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Firm Characteristics And Financing Decision: The Moderating Effect Of Covid-19 In Emerging Market

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	Abstract
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Keywords:	leverage ratio, Covid-19, regression model, tangibility, policy makers



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INTRODUCTION

The financing decision is one of the challenging decisions that managers are confronted with because of its impact on firm value. The capital structure irrelevance theory was proposed by Modigliani and Miller (1958) which have raised debate about the optimal capital structure. Numerous theories have been developed such as Agency Theory (Jensen & Meckling, 1976), the Trade-Off Theory, the Bankruptcy Cost Theory (Titman, 1984), the Pecking Order Theory (Myers & Majluf, 1984), the Signaling Theory (Myers, 1977). These theories have provided alternative justification of the relevance of financing decisions in an imperfect market.

Subsequently, researchers have tried to find factors of the capital structure decision. Researchers have identified various firm-level factors i.e growth opportunities, profitability, risk, asset tangibility, liquidity and firm size (Bhaird and Lucey, 2010; Abdeljawad et al., 2024; Touil and Mamoghli, 2022; Bharath, Pasquariello, and Wu, 2009; Cassar and Holmes, 2003 (Rehman et al., 2023; Rehman & Rehman, 2011, 2014, 2015; Rehman, Rehman, et al., 2015)) as potential determinants of capital structure. However, there is lack of consensus among the results reported in the existing available literature (Akbar et al., 2013; Rajan & Zingales, 1995; Rehman & Rehman, 2014; Rehman, Rehman, et al., 2015; Voutsinas & Werner, 2011).

Further, majority of studies on capital structure were carried out and have focused on normal economic conditions. There are few studies that have focused on crisis period especially Covid-19 period. Rehman et al. (2025) for example has examined the performance of Islamic banks during crisis period and have overlooked the capital structure behavior during pandemic period. Additionally, there is also dearth of research on the moderator role of Covid-19 in the firm level characteristics and capital structure. As the COVID-19 pandemic has brought about new challenges to the corporate financing decisions across the globe. Therefore, the role of Covid-19 pandemic on the financing decision is area which needs thorough investigation. Till date, there is relatively less or no studies that have examined the capital structure behavior during pandemic period, and the moderator role of Covid-19 in an emerging market like Pakistan.

Therefore, the current study will fill these gaps in the available literature by focusing on firm-level factors that influence the financing decision during the pandemic period and to test the moderator role of Covid-19 pandemic on the connection between them using panel data set from Pakistani non-financial listed firms.

LITERATURE REVIEW

The irrelevance of capital structure theory proposed by Modigliani and Miller (1958) have sparked wide debate about the relevance of capital structure in an frictionless market. Various theories have been developed such as Agency Theory (Jensen & Meckling, 1976), the Trade-Off Theory, the Pecking Order Theory (Myers & Majluf, 1984), the Signaling Theory (Myers, 1977), Bankruptcy Cost Theory (Titman, 1984). These theories have provided alternative justification of the relevance of financing decisions in an imperfect market.

In search of optimal capital structure, various micro (firm level) factors have been recognized by existing literature as potential factors explaining the behavior of capital structure. These firm-level factors are age, size, tangible assets, growth opportunities, risk, liquidity etc ((Cassar & Holmes, 2003; Chang et al., 2014; Rehman, Rehman, et al., 2015) . These studies have used various firm level factors and modelled them as a function of capital structure.

Existing literature has provided evidence in support of the pecking order theory. Using data on UK private firms Rehman, Rehman, et al. (2015) validated the pecking order theory. Existing literature has also confirmed the forecasts of the pecking order (Akbar et al., 2017; Akbar et al., 2013; Al-Najjar & Taylor, 2008; Hol & Van der Wijst, 2008; Psillaki & Daskalakis, 2009; Rehman & Rehman, 2015; Van der Wijst & Thurik, 1993). However, some studies have supported the trade-off theory which predicts the opposite. These studies have reported the positive rather than negative coefficient of ROA and debt ratio ((Hol & Van der Wijst, 2008; Panno, 2003). Others have reported insignificant results during the crisis period (Akbar et al., 2017; Rehman, Rehman, et al., 2015)

Existing literature reveals that firms with more growth opportunities rely heavily on external financing. This view is supported by (Lang et al., 1996; Leary, 2009; Rajan & Zingales, 1995; Rehman, Rehman, et al., 2015). Akbar et al. (2013) finds that growing UK privates firms rely heavily on external debt due to insufficient internal funds. Others reported negative coefficient of growth opportunities (Eriotis et al., 2007; Rehman, Rehman, et al., 2015). However, some studies have find statistically insignificant result between growth opportunities and debt ratio (Akbar et al., 2017)

Similarly, there is disagreement in the connection between asset tangibility, size and debt ratio. Some studies have reported positive coefficient of tangibility & Size with the debt ratio while others have reported negative connection between these variables ((Abor, 2005; Ahmed Sheikh & Wang, 2011; Chen, 2004; Rehman, Rehman, et al., 2015). The lack



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of consensus and inconclusive results suggests further research about this issue in normal period and in crisis period. Some authors have called for more research to better understand the debt and equity financing choice of Pakistani firms (Rehman, 2025).

The above-mentioned factors have helped us to better understand the firm-level factor influencing debt-equity choice of firms. However, variation in the financing decision is not fully explained by the traditional determinants of capital structure (Lemmon et al., 2008). Others studies have cast doubt on the usefulness of corporate financing decision that is exclusive based on the demand side factor (firm-level factors) (Morellec, 2010). Some studies have provided evidence that variation in the supply of capital also plays an important role in firm financing decision (Akbar et al., 2017; Rehman & Rehman, 2014; Rehman, Rehman, et al., 2015; Rehman, Saeed, et al., 2015)

Literature suggests that supply side factors should also be considered along with firm level factors in modelling the firm financing decision especially during the crisis period (Akbar et al., 2017; Akbar et al., 2013). Using data from the UK private firms, Rehman, Rehman, et al. (2015) provide evidence that credit supply condition be consider alongside demand side factors in determining the firm financing decision. However, none of these studies have focused on global health pandemic and its subsequent impact on firm debt-equity choice.

The global health pandemic, which was a health emergency not a financial crisis, has adversely affected the health sector as well as the real sectors of the economy (Hemingray, 2023; Leal Filho et al., 2022; Yong & Sia, 2023). However, its potential impact on the firm financing decision has largely been ignored in the exiting literature. Some studies have called for more research on the issue (Rehman et al., 2025; Rehman, 2025). Further, the moderating role of the Covid-19 pandemic has never been thoroughly investigated till date especially in the emerging market like Pakistan. Therefore, this study aims to address the gaps in the exiting literature by focusing on firm-level factors and crisis-period as determinants of firm capital structure. Additionally, to explore the moderating role of Covid-19 on non-financial Pakistani listed firms.

METHODOLOGY

To explore the factors of leverage ratio and to investigate the moderator role of Covid-19 pandemic on the connection between them, the study used a quantitative research design. Panel data set on non-financial firms has been utilized from 2013 to 2023. Financial firms were excluded due to standard reason (For Details see, Akbar et al., 2017; Akbar et al., 2013; Rehman et al., 2023; Rehman & Rehman, 2014, 2015; Rehman, Rehman, et al., 2015; Rehman, Saeed, et al., 2015). Data was obtained from various sources such as the Annual Reports of the companies and the website of PSX. The final sample consists of 1,559 firm-year observations. To avoid outlier problem, the study used winsorization method to minimize the impact of extreme values on the regression model results.

To achieve the objectives, insight from the available existing literature (Akbar et al., 2017; Akbar et al., 2013; Proença et al., 2014; Rehman et al., 2025; Rehman & Rehman, 2014; Rehman, Rehman, et al., 2015; Rehman, Saeed, et al., 2015; Rehman, 2025; Zeb et al., 2014) is taken and uses the following models which is as follows

$$\text{Leverage} = \beta_0 + \beta_1 \text{Profitability} + \beta_2 \text{Tengibility} + \beta_3 \text{Growthoption} + \beta_4 \text{Size} + \beta_5 \text{Covid} + \epsilon_{it} \text{---} \text{-----} \text{---(A)}$$

To find the moderator role of Covid-19 pandemic the study modified model (A) and allows for the interactive terms, the resulting model is produced here as model (B)

$$\text{Leverage} = \beta_0 + \beta_1 \text{Profitability} + \beta_2 \text{Tengibility} + \beta_3 \text{Growthoption} + \beta_4 \text{Size} + \beta_5 \text{Covid} + \beta_6 \text{Profitability} * \text{Covid} + \beta_7 \text{Tangibility} * \text{Covid} + \beta_8 \text{Growth opportunity} * \text{Covid} + \beta_9 \text{Size} * \text{Covid} \epsilon_{it} \text{---} \text{-----} \text{---(B)}$$

EMPIRICAL RESULTS

Descriptive statistics are given below in table 1 below. The table shows firm level observation which is 1559. Basic statistics about leverage, profitability, tangibility, growth opportunities and size are given below. These values show consistent patterns and indicate that all values are well withing the range and there are no extreme or abnormal values reported in the table.

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Leverage	1559	.6	.127	.443	.756
Profitability	1559	3.066	2.414	-3.4	5.8
Tangibility	1559	.513	.143	.35	.7
Growth opportunity	1559	0.034	1.34	0.043	3.234
Size	1559	15.614	1.194	14	17



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Covid	1559	.5	.5	0	1
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The study also calculated the correlations between variables, the results are reported in table 02 below. Table 02 reveals no high correlations between study variables, suggesting absence of multicollinearity issue in the data. According to literature if the collinearity between variables is less than 0.80 then there is no problem of multicollinearity (Gujarati, 2003). The study also conducted VIF test, however, to save space the result is not reported. All the statistics, i-e tolerance value and VIF falls within the acceptable range signify the lack of multicollinearity issue in the data set.

Table 02 Collinearity among variables

Variables	(1)	(2)	(3)	(4)	(5)
(1) leverage	1.000				
(2) Profitability	-0.079 (0.002)	1.000			
(3) Tangibility	0.117 (0.000)	-0.309 (0.000)	1.000		
(4) Growth opportunity	0.185 (0.000)	0.146 (0.000)	-0.104 (0.000)	1.000	
(5) Size	0.073 (0.004)	0.179 (0.000)	-0.223 (0.000)	0.239 (0.000)	1.000

Further, as the study is using panel data set therefore, Hausman specification test is used. The purpose is to decide which effect (fixed or random effect) is most appropriate in the current study case. The result of Hausman model test is reported in table 03 below

Table 3: Husman Test

$$\begin{aligned} \chi^2(5) &= (b-B)'[(V_b - V_B)^{-1}](b-B) \\ &= 12.77 \end{aligned}$$

Prob > chi2 = 0.0257

As the Prob > chi2 = 0.0257 which is significant at the level of 05 percent suggesting that we will accept alternative hypothesis that is fixed effect is appropriate in this study case as compared to other (random) effect. Therefore, based on Hausman test, the fixed-effect panel regression model is used.

Model-A is run to investigate the connection of micro (firm-level) factors, Covid-19 and the leverage ratio. The results of model-A is reported in table 04 below

Table 04 Impact of Firm Level Characteristics and Covid-19 on Capital Structure

leverage			t-	p-	Interval]		Sig
	Coef.	St.Err.	value	value	[95% Conf		
Profitability	-.005	.001	-5.49	0.000	-.006	-.003	***
Tangibility	-.005	.022	-0.21	.834	-.049	.039	
Growth Opportunity	.001	0	2.82	.005	.001	.002	***
Size	.004	.002	1.42	.157	-.001	.008	
Covid	-.008	.003	-2.45	.015	-.015	-.002	***
Constant	.557	.041	13.52	.000	.476	.638	***
R-squared	0.033		Number of obs		1559		
F-test	9.555		Prob > F		0.000		

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



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Table no 04 shows that Profitability has negative coefficient. The result is also highly significant. This shows profitable firms prefer internal finance and rely less on external financing when internal funds are available. This confirms the forecasts for the Pecking Order theory. This finding is consistent with the results reported in (Rehman & Rehman, 2014; Rehman, Rehman, et al., 2015). The coefficient of tangibility is negative however; the result is statistically not significant. This may suggest that asset tangibility doesn't play or impact the leverage ratio of firms. Result is, however, consistent with the view of Harc, M., (2015).

Growth opportunities carry positive coefficient. The result is also highly statistically significant. Firms with better growth opportunities need more external funds. This finding is in line with the conclusions reported in (Al-Najjar & Taylor, 2008; Rehman & Rehman, 2014; Rehman, Rehman, et al., 2015). The coefficient of size is positive, which confirms the predictions of trade-off theory however, the result is statistically not significant. Size carries positive coefficient which is in line with the findings of Reid, G. C. (2003). As the result is statistically not significant therefore robust conclusion cannot be drawn.

The coefficient of main variable of interest i-e Covid-19 is negative and also highly statistically significant. This shows that leverage decreased during the Covid-19 period. The uncertainty created by Covid-19 has led the firm to precautionary financing by firms. The increased uncertainty and cost of external financing due to the global pandemic have led the firm to use less external financing and rely more on internal funds.

Further, to investigate the moderating role of the Covid-19 pandemic, the study run model (B). The result of the regression model B is reported in table (5) below.

Table 05 Moderating Role of Covid-19 Crisis

leverage	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Profitability	-.005	.001	-4.25	0.00	-.007	-.003	***
Tangibility	.022	.026	0.85	.395	-.029	.073	
Growth opportunity	.001	0	2.47	.014	0	.002	***
Size	.002	.003	0.70	.483	-.004	.008	
Covid	-.025	.05	-0.49	.624	-.124	.074	
Profitability*Covid	.000	.001	0.33	.742	-.002	.003	
Tangibility*Covid	-0.467	.02	-1.81	.070	-.097	.003	
Growth opportunity *Covid	8.19e-06	.0005	0.02	.988	-.001	.001	
Size*Covid	.002	.003	0.82	.411	-.003	.008	
Constant	.565	.048	11.81	0	.471	.659	***
R-squared	0.037		Number of obs	1559			
F-test	5.966		Prob > F	0.000			
Akaike crit. (AIC)	-4361.256		Bayesian crit. (BIC)	-4307.738			

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

Findings of micro (firm-level) factor (i-e profitability, tangibility, growth opportunities and size) are similar to the one as reported in table 01 above. The interactive term i-e Covid-19 * profitability is positive but not statistically significant. In other words, the Covid-19 crisis did not moderate and didn't change the association between profitability and debt ratio. The interactive term Covid-19 and tangibility carry negative coefficient and this finding is significant. It indicates Covid-19 has moderated the asset tangibility and leverage relationship during the crisis period. Tangible asset was used as a collateral in obtaining external financing (debt financing) which is weakened during pandemic period. The lender seems cautious, with less reliance on tangible assets as collateral during the pandemic.

The interactive term Growth Opportunities × COVID-19 is positive but not significant. It shows that crisis has not affected the relationship between growth opportunities and leverage during crisis period. Similarly, the interactive Size * Covid-19 is positive and statistically not significantly. In other words, the moderator role of pandemic crisis is



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not statistically significant. This means that moderating role of pandemic has not been established between these variables in the crisis period.

To further check whether the study results are robust and are not driven by any econometric issues such as heteroscedasticity and serial correlations, the study adjusts for heteroscedasticity and serial correlation by using robust standard error which control for both of these econometrics' issues. To preserve space the result is not reported here, the result of the control variables are materially same as the result reported in table 04 above. However, none of the interactive terms was statistically significant which shows the lack of moderating role of pandemic between firm financing decision and firm level factors.

CONCLUSION

The study aims to explore the firm-level factors influencing capital structure decision with moderating role of Covid-19 pandemic. For this purpose, panel data set on Pakistani listed firms is used. The results show that profitability is the significant factor affecting the firm financing decision. It implies that gainful firms rely on internally generated funds during normal and uncertain time period and avoid external finances when internal funds are available. Growth opportunities also influence the financing decisions, but the result is statistically weak. However, tangibility and size don't statistically influence the leverage ratio. Covid-19 pandemic has negative and statistically significant impact on financial structure of Pakistani firms. However, it becomes statistically insignificant when interactive terms are used in the model. Further the interactive term Covid-19 with firm level variables is statistically not significant which implies that pandemic has not materially moderated the connection between capital structure and firm-level characteristics suggesting the lack of moderation of global Pandemic.

The study suggests further research on the issue to better understand capital structure behavior of firms. Future research may consider macroeconomic factors, Covid-19 and firm level factors in explaining the behavior of capital structure. Comparative studies will also help to better comprehend the factors responsible for financing behavior of firms before and during the crisis period.

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