




# “Relationship between financial risks and firm value: A moderating role of capital adequacy”

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# RELATIONSHIP BETWEEN FINANCIAL RISKS AND FIRM VALUE: A MODERATING ROLE OF CAPITAL ADEQUACY

## Abstract

The study of firm value and financial risks became more important after the global financial crisis of 2007–2008, as the required risk was mismanaged, resulting in a deterioration in firm value. It is important to study the relationship between financial risks and firm value. This study aims to examine the moderating effect of capital adequacy on the relationship between financial risks and the firm value of listed banks in Pakistan. This study is based on half-yearly secondary data of 560 sample observations from 2009 to 2021. Multiple regression and panel data estimation techniques were employed for the analysis. The study used firm value as a dependent variable, proxied by Tobin's Q, along with five independent variables and one moderating variable. The results of this study indicate that a higher capital adequacy ratio (CAR) increases firm value and has a moderating effect on financial risks and firm value. Nonperforming loans, net interest margin, and cost income ratio are found to have a significant negative relationship with firm value. The study concludes that the stock prices of listed banks in Pakistan are declining persistently, which causes the stock's worth to shift from being inflated to being undervalued.

## Keywords

firm value, capital adequacy, nonperforming loans, cost income ratio, net interest margin

## JEL Classification

G32, G21, L25, O16

## INTRODUCTION

The market price of equity shares increases market capitalization, which could enhance firm value. In other words, firm value is derived from market capitalization (Kirkpatrick & Radicic, 2020). Considering firm value is crucial because it is one of the essential components of well-governed firms (Esan et al., 2022). After the global financial crisis 2007–2008, the firm value became more important because the share price of various shares was severely affected and exposed to deterioration of market capitalization (Liu et al., 2012; Parida & Wang, 2018).

The global financial crisis 2007–2008 exposed banks to risk because most banks around the world faced financial distress due to an unhealthy risk environment. Hence, the incidents of bank failure due to mismanagement of risk appetite affected firm value (Acharya & Richardson, 2009). Market risk is a phenomenon where losses occur due to changes in market factors like interest rates and foreign exchange rates. The critical market risk measures are value at risk (VAR) and beta (Bouheni et al., 2016). Credit risk represents loan quality problems and exposes nonperforming loans (Kakanda & Salim, 2017). A lack of adequate internal control or system reveals operational risk. Interest rate risk arises when there is a persistent fluctuation in interest rates. Banks face liquidity risk when they have insufficient funds to meet their financial obligations (Bouheni et al., 2016).

The role of the capital adequacy ratio (CAR) is also important because it protects banks against any financial risk by holding a cushion of capital against expected losses. The State Bank of Pakistan recommends that banks comply with the risk-weighted capital adequacy framework proposed under Basel I and II (Rafique et al., 2020). As recommended by the central bank, all banks in Pakistan are required to maintain a minimum CAR of 10 percent (Ayub & Javeed, 2016).

The progress of the overall banking sector in Pakistan was recorded at 6 percent in 2016 with 3.3 percent of gross domestic product (GDP), which indicates a significant contribution to the economy's overall growth. However, the financial system in Pakistan is extensive as it consists of both bank and nonbank financial institutions, but the banking sector is dominant within the country (Akram & Rahman, 2018). The State Bank of Pakistan, the central bank of the country, issued comprehensive risk management guidelines for banks in 2003. The main objective of giving these guidelines was to strengthen the control over financial risks and to support the uniformity (homogeneity) assumption by which all banks were required to implement a system for risk management (Ishtiaq, 2015; Saeed & Tahir, 2015).

Investors use firm value as a yardstick when making investment decisions and trading in securities or equity shares (Shah et al., 2018). Therefore, the maximization of firm value is a core objective of all listed firms around the globe (Chen & Chen, 2011). The firm value of listed banks in Pakistan is decreasing compared to nonfinancial firms. It has been proven after analyzing the figures of the market capitalization of listed banks in Pakistan, which have declined from 2015 to 2020 (KPMG, 2020). Therefore, it is important to examine the relationship between financial risks and firm value in listed banks of Pakistan.

Isidro and Sobral (2015), Agyemang-Mintah and Schadewitz (2018), Vo and Bui (2017), Fallatah and Dickins (2012), Bhuiyan et al. (2020), Vintila et al. (2015), and Mishra and Kapil (2018) were among the earlier studies that examined the relationship between board characteristics and firm value without focusing on financial risk or the banking sector. However, research conducted in Pakistan by Javeed et al. (2017) and Sheikh and Khan (2016) examined the association between board characteristics, corporate governance, and firm value without taking financial risks into account. Thus, these studies were inconclusive. Therefore, the Pakistani banking industry, which is dominant in economic growth is overlooked. Further, the financial risks and firm value are the major challenges for the banking sector of Pakistan, and they have been ignored in previous studies. Furthermore, past studies have also not examined the moderating role of CAR. The objective of this study is to measure the relationship of financial risks with firm value in listed banks of Pakistan with the moderating effect of CAR.

This study is unique in several ways compared to previous studies. This study examines the moderating effect of capital adequacy on the relationship between financial risks and the firm value of listed banks in Pakistan. However, most of the earlier studies were limited, only addressed nonfinancial firms, and were inconclusive. The earlier studies were also limited to board characteristics without focusing on financial risks. This study includes the capital adequacy ratio (CAR) as a new moderating variable to examine the moderating effects of financial risks and firm value. This study also includes the latest dataset, from 2009 to 2021. Hence, this study is conducted to fill the gap in the literature, as very few studies with inconclusive findings have previously examined. To the best of the authors' knowledge, this study is the first to investigate this relationship.

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## 1. LITERATURE REVIEW AND HYPOTHESES

Agency theory supports financial risks by considering risk-taking practices and decisions made by the manager that could create agency problems be-

tween the manager and shareholders. Agency theory also explains the notion that managers would be able to take appropriate decisions for the firm when favorable policies against risk management are prepared (Jensen, 1976). Therefore, risk-taking decisions may create conflict and an agency prob-

lem within the firm (Chari et al., 2019). The agency theory is the main theory because this theory is widely used in corporate governance and risk management.

Many earlier studies, such as Fallatah and Dickins (2012), Bhuiyan et al. (2020), Vintila et al. (2015), and Mishra and Kapil (2018), examined the relationship between board characteristics and attributes, corporate governance, and firm value without considering the financial risks. Although financial risk is a major concern, especially for the banking sector around the world after the global financial crisis of 2007–2008, very limited studies have examined financial risks in terms of firm value and the moderating effect of capital adequacy. The most superior proxy to measure firm value is Tobin's Q because it is a stock-based measure and influences investors through market reaction. On the contrary, the return on equity (ROE) and economic value added (EVA) are traditional measures as compared to Tobin's Q (Nazir & Afzal 2018).

The fluctuations in market conditions, such as option price volatility, may expose businesses to market risk. The indicator of market risk is called "value-at-risk" (VaR). It calculates a portfolio's maximum or probable loss over a specific period (Badawi, 2017; O'Brien & Szerszen, 2017). The adverse price movement within the market could affect unfavorable variations in interest and currency exchange rates, which may bring about changes in equity stock and affect firm value. Therefore, an increase in market risk has an inverse relationship with firm value (Abdel-Azim & Abdelmoniem, 2015).

During the financial crisis 2007–2008, over excessive risk-taking was a major cause of firm value deterioration. Thereafter, more emphasis on risk management was drafted in BASEL III to overcome the expected and unexpected risks (McShane et al., 2011). Although Pakistan's banking industry has grown significantly in recent years, it has been unable to fully regulate market risk. Therefore, market risk has significantly affected the banking sector in Pakistan (Hanif et al., 2019).

Due to the borrowers' poor credit records, these loans are riskier. Hence, credit risk affects firm value (Inoguchi, 2016). Practices for credit risk

management emerged due to the global financial crisis 2007–2008. These crises also affected equity stocks in the US and other countries, which affected firm value. Thereafter, credit risk has become a challenge for the banking sector around the world (Perera & Morawakage, 2017).

The average outstanding loan generates less interest revenue when new loans are issued at a comparably lower rate, suggesting that real interest income is anticipated to drop. Consequently, it lowers the value of a firm. Commercial banks increase loan amounts to increase profits, but doing so may result in larger loan losses, which may have an impact on firm value (Olalere et al., 2020). Banks are renowned for offering a variety of financial services with the goal of maximizing profit and shareholder value. Banks give their attention to increasing their lending portfolio to achieve a major chunk of profit, but lending activity may also expose banks to credit risk, which could affect firm value (Dauda & Nyor, 2018).

When liquidity risk is not effectively managed, it negatively impacts firm value. Excessive withdrawals from banks create liquidity risk. Therefore, it makes difficult for banks to meet their short-term obligations and unanticipated cash flow. Liquidity risk was also one of the main reasons for the global financial crisis in 2007–2008. Since the banks relied on the short-term money market to finance their assets, they experienced liquidity issues during the financial crisis (Chen et al., 2018). Liquidity risk is a threat to the banks and could affect firm value (Olalere et al., 2020). Earlier empirical studies investigated that besides market and credit risks, liquidity risk also affects firm value (Du et al., 2016).

Managing operational risk in the banking industry is crucial. Operational risk causes significant losses first. In the second place, it leads to control failure because it is generated internally. Thirdly, fraud as well as insufficient or failing internal systems, people, or processes are to blame (Chernobai, Ozdagli & Wang, 2020). By reducing the anticipated costs of operational loss, operational risk management allows banks to increase future expected cash flows. The increase in operating losses could reduce expect-

ed profits and decrease firm value. Therefore, a high level of operational risk exposure may have an impact on firm value (Olaere et al., 2020). Operational risk is typically linked to several problems that happen when a process or procedure fails. Operational risk affects all business operations and firm value since it is inherent in the implementation of a process or operational activity (Situmorang & Augustine, 2019).

NIM is the difference between the cost of borrowing and the interest on loans. The increase in interest rate risk affects banks' performance and firm value. Interest earned on loans may differ from interest paid on deposits due to the sharp change in interest rates. Therefore, the frequent variation in interest rates could affect firm value (Olaere et al., 2020). A mismatch between interest earned on loans and interest paid on deposits could result from the shift in interest rates, and the investors are likely to suffer losses. The net interest margin of the banking sector may be sensitive to changes in interest rates if the banks choose to take on comparable exposures. Bank customers continue to borrow money despite interest rate increases, which drives up borrowers' interest payments. Therefore, interest rate risk has an inverse relationship with firm value (Ebenezer et al., 2019).

Pakistan has a complex and varied banking industry. The nation's central bank oversees its regulation. As a result, banks must maintain a certain level of capital to manage any risk. Capital is essential because it provides money for banks to attract business. It is also crucial since it enhances firm value by protecting against the possibility of bank failure and absorbing financial losses. The current regulations require banks to maintain a certain amount of equity per loan and other assets due to the nature of the risk under which they operate. The purpose of this minimal requirement is to safeguard banks against unforeseen losses and expected risk (Badru et al., 2017). The authorities have recommended banks to maintain minimum capital requirements to withstand unforeseen losses. It was discovered that there is an inverse relationship between bank capital and financial risk since sufficient capital serves to give banks an additional cushion (Wahab et al., 2017).

The objective of this study is to examine the relationship between financial risks and firm value with the moderating effect of capital adequacy. Based on the arguments and literature review mentioned above, this study expects that financial risks and capital adequacy affect firm value in listed banks of Pakistan. Therefore, the following hypotheses are formulated:

*H<sub>1</sub>: Market risk significantly influences firm value.*

*H<sub>2</sub>: Credit risk has a negative relationship with firm value.*

*H<sub>3</sub>: Liquidity risk has a negative association with firm value.*

*H<sub>4</sub>: Operational risk has a negative relationship with firm value.*

*H<sub>5</sub>: Interest rate risk significantly influences firm value.*

*H<sub>6A</sub>: The impact of market risk is lower when CAR is higher.*

*H<sub>6B</sub>: The impact of credit risk is lower when CAR is higher.*

*H<sub>6C</sub>: The impact of liquidity risk is lower when CAR is higher.*

*H<sub>6D</sub>: The impact of operational risk is lower when CAR is higher.*

*H<sub>6E</sub>: The impact of interest rate risk is lower when CAR is higher.*

## 2. METHODOLOGY

The study used quantitative data extracted from the financial statements of listed banks in Pakistan and the Pakistan Stock Exchange (PSX). The sample for this study consists of listed banks in Pakistan. This study has taken half year data with 560 observations from 2009 to 2021 (details are provided in Table 1). This study uses secondary data to examine the relationship between the variables in the research framework.



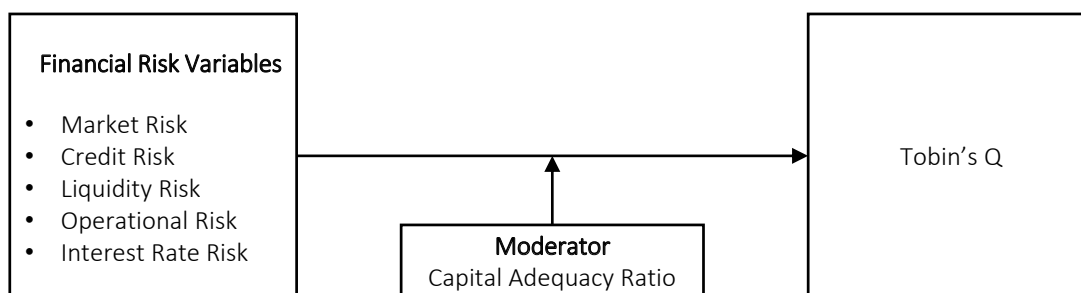


Figure 1. Logical relationship between variables

Table 1. Half-yearly observations of listed banks of Pakistan

Source: State Bank of Pakistan, www.sbp.org.pk.

Year	Year-Wise Total Listed Banks	Half-Yearly Observations
2009	25	50
2010	24	48
2011	23	46
2012	22	44
2013	22	44
2014	22	44
2015	21	42
2016	21	42
2017	20	40
2018	20	40
2019	20	40
2020	20	40
2021	20	40

The research framework is presented in Figure 1 reflecting the logical relationship among variables.

This study used Multiple Regression Model to examine the hypotheses and the effect of financial risks on firm value. Next, the model will examine the moderating impact of capital adequacy ratio on financial risks and firm value. This study uses panel data for analysis. Panel data contains longitudinal and cross-sectional properties that allow it to track changes in firm values across time.

$$\begin{aligned}
 \text{Tobin's } Q_{jt} = & \beta_0 + \beta_1 \text{Firm Value}_{jt} + \\
 & + \beta_2 \text{NPLR}_{jt} + \beta_3 \text{RLATA}_{jt} + \beta_4 M\beta_{jt} + \\
 & + \beta_5 \text{CR}_{jt} + \beta_6 \text{RNIM}_{jt} + \varepsilon_{jt}, \tag{1}
 \end{aligned}$$

where  $\text{Firm Value}_{jt}$  = Firm Value of  $j$ th bank at time  $t$ ;  $jt$  =  $j$ th bank at time  $t$ ;  $\text{NPLR}_{jt}$  = Ratio Non-Performing Loans of  $j$ th bank at time  $t$ ;  $\text{RLATA}_{jt}$  = Ratio of Long-term Assets to Total Assets of  $j$ th bank at time  $t$ ;  $M\beta_{jt}$  = Market Risk Beta of  $j$ th bank at time  $t$ ;  $\text{CR}_{jt}$  = Cost Income Ratio of  $j$ th bank at time  $t$ ;  $\text{RNIM}_{jt}$  = Ratio of Net Interest Margin of  $j$ th bank at time  $t$ ;  $\varepsilon_{jt}$  = error term of  $j$ th bank at time  $t$ .

$$\begin{aligned}
 \text{Tobin's } Q_{jt} = & \beta_0 + \beta_1 \text{RNPL}_{jt} + \\
 & + \beta_2 \text{RLATA}_{jt} + \beta_3 M\beta_{jt} + \beta_4 \text{CR}_{jt} + \\
 & + \beta_5 \text{RNIM}_{jt} + \beta_6 \text{CAR}_{jt} + \beta_7 \text{RNPL} \cdot \text{CAR}_{jt} + \\
 & + \beta_8 \text{RLATA} \cdot \text{CAR}_{jt} + \beta_9 M\beta_{jt} \cdot \text{CAR}_{jt} + \\
 & + \beta_{10} \text{CR} \cdot \text{CAR}_{jt} + \beta_{11} \text{RNIM}_{jt} + \varepsilon_{jt}, \tag{2}
 \end{aligned}$$

where  $\text{RNPL}$  = Non-Performing Loans;  $\text{RLATA}$  = Long term Assets to Total Assets;  $M\beta$  = Market Risk;  $\text{CR}$  = Cost Income Ratio;  $\text{RNIM}$  = Net Interest Margin; Interaction Terms –  $\text{RNPL} \cdot \text{CAR}$ ;  $\text{RLATA} \cdot \text{CAR}$ ;  $M\beta \cdot \text{CAR}$ ;  $\text{CR} \cdot \text{CAR}$ ;  $\text{RNIM} \cdot \text{CAR}$ .

Table 2 presents the measurement of variables.

Table 2. Summary of variables and measurements

Variables	Code	Measurements	Sources
Tobin's Q	Tobin's Q	Market value of equity + book value of debt/Book value of total assets	Isidro & Sobral (2015)
Credit Risk	RNPL	Total NPL/Total loan outstanding	Perera & Morawakage (2017); Olalere et al. (2020)
Liquidity Risk	RLATA	Liquid assets/Total assets	Ebenezer et al (2019); Olalere et al. (2020),
Market Risk	Mβ	Covariance of equity stock /Variance of equity stock	McShane et al. (2011)
Operational Risk	CR	Operating Cost/Operating Income	Olalere et al. (2020)
Interest Rate Risk	RNIM	Net interest income/Average. interest earning assets	Ebenezer et al (2019); Olalere et al. (2020)
Capital Adequacy Ratio	CAR	Total capital / risk weighted assets: Risk weighted assets = credit risk weighted assets	Laeven & Levine (2009)

### 3. EMPIRICAL RESULTS

Descriptive statistics in Table 3 present an overview of the variables used in the study. Tobin's Q is a dependent variable, and MBeta, RNPL, RLATA, CR, and RNIM are independent variables. However, CAR is a moderating variable. The lower mean of Tobin's Q, 0.1218 or 12.18%, indicates that listed banks in Pakistan are undervalued. It shows that Tobin's Q is constantly falling, which causes the stock's value to change from being overpriced to being undervalued. The fact that the mean value of CAR is 12.168% reveals that the average CAR of listed banks in Pakistan is 12.168%, higher than the minimum requirement as recommended by the regulator. The average RNPL ratio of listed banks in Pakistan is 13.180%, which suggests that a higher RNPL ratio could put banks at risk of lower profitability. The mean RLATA value is 0.9377, indicating that listed banks in Pakistan have about 94% of easily convertible liquid assets. In other words, banks in Pakistan are strong enough to fulfil their short-term obligations. The highest mean, 58.960, of CR indicates that listed banks in Pakistan make less revenue as compared to their expenses, which may be because of insufficient systemic supervision or weak internal controls. The lower RNIM mean of 2.9617 shows that investment returns are insufficient to cover interest costs. Therefore, listed banks in Pakistan need to effectively use their assets. Beta has a mean of -0.080, which reveals negative beta. It means there is an adverse price movement within the market in terms of interest rates and currency exchange rates. Hence, it exposes market risk.

Table 4 presents the test of goodness of fit, which is commonly known as model fitness. The regression model explained 67 percent of the variability

**Table 3.** Descriptive statistics

	TOBIN'S Q	MBETA	RNPL	RLATA	CR	RNIM	CAR
Mean	0.1218	-0.080	13.180	0.9377	58.960	2.9617	12.168
Median	0.0310	0.0000	10.405	0.9300	75.000	2.8000	11.000
Maximum	1.700	1.700	103	5.760	153.0	80.00	57.04
Minimum	0.00	-8.500	0.00	0.20	-86.0	-7.50	0.08
Std. Dev	0.1795	0.3869	11.448	0.2839	53.770	3.8677	6.5269

**Table 4.** Goodness of fit test

Model	R	R-Squared	Adjusted R-Squared	Std. Error of the Estimate
1	0.822a	0.675	0.636	82.159

Note: a – Dependent Variable: Tobin's Q Note: p < 0.05.

observed in the targeted variable, resulting in an R-squared of 0.674. Further, 67 percent of the results of R-squared indicate that the data is fit for the regression model.

The coefficient determines how closely the dependent and independent variables are related to one another. Table 5 demonstrates that the dependent and independent variables have both positive and negative relationships. Four out of the six variables are statistically significant. However, the variables RLATA and MBETA are statistically insignificant. It means CAR, RNPL, CR, and RNIM influence the firm value of listed banks in Pakistan.

**Table 5.** Regression results of financial risks and firm value

Variables	Coefficient	t-statistics	p-values
CAR	1.3370	19.118	0.000
RNPL	-0.0149	-1.221	0.012
MBETA	-0.0760	-1.459	0.012
RLATA	0.2550	2.541	0.381
CR	-0.0528	-1.914	0.010
RNIM	0.0871	0.451	0.000

Note: a – Dependent Variable: Tobin's Q. p < 0.05.

Table 6 reveals the association of dependent and independent variables. The correlation matrix indicates that CAR and Tobin's Q have a positive relationship. It shows that the capital adequacy ratio raises the firm value of listed banks in Pakistan. The ratio of nonperforming loans has a negative association with Tobin's Q and CAR. It means NPLs in listed banks decrease both capital adequacy and firm value. Correspondingly, the ratio of LATA indicates a positive relationship with Tobin's Q and CAR, which means LATA in listed banks enhances firm value and

**Table 6.** Pearson correlation

	Tobin's Q	CAR	RNPL	RLATA	CR	RNIM	MBETA
Tobin's Q	1						
CAR	0.6231	1					
RNPL	-0.6933	-0.5311	1				
RLATA	0.2241	0.3212	-0.1711	1			
CR	-0.7145	-0.4111	0.4778	0.2556	1		
RNIM	0.6712	0.4933	0.2423	0.3944	-0.3576	1	
MBeta	0.3745	0.3544	0.6134	0.4412	0.5321	-0.3654	1

Note: \* $P < 0.05$ .

capital adequacy. The cost-to-income ratio reveals a negative relationship with Tobin's Q and CAR. However, CR shows a positive relationship with RNPL, which means increased costs in listed banks reduce firm value and capital adequacy. However, it increases NPLs. The ratio of net interest margin has a positive relationship with Tobin's Q and CAR. Hence, it reveals a positive relationship with NPLs and LATA and a negative association with CR. Lastly, market beta has a positive relationship with Tobin's Q.

Table 7 shows that all interaction terms (RNPL\*CAR, MBETA\*CAR, RLATA\*CAR, and RNIM\*CAR) are found to be significant to Tobin's Q, indicating the moderating effects of CAR on the relationships of financial risk variables. Further, negative beta of RNPL, MBETA, RLATA, and CR indicate that market, credit, liquidity, and operational risks are lower, as CAR is significantly higher in listed banks of Pakistan, which supports hypotheses  $H_{6A}$ ,  $H_{6B}$ ,  $H_{6C}$ ,  $H_{6D}$  and  $H_{6E}$ .

Eight of the ten hypotheses are supported by Table 8, which shows that financial risks affect firm value.

**Table 8.** Hypotheses testing results

Hypotheses	Tobin's Q
$H_1$ : Market risk significantly influences firm value.	Hypothesis not Supported
$H_2$ : Credit risk has a negative relationship with firm value.	Hypothesis Supported
$H_3$ : Liquidity risk has a negative association with firm value.	Hypothesis not Supported
$H_4$ : Operational risk has a negative relationship with firm value.	Hypothesis Supported
$H_5$ : Interest rate risk significantly influences firm value.	Hypothesis Supported
$H_{6A}$ : The impact of market risk is lower when CAR is higher.	Hypothesis Supported
$H_{6B}$ : The impact of credit risk is lower when CAR is higher.	Hypothesis Supported
$H_{6C}$ : The impact of liquidity risk is lower when CAR is higher.	Hypothesis Supported
$H_{6D}$ : The impact of operational risk is lower when CAR is higher.	Hypothesis Supported
$H_{6E}$ : The impact of interest rate risk is lower when CAR is higher.	Hypothesis Supported

**Table 7.** Moderating effects of CAR on financial risks and Tobin's Q

Variables	Model 1		Model 2		Model 3	
	$\beta$	$p$ -value	$\beta$	$p$ -value	$\beta$	$p$ -value
CAR			0.106	0.015	0.313	0.000
RNPL	-0.039	0.013	-0.038	0.014	-0.157	0.036
MBETA	-0.026	0.535	-0.026	0.541	-0.727	0.053
RLATA	0.035	0.412	0.042	0.327	0.179	0.178
CR	-0.033	0.024	-0.042	0.001	-0.078	0.014
RNIM	0.030	0.001	0.061	0.000	0.017	0.002
RNPL*CAR					-0.324	0.005
MBETA*CAR					-0.760	0.043
RLATA*CAR					-0.288	0.021
CR*CAR					-0.100	0.034
RNIM*CAR					0.016	0.029

Note: Financial Risks = RNPL, MBETA, RLATA, CR, RNIM; Moderating variable = CAR; Interaction terms = RNPL\*CAR, MBETA\*CAR, RLATA\*CAR, CR\*CAR, RNIM\*CAR.  $p < 0.05$ .



## 4. DISCUSSION

The findings of this study provide empirical proof that a higher capital adequacy ratio increases firm value and has a moderating effect on financial risks and firm value. The stock prices of listed banks in Pakistan are declining persistently, which causes the stock's worth to shift from being inflated to being undervalued. The findings of this study support the agency theory and are consistent with the findings of Abdel-Azim and Adelmoniem (2015), Hanif et al. (2019), Ebenezer et al. (2019), Olalere et al. (2020), and Wahab et al. (2017). However, the findings are inconsistent with the empirical findings of Busch and Memmel (2015) and Badru et al. (2017).

The empirical findings of this study reveal that the capital adequacy ratio of listed banks in Pakistan is higher, which indicates that Pakistani listed banks are meeting the mini-

imum capital requirement. Thus, the findings of this study are consistent with those of Wahab et al. (2017). Further, listed banks in Pakistan face credit, operational, and interest rate risks that influence firm value. However, market and liquidity risks do not affect the firm value of listed banks in Pakistan.

The global financial crisis of 2006–2007 brought numerous challenges for the world, including Pakistan. Consequently, shareholders are more concerned about enhancing firm value. Hence, the banking sector in Pakistan must plan and implement sound risk management policies, with a focus on increasing firm value. The findings of this study present factual evidence that an increase in capital adequacy enhances firm value in banks. Further, credit, operational, and interest rate risks affect firm value. Based on the empirical evidence of this study, banks need to improve their risk management framework to support firm value.

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## CONCLUSION

This study aims to investigate the moderating effect of capital adequacy on the relationship between financial risks and the firm value of listed banks in Pakistan. To obtain a more robust empirical model, this study incorporates the moderator. The results of this study reveal that the capital adequacy ratio of listed banks in Pakistan is higher. This implies that banks in Pakistan meet the minimum capital requirements as set by the regulators. Other empirical findings reveal that there are increasing credit, operational, and interest rate risks that influence firm value. However, there are no market or liquidity risks affecting the firm value of listed banks in Pakistan. This implies that an increase in the proportion of risks could further deteriorate the firm value of listed banks in Pakistan.

Based on the empirical findings of this study, it is concluded that banks in Pakistan are encountering apparent risk, which could affect firm value. Therefore, the stock prices of listed banks in Pakistan are declining persistently, which causes the stock's worth to shift from being inflated to being undervalued. Thus, this study develops a framework to present the interactions between financial risks and firm value, in which capital adequacy acts as a moderator in the relationship between financial risk and firm value. In this context, this study has considered the moderator as a proactive risk mitigation tool. The findings of this study help policymakers, regulators, and banks how capital adequacy acts as a moderator in the mitigation of financial risks and enhances firm value.

There are numerous opportunities for future research. First, this study only considered listed banks in Pakistan. The same investigation could be conducted by employing the listed banks of other South Asian developing countries to explore the cross-country findings. Second, the role of the corporate board is also very important. Therefore, the variables of this study and the characteristics of the board may be combined into a single model to explore the novel findings.

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## REFERENCES

1. Abdel-Azim, M. H., & Abdelmoniem, Z. (2015). Risk Management and Disclosure and Their impact on Firm Value: The Case of Egypt. *International Journal of Business, Accounting, & Finance*, 9(1). Retrieved from [https://scholar.cu.edu.eg/?q=mohamed-abdelazim/files/abdel-azim\\_has-san\\_-\\_ijbaf\\_volume\\_9\\_number\\_1\\_spring\\_2015\\_-\\_feb\\_12.pdf](https://scholar.cu.edu.eg/?q=mohamed-abdelazim/files/abdel-azim_has-san_-_ijbaf_volume_9_number_1_spring_2015_-_feb_12.pdf)
2. Abdul Wahab, H., Saiti, B., Rosly, S. A., & Masih, A. M. M. (2017). Risk-taking behavior and capital adequacy in a mixed banking system: new evidence from Malaysia using dynamic OLS and two-step dynamic system GMM estimators. *Emerging Markets Finance and Trade*, 53(1), 180-198. <https://doi.org/10.1080/1540496X.2016.1162151>
3. Acharya, V. V., & Richardson, M. (2009). Causes of the financial crisis. *Critical Review*, 21(2-3), 195-210. <https://doi.org/10.1080/08913810902952903>
4. Akram, H., & Rahman, K. U. (2018). Credit risk management: A comparative study of Islamic banks and conventional banks in Pakistan. *ISRA International Journal of Islamic Finance*, 10(2), 185-205. <https://doi.org/10.1108/IJIF-09-2017-0030>
5. Agyemang-Mintah, P., & Schadewitz, H. (2018). Audit committee adoption and firm value: evidence from UK financial institutions. *International Journal of Accounting & Information Management*, 26(1), 205-226. <https://doi.org/10.1108/IJAIM-04-2017-0048>
6. Ayub, H., & Javeed, A. (2016). Impact and implications of capital adequacy ratio on the financing behaviour: Evidence from Islamic banks in Pakistan. *Journal of Islamic Business and Management*, 6(1). Retrieved from <https://www.semanticscholar.org/paper/Impact-and-Implications-of-Capital-Adequacy-Ratio-Ayub-Javeed/0862a35cacb8c1c5cb7211626335be36f14af06f>
7. Badawi, A. (2017). Effect of Credit Risk, Liquidity Risk, and Market Risk Banking to Profitability Bank (Study on Devised Banks in Indonesia Stock Exchange). *European Journal of Business and Management*, 9(29), 1-8. Retrieved from [http://digilib.mercubuana.ac.id/manager/t!@file\\_artikel\\_abstrak/Isi\\_Artikel\\_465124669056.pdf](http://digilib.mercubuana.ac.id/manager/t!@file_artikel_abstrak/Isi_Artikel_465124669056.pdf)
8. Badru, B. O., Ahmad-Zaluki, N. A., & Wan-Hussin, W. N. (2017). Board characteristics and the amount of capital raised in the Malaysian IPO market. *Journal of Multinational Financial Management*, 42, 37-55. <https://doi.org/10.1016/j.mul-fin.2017.09.001>
9. Bhuiyan, M. B. U., Cheema, M. A., & Man, Y. (2020). Risk committee, corporate risk-taking and firm value. *Managerial Finance*, 47(3), 285-309. <https://doi.org/10.1108/MF-07-2019-0322>
10. Bouhenni, F. B., Ammi, C., & Levy, A. (2016). *Banking Governance, Performance and Risk-taking*: Wiley Online Library. Retrieved from <https://www.wiley.com/en-us/Banking+Governance,+Performance+and+Risk+Taking:+Conventional+Banks+vs+Islamic+Bank+s-p-9781786300829>
11. Chari, M. D., David, P., Duru, A., & Zhao, Y. (2019). Bowman's risk-return paradox: An agency theory perspective. *Journal of Business Research*, 95, 357-375. <https://doi.org/10.1016/j.jbusres.2018.08.010>
12. Chen, Y.-K., Shen, C.-H., Kao, L., Yeh, C.-Y. (2018). Bank liquidity risk and performance. *Review of Pacific Basin Financial Markets and Policies*, 21(01). <https://doi.org/10.1142/S0219091518500078>
13. Chen, L.-J., & Chen, S.-Y. (2011). The influence of profitability on firm value with capital structure as the mediator and firm size and industry as moderators. *Investment Management and Financial Innovations*, 8(3), 121-129. Retrieved from [https://www.businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/4210/imfi\\_en\\_2011\\_03\\_Chen.pdf](https://www.businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/4210/imfi_en_2011_03_Chen.pdf)
14. Chernobai, A., Ozdagli, A., & Wang, J. (2020). Business complexity and risk management:

- Evidence from operational risk events in US bank holding companies. *Journal of Monetary Economics*, 11(7). <https://doi.org/10.1016/j.jmoneco.2020.02.004>
15. Dauda, I., & Nyor, T. (2018). Credit Risk and Shareholders' Value in Nigerian Deposit Money Banks *IOSR Journal of Business and Management*, 20(7), 36-46.
  16. Du, J., Wu, F., & Liang, X. (2016). Corporate liquidity and firm value: evidence from China's listed firms. *International Seminar on Social Science and Humanistic Education*. <https://doi.org/10.1051/shsconf/20162401013>
  17. Ebenezer, O. O., Islam, M. A., Yusoff, W. S., & Rahman, S. (2019). The Effects of Liquidity Risk and Interest-Rate Risk on Profitability and Firm Value among Banks in ASEAN-5 Countries. *Journal of Reviews on Global Economics*, 8, 337-349. <https://doi.org/10.6000/1929-7092.2019.08.29>
  18. Esan, O. M., Nwobu, O., Adeyanju, I. T., & Adeyemi, J. O. (2022). Firm Value Response to Internal and External Corporate Governance in the Nigerian Stock Market. *Asian Economic and Financial Review*, 12(4), 227-243. <https://doi.org/10.55493/5002.v12i4.4465>
  19. Fallatah, Y., & Dickins, D. (2012). Corporate governance and firm performance and value in Saudi Arabia. *African Journal of Business Management*, 6(36), 10025-10034. <https://doi.org/10.5897/AJBM12.008>
  20. Hanif, H., Naveed, M., & Rehman, M. (2019). Dynamic modeling of systemic risk and firm value: A case of Pakistan. *Cogent, Business and Management*, 6(1), 1651440. <https://doi.org/10.1080/23311975.2019.1651440>
  21. Inoguchi, M. (2016). Nonperforming Loans and Purchase of Loans by Public Asset Management Companies in Malaysia and Thailand. *Pacific Economic Review*, 21(5), 603-631. <https://doi.org/10.1111/1468-0106.12197>
  22. Ishtiaq, M. (2015). *Risk management in banks: determination of practices and relationship with performance*. Retrieved from <http://hdl.handle.net/10547/584264>
  23. Isidro, H., & Sobral, M. (2015). The effects of women on corporate boards on firm value, financial performance, and ethical and social compliance. *Journal of Business Ethics*, 132(1), 1-19. <https://doi.org/10.1007/s10551-014-2302-9>
  24. Javeed, A., Yaqub, R. M. S., Aslam, M. (2017). Revisiting capital structure and firm value: moderating role of corporate governance: Evidence from Pakistan. *Developing Country Studies*, 7(5), 39-48.
  25. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
  26. Kakanda M. M., & Salim, B. (2017). Corporate governance, risk management disclosure, and firm performance: A theoretical and empirical review perspective. *Asian Economic and Financial Review*, 7(9) 836-845. <http://doi.org/10.18488/journal.aefr.2017.79.836.845>
  27. Kirkpatrick, A. K., & Radicic, D. (2020). Tax Planning Activities and Firm Value: A Dynamic Panel Analysis. *Advances in Taxation*, 27, 103-123. <https://doi.org/10.1108/S1058-74972020000027004>
  28. Klynveld Peat Marwick Goerdeler (KPMG). (2020). *Snapshot of results of banks in Pakistan* (pp. 1-18). Retrieved from <https://assets.kpmg/content/dam/kpmg/pk/pdf/2020/11/Snapshot-of%20Banking-Results-June-2020.pdf>
  29. Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93(2), 259-275. Retrieved from <https://doi.org/10.1016/j.jfineco.2008.09.003>
  30. Liu, C., Uchida, K., & Yang, Y. (2012). Corporate governance and firm value during the global financial crisis: Evidence from China. *International Review of Financial Analysis*, 21, 70-80. <https://doi.org/10.1016/j.irfa.2011.11.002>
  31. McShane, M. K., Nair, A., & Rustambekov, E. (2011). Does enterprise risk management increase firm value? *Journal of Accounting, Auditing & Finance*, 26(4), 641-658. <https://doi.org/10.1177/0148558X11409160>
  32. Mishra, R. K., & Kapil, S. (2018). Board characteristics and firm value for Indian companies. *Journal of Indian Business Research*, 10(1), 2-32. <https://doi.org/10.1108/JIBR-07-2016-0074>
  33. Nazir, M. S., & Afza, T. (2018). Does managerial behavior of managing earnings mitigate the relationship between corporate governance and firm value? Evidence from an emerging market. *Future Business Journal*, 4(1), 139-156. <https://doi.org/10.1016/j.fbj.2018.03.001>
  34. Olalere, O., Islam, M. A., Junoh, M. Z. M., Yusoff, W. S., Iqbal, M. M. (2020). Revisiting the impact of intrinsic financial risks on the firm value of banks in ASEAN-5 countries: a panel data approach. *Banks and Bank Systems*, 15(2), 200-213. [http://dx.doi.org/10.21511/bbs.15\(2\).2020.18](http://dx.doi.org/10.21511/bbs.15(2).2020.18)
  35. Parida, S., & Wang, Z. (2018). Financial crisis and corporate social responsible mutual fund flows. *International Journal of Financial Studies*, 6(1), 8. <https://doi.org/10.3390/ijfs6010008>
  36. Perera, L., & Morawakage, P. (2017). Credit risk management and shareholder value creation: with special reference to listed commercial banks in Sri Lanka. *Kelaniya Journal of Management*, 5(2). <http://doi.org/10.4038/kjm.v5i2.7514>
  37. Rafique, A., Qudoods, M. U., Akhtar, M. H., & Karim, A. (2020). Impact of financial risk on financial performance of banks in Pakistan; the mediating role of capital adequacy ratio. *Journal of Accounting and Finance in Emerging Economies*, 6(2), 607-613.
  38. Saeed, J. T., & Tahir, J. H. (2015). Relationship between Earning

- Per Share & Bank Profitability. *International Journal of Novel Research in Humanity and Social Sciences*, 2(2), 4-13.
39. Shah, S. S. H., Xinping, X., Khan, M. A., Harjan, S. A. (2018). Investor and manager overconfidence bias and firm value: Micro-level evidence from the Pakistan equity market. *International Journal of Economics and Financial Issues*, 8(5), 190. Retrieved from <https://ideas.repec.org/a/eco/journ1/2018-05-26.html>
  40. Sheikh, N. A., & Khan, M. (2016). Effects of excess cash, board attributes and insider ownership on firm value: evidence from Pakistan. *Australasian Accounting Business and Financial Journal*, 10(1), 29-39. <http://dx.doi.org/10.14453/aabfj.v10i1.4>
  41. Situmorang, D. P., & Augustine, Y. (2019). The Effect of Risk Management on Firm Value with Firm Performance as a Mediation (Study in Banking Industries Listed in IDX) for the year 2013-2017. *Research Journal of Finance and Accounting*, 10(4), 1-5. <https://doi.org/10.7176/RJFA/10-8-01>
  42. Vintila, G., & Gherghina, S. C. (2013). Board of directors independence and firm value: empirical evidence based on the bucharest stock exchange listed companies. *International Journal of Economics and Financial Issues*, 3(4), 885. Retrieved from <https://ideas.repec.org/a/eco/journ1/2013-04-10.html>
  43. Vo, T. T. A., Bui, P. N. K. (2017). Impact of Board Gender Diversity on Firm Value: International Evidence. *Journal of Economics and Development*, 19(1), 65-76. Retrieved from <https://ssrn.com/abstract=3049432>