original theory (Tradeoff theory). They illustrate that when corporate tax laws allow the deductibility of interest payments, then the market value of the firm will be increasing as a response to leverage. Some studies argue that the use of debt increase as a result of high marginal tax rates (Mackie-Mason, 1990, Graham 1996). Graham 2000, using financial statements of firms, argued that mean corporate tax benefits to firm as a result of debt interest shield is 10% of firm value.

Miller (1977) also considered leverage as a function of increasing firm value. But both the previous theories do not consider the bankruptcy cost, which is the negative side of debt. Wruck (1990) argued as a situation when a firm's operating cash-flows are not sufficient to meet the current obligations, and the firm is forced to take corrective measures. Stiglitz (1972) and Kim (1978) stated that when advantages from marginal tax shield equal marginal bankruptcy costs, this is called the optimal level, where the firm value reaches its maximum level. Altman (1984) and Warner (1977) find that the bankruptcy costs and financing decision, they argued that using debt financing can create direct and indirect bankruptcy costs. Therefore, Bankruptcy costs may be one of the hurdles affecting the level of financing decision.

Frank and Goyal, 2009 argued that there is no optimal capital level. The firm chooses the source of financing in view of the cost of financing and access, i.e., internal funds, debt, and equity. Jensen (1986) proposed the Free cash flow theory and argued that debt might reduce the agency cost by reducing the availability of free cash flow to the managers.

To get a deep view of the sprawling research field, two ways of thinking can be explored. First, one can use the pecking order theory, where the company is supposed to choose internal funds before external financing without planning for any predetermined debt-to-equity ratio. Secondly, one can follow a trade-off framework to explain the firm's choice of capital structure.

Further research leads to acceptance and rejection of these two main theories (Fama & French, 2002; Ozkan, 2001). In the presence of information asymmetry or imperfections such as recapitalization costs, deviations from the optimum may not be perfectly adjusted for in each period, as stated in static trade-off theory (Fischer et al., 1989).

Some authors argued that some internal factors matter a lot in deciding capital structure. Factors that are considered as the most important are profitability, the tangibility of assets, size, growth, depreciation, and earnings volatility (Frank & Goyal 2009). De Jong, Kabir, and Nguyen, (2008), by studying firms' specific characteristics across 42 countries, found that firm-specific determinants of leverage differ across countries, and also there is an indirect impact because country-specific factors also influence the roles of firm-specific determinants of leverage. Some studies argued that both country and industry are significant factors influencing capital structure in Asia (Aggarwal, 1990; Krishnan & Moyer, 1997).

Further studies argued that some internal factors or economic factors affect the financing decisions (Mackie-Mason, 1990, Graham 1996) argued that leverage increase with an increase in the tax rate, which can benefit in increasing firm value. (Barton & Gordon, 1988; Bauer, 2004) argued that profitability can lead to change in future financing decisions. At the same time, Bokpin (2009) found that macro-economic factors can affect firm financing decisions. Bhamra, Fisher, and Kuehn (2011) claim that monetary policy influences corporate scenarios through its impact on inflation and inflation expectations. In comparison, some studies found that stock return affects the capital structure of a firm (Hovakimian, Opler, and Titman, 2001) claim that stock volatility affects the choice of debt and equity by managers.

Countries with strong and vital financial systems are likely to provide greater access to the financial resources needed for innovation and investments (Edquist 2005; Huang & Xu 1999) as compared to countries that are not so well equipped with resources and infrastructure. These Sources of inputs include banks, stock markets, and venture capital. While stock markets provide access to equity for established firms, banks serve as a source of funding for private businesses and small firms from established sectors (Levine & Zervos 1998). Selecting equity or debt financing depends on corporate structure and country-specific economic factors. The main factors are interest rate and tax.

There are several studies conducted on the country level in Pakistan, like Raza (2013) argued that there is a negative relation between leverage and firm performance, for textile industry leverage ratio is high, and on average, profitability is negative due to high cost of long-term debt. Scholars (Raza, 2013; Farooq & Masood, 2016) found that in the cement sector, there is a positive relationship between leverage and firm performance. Other studies (Raza, 2013; Farooq & Masood, 2016; Khan, 2012) argued that there positive/negative relationship between leverage and firm value in different sectors of the Pakistani industry. Shah, A & Khan, Safi. (2007) found that there were significant industry effects, and their studies agreed with trade off theory & pecking order theory. There are some other famous studies on the capital structure design and decisions in Pakistani industry (e.g., Mumtaz et al., 2013; Rafique, 2011; Shah & Hijazi, 2004; Sheikh & Wang, 2011; Fareed, et al., 2014), but they all focus on small periods and specific sectors, and some include era before 2000, while this study will focus on more detailed period and will cover all sectors from the industry as well as will focus on industry wise leverage position.

HYPOTHESIS
On the basis of the above discussion, our proposed hypothesis will be as under;
H1= Leverage will increase the firm value if the financial quality is better
H2: Debt-Tax shield will increase the value of the firm if bankruptcy cost is low
H3: Non-Debt-Tax shield will have a positive impact on firm value of financial quality is better
H4: High free cash flow will have a negative impact on the value of the firm
H5: Profitability will positively impact the value of the firm.
H6: Leverage will positively impact the value of the firm if the growth opportunities are higher;
H7: Dividend payment will have a positive impact on firm value

H8: A firm with more liquid assets will have a higher value
H9: Firm with more tangible assets will have high debt in their capital structure, which will lead to a higher value of the firm
H10: There exists an optimal capital structure while using debt financing

DATA AND METHODOLOGY

The study uses data from companies on the Karachi stock exchange (Pakistan). The sample period consists of fifteen years from 2005 to 2009. The data was collected from reports published by the State bank of Pakistan.

This study will use the Generalized Method of Moment (GMM) with fixed effects to estimate our variables with one step lag of dependent variable as an independent variable in the model for our linear sturdy. And next, we will use Hansen's (1999, 2000) fixed effect panel threshold regression model for threshold study, with an advanced tool proposed by Wang (2015). to check in the quadratic effect of leverage on firm value and the quadratic nature of other variables on the relationship of leverage and firm value. We check the rationality of data by using IPS and LLC tests.

We will value the use-value of the firm, proxy by Tobin's Q (V_L) as Dependent variable, while independent variables are Leverage (D_{it}) proxied by debt to asset ratio, ZScore (Altman, 1984), Debt Tax shield (Tax) proxied by annual tax, Non-Debt tax shield (Dep) proxied by the depreciation of the year, Free cash flow per share (FCPS), Profitability (EA) proxied by EBIT to net-income ratio, Growth (GR) proxied by the annual change in total assets, liquidity (CR) proxied by current ratio, Tangibility (FA) proxied by fixed assets to total assets ratio, Dividend (DI) proxied by dividend to net-income ratio, and two control variables Size proxied by the log of total assets, Age proxied by the number of years since the company started its operations. Our linear model will be like this

$$V_{L,it} = \alpha_1 + \alpha_2 D_{it} + \alpha_3 Zscore_{it} + Size + Age + \varepsilon$$

$$V_{L,it} = \alpha_1 + \alpha_2 D_{it} + \alpha_3 Tax_{it} + Size + Age + \varepsilon$$

Same we will use different variables along with debt ratio to evaluate their relationship with firm value and as well as their impact on the relationship said above.

Our quadratic model for panel threshold regression study is Hansen's (1999, 2000);

$$V_{it} = \begin{pmatrix} \mu_i + \theta' h_{it} + \beta_1 D_{it} + \varepsilon_{it} & if \ q_{it} \leq \Upsilon \\ \mu_i + \theta' h_{it} + \beta_2 D_{it} + \varepsilon_{it} & if \ q_{it} > \Upsilon \end{pmatrix}$$

ß1 = is the threshold coefficient when its value is lower than estimated Υ
ß2 = is the threshold coefficient when its value is higher than estimated Υ
Υ is threshold parameter of any variable q used as a threshold parameter, q=(Leverage, Zscore, Profitability, FCPS, Growth, Tangibility) and D_{it} is the regime dependent variable which is debt to asset ratio in our model
The errors ε_{it} are assumed to be independent and identically distributed (i.i.d) with mean zero, and finite variance σ^2 (ε_{it} i.i.d (0, σ^2))
"I" represents different firms, and "t" represents different time periods. μ_i is the individual (fixed) effect,

RESULTS AND DISCUSSION

Table 2 displays the regression results for a linear model. The results show that there is a positive relation between leverage (D_{it}) and firm value (V_L), financial quality (Zscore), debt-tax shield (Tax) and non-debt tax shield (DEP), free cash flow (FCPS), and firm profitability (EA) in the presence of leverage. On the other hand, if we see leverage become negative with ZScore, Depreciation, and profitability, while in the presence of Tax and free-cash-flow, leverage is positive.

Table 1: Summary statistics of the variables used in regression.

Variable	Obs	Mean	Std. Dev.	Min	Max
V_{it}	3570	1.281	1.523	-8.788	19.641
D_{it}	3570	.278	.222	0	1.383
ZScore	3570	1.245	1.092	-.018	21.139
Tax	3570	.203	1.34	-11.055	51.207
Dep	3570	.034	.045	-.028	2.2
EA	3570	.095	.134	-1.961	2.031
FCPS	3570	8.672	70.422	-986.031	1653.51
GR	3570	.125	.323	-.868	9.877
DI	3570	.33	2.58	-35.786	129.839
CR	3570	1.698	3.866	.007	138.527
Tangibility	3570	.443	.216	0	.985

Table 2: Results for hypotheses H1 to H5.
Dependent Variable is Value of Firm

	H-1	H-2	H-3	H-4	H-5
Variables	Coef.	Coef.	Coef.	Coef.	Coef.
VL.it (Lag)	.553*** (19.52)	.823*** (11.69)	.667*** (.015)	.605*** (8.32)	.618*** (21.90)
Dit	-16.152*** (-2.61)	4.818*** (6.05)	-19.207*** (2.609)	29.259** (2.19)	-23.574*** (-3.480
Z-Score	9.7*** (5.68)				
Tax		15.299* (1.68)			
Dep			97.772*** (37.516)		
FCPS				.244*** (2.64)	
EA					47.474** (2.57)
Size	3.952*** (3.41)	9.461* (4.06)	-.489 (0.321)	8.274** (2.53)	1.083 (1.0)
Age	.078 (0.58)	122*** (0.47)	.179*** (0.04)	.308 (1.045)	.042 (0.25)
Constant	-69.276*** (-3.48)	-152.907*** (-4.62)	3.861 (5.717)	-146.922*** (-2.86)	-14.613 (-0.80)

Note: Table 4 displays results of system-GMM for hypotheses H1 to H5.

The dependent variable is the value of the firm, which is equal to Tobin's Q. Independent variable is VL.it (Lag) is the lag value of the Dependent variable used in the GMM system method as an explanatory variable. Dit is the leverage of a firm equal to the Debt to Asset ratio of the firm. Z-Score is the Altman financial quality of the firm. Tax is the total tax to EBIT ratio. Dep is Depreciation to total assets ratio. FCPS is Free cash flow to total outstanding shares of the company at the end of the year. EA is the profitability of a firm equal to EBIT to total assets. Size is the log of a firm's total assets. Age is the number of years since the company started its operations.

Table 3: Results for hypotheses H6 to H10.
Dependent Variable is Value of Firm

	H-6	H-7	H-8	H-9	H10
Variables	Coef.	Coef.	Coef.	Coef.	
VL.it (Lag)	.596*** (21.13)	.574*** (6.37)	.86*** (35.04)	.65*** (38.48)	.93*** (53.34)
Dit	-32.022*** (-5.73)	-44.433** (-2.31)	-21.74** (-2.21)	-14.843*** (-3.86)	-25.30*** (-5.45)
GRit	-6.473* (-1.90)				
DI		11.271** (2.16)			
CR			2.306** (2.40)		
FA				-46.957*** (-5.25)	
Dit (Quadratic)					23..26*** (8.66)
Size	1.635 (1.43)	-2.286 (-0.63)	2.842** (2.17)	5.824*** (4.93)	-0.269 (4.48)
Age	.321** (2.43)	.352 (0.81)	.178** (2.00)	.432*** (5.22)	.018 (1.76)
Constant	-25.222 (-1.33)	31.853 (0.53)	-46.63** (-2.18)	-78.273*** (-3.67)	7*** (-4.85)
*** p<.01, ** p<.05, * p<.1					

Note: Table 5 displays results of system-GMM for hypotheses H6 to H10.

The dependent variable is the value of the firm, which is equal to Tobin's Q. Independent variable are VL.it (Lag) is the lag value of Dependent variable used in the GMM system method as an explanatory variable Dit is the leverage of firm equal to Debt to Asset ratio of the firm. Dit (Quadratic) is the quadratic function of Dit. The purpose is to identify the existence of optimal capital structure. Z-Score is the Altman financial quality of the firm. GRit is the growth and is equal to the annual change in total assets. DI is the ratio of total dividend to net income. CR is the liquidity of a firm, equal to the current ratio. FA is the tangibility of a firm and is equal to Net fixed assets to total assets. Size is the log of a firm's total assets. Age is the number of years since the company started its operations.

Table 4: Shows threshold statistics and coefficient of variables.
Dependent Variable is Value of Firm

Threshold variables	(2) Threshold-Level (ϓ)	(3) Lower	(4) Upper	(5) Leverage Coefficient (α)	F-Stat
	Single Threshold (ϓ1)			α1	
Dit	0.673*	0.671	0.677	1.11***	2.48
ZScore	2.02	1.97	2.08	1.085***	2.76
EA	-0.152**	-0.172	-0.145	0.063**	6.79
FCPS	104.863	95.775	116.568	-3.022	52.45
GRit	0.869*	-	-	1.050***	7.55
FA	0.576	0.574	0.578	1.0582***	39.83
	Double Threshold (ϓ2)			α2	
Dit	0.433***	0.430	0.447	-0.974***	17.43
ZScore	2.99***	2.249	3.028	29.769***	15.87
EA	0.034**	0.034	0.035	-0.663**	22.33
FCPS	-11.300***	-12.845	-11.023	34.693***	9.06
GRit	0.112	0.0965	0.1760	-4.67**	2.33
FA	0.687	0.629	0.717	2.719***	104.47

Note: F-statistics and p-values result from repeating the bootstrap procedures 300 times for each of the three bootstrap tests, ***, **, and * indicate significance at the 1, 5, and 10% levels, respectively.
Note: α1, α2, and α3 are the estimated coefficients of the regimes of Debt < ϓ1, Debt > ϓ2, ϓ3>Debt
Column 1 shows the threshold variable. Column 2 shows the exact threshold value, while column 3 and 4 shows the upper and lower boundary of threshold movement. Column 5 shows the coefficient value of leverage as a result of the threshold level of the specified variable in column 1

Table 3 displays results for the remaining variables, and we can see that growth GR and tangibility FA are having negative while dividend DI and liquidity CR have a positive relationship with firm value in the presence of leverage. While interestingly, leverage has a negative relationship with firm value in the presence of these variables. Finally, we also check the presence of optimal level of leverage in Pakistani industry, we use a quadratic term of leverage, and the result is interestingly positive for leverage, which means that there exists an optimal capital structure.

Table 4 shows results for the Fixed effect -dynamic Panel threshold (Hansen 1999) model. We included results for two thresholds. Only the third threshold is omitted due to space limitations. Column 2 shows the threshold parameter value, which is changing in every row. Column 3 & 4 shows the upper and lower limit for parameter values, while column 5 shows the coefficient value of leverage which is regime dependent variable, as a result of the threshold value of parameter variables. For example, if the debt level is 0.6, the effect of debt on firm value will be 1.1, and if the Z-Score value is 2.02, as a result, at that point effect of leverage on firm value will be 1.085. Then same results for FCPS, growth, and tangibility. The results show that leverage has optimal nature while the other variables are also non-linear in nature.

CONCLUSION

This study investigated the capital structure of Pakistani firms and its impact on firm value. The study analyses the debt level of firms listed on the Pakistani stock exchange and how other variables impact this relationship. The results show that the mean debt for the overall industry is 0.27, while the highest value is 0.42 for the textile sector only, which is the largest sector in the Pakistani industry. The study further exhibits that firms are not benefitting from leverage in true meaning due to high costs and complicated processes. The findings also show that most of the firms use internal funds for growth and investment, while leverage is avoided due to high costs. Threshold data also shows that other variables like ZScore, Profitability, FCPS, and growth are affecting the relationship between debt ratio and firm value in different ways. Further, the data shows that in the case of negative profitability, debt has a positive and significant coefficient on the value of the firm. The results also show the quadratic nature of leverage; hence we can say that there is an optimal level of capital structure, and above or below this level firm value will be changed depending on other contextual factors like financial quality, level of free cash, growth as well as the size of the firm.

Important findings of the study are H10, which shows the existence of optimal structure, and then threshold analysis verifies it by giving a positive impact of leverage above 0.66, which implies that firms should go for higher loans to get positive benefits.

IMPLICATIONS

The low level of leverage in Pakistan is due to the high cost, the emergence of Islamic banking, and family control of the business. Private credit from banks to industries matters a lot in economic development. Therefore, government should ease borrowing from banks to strengthen economic development.

We also did a sector-wise analysis, but results are not included due to space limitations. Also, third threshold results, rationality checking (Table 5), and correlation analysis are not included due to space limitations.
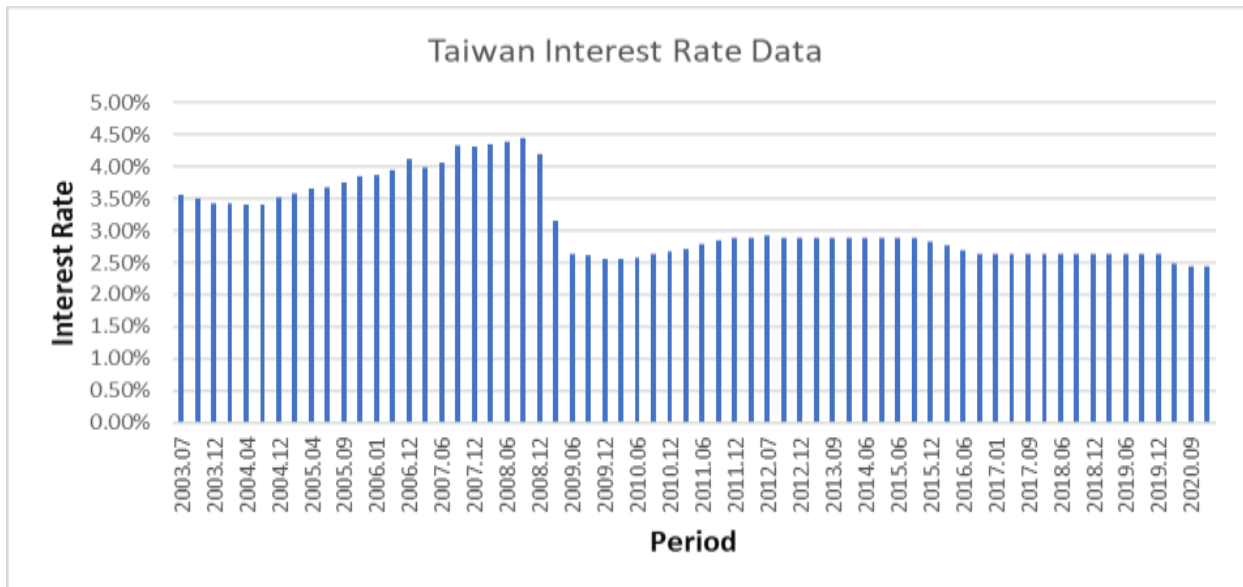
Table 5. Panel unit-root test results.

Variables	LLC	IPS
VL.it	-14.0278***	-1.9767***
Dit	-5.6320***	-1.7984***
ZScore	-13.8323***	-2.0176***
FCPS	-11.1474 ***	-2.5009***
EA	-15.3656***	-2.5318***
GRit	-21.0528***	-4.0579***
FA	-11.9661***	-1.9753***
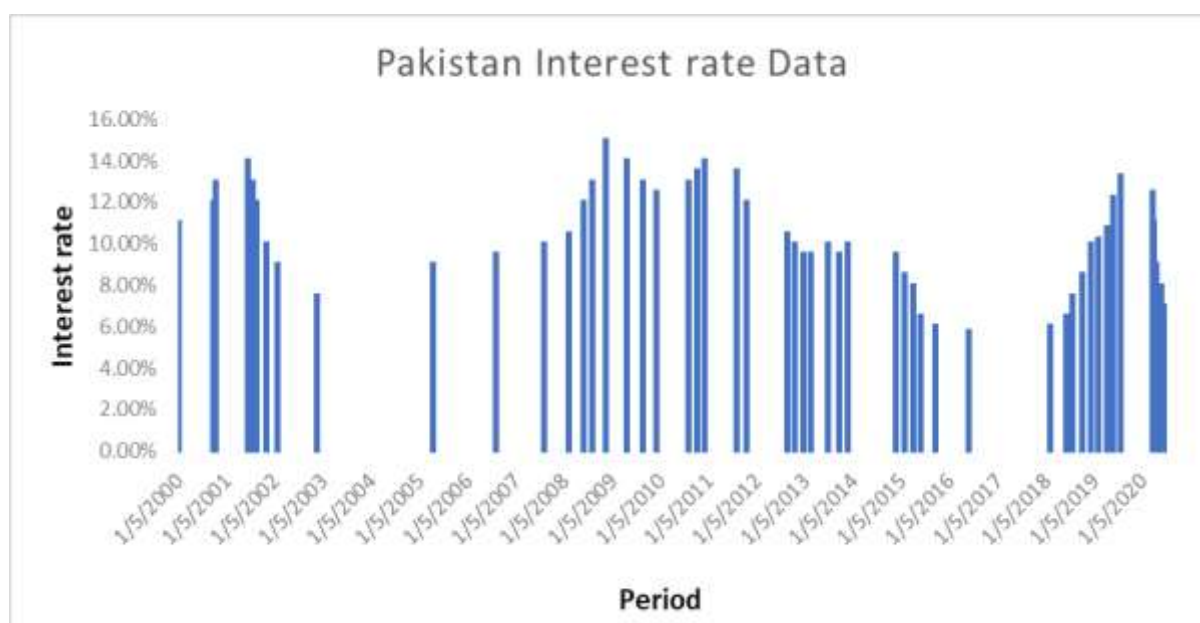
Data Source: State bank of Pakistan.
Figure 2: Pakistan Interest rates statistics (2000 – 2020).

Data Source: Central Bank of the Republic of China (Taiwan).
Figure 3: Taiwan Interest rates statistics (2003-2020).

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