

# Non-performing Loans and Bank Stability: Evidence from Pakistan

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Non-performing loans have been a serious issue in the banking sector worldwide, with implications for bank stability, asserting the need to investigate the extent of the effects of such loans. This study aims to examine the impact of non-performing loans on the stability of Pakistani banks for the period 2006-2018. The negligible significant positive effect of non-performing loans to equity was noted on the bank stability. However, results indicate that the level of non-performing loans and their write-offs have significant negative effect on bank stability, seeking the regulator's attention to tighten the measures to control the magnitude of these loans. The results support the theory of information asymmetry and adverse selection theory, in view of imbalance of information between borrower and lender inducing the provision of low-quality loans and impairing the banks' ability to identify the credit worthy customers, thus undermining their stability. There is also support to endorse the moral hazard which arises in the case when the government provides deposit safety nets, making the banks inclined to take excessive risk, thereby increasing their instability. Finally, as regards the control variables, bank size was found to have insignificant positive effect while profit depicted significant negative effect on bank stability, in line with the risk-return hypothesis.

**Key words:** *Non-performing Loans, Bank Stability, Bank Size, Profitability*

## INTRODUCTION

The alarming level of non-performing loans in the banking sector may be attributed to the global financial crises (2008/2009) that resulted in credit crises on a massive level in most of the economies, arousing the researchers' attention to investigate the nexus between non-performing loans and bank stability (Atoi, 2018).

Non-performing loans are those loans which are past being due for ninety days or more than this period, or that do not accrue interest (Gilbert & Hazen, 2001) and are unpaid in the structured time period as fixed in the contract between the bank and borrower (Mazreku et al., 2018). The banks' asset quality in relation to non-performing loans may significantly be a predictor of bank failures (Barr et al., 1994; Demirguc-Kunt & Detragiache, 1997; Demirguc-Kunt et al., 2006; Peterson & Arun, 2018).

As regards Pakistan, a number of studies highlight the determinants of non-performing loans growth such as the exchange rate and private sector lending (Zia & Huma, 2015), a democratic political system, board size, board independence and concentrated ownership (Rehman et al., 2016), loan duration and credit policy (Ikram et al., 2016), leverage, profitability and capital adequacy (Khan & Ahmad, 2017), debt to equity ratio, financial burden, asset utilisation and diversification of the bank activities (Hussain, 2017), and capital adequacy ratio, bank size, inflation and GDP growth (Ashraf & Butt, 2019).

Haneef et al. (2012), Jameel (2014), Hassan et al. (2014) and Kashif et al. (2016) identified that bank specific factors have caused an increase in the non-performing loans of the Pakistani banking sector, which may enhance the banks' insolvency and so should be regarded as a major concern. Moreover, no particular study highlights the relationship of non-performing loans with a specific, relevant measure of bank stability. Therefore, this study aims to investigate the effect of non-performing loans on the stability of Pakistani banks and contribute to the pertinent literature in this regard.

## LITERATURE REVIEW

### Theoretical Perspective

The pertinent theories highlighting the effect of non-performing loans on bank stability includes the theory of asymmetric information. The theory posits that the lack of balance in information between buyers and sellers can result in market inefficiency. In accordance with the theory, Cottarelli et al. (2005) document the presence of risks associated with the bank portfolios quality, coupled with rapid credit growth calling for a supervisory role, as backed by the view that there is a link between credit booms and banking sector crises. Likewise, Kraft and Jankov (2005) suggested increasing the banks' capital requirements as a tool to prevent a credit boom.

According to the theory of asymmetric information, good borrowers can be difficult to differentiate from bad borrowers, resulting in adverse selection and a moral hazard (Atoi, 2018). Therefore, the adverse selection theory and moral hazard theory/model may also have basis to explain the relationship between non-performing loans and bank stability. The asymmetric information, adverse selection and moral hazard limit the productive credit supply (Stiglitz & Weiss, 1981) and in a credit boom the banks may likely provide credit to those borrowers who have less concerns about the strict lending conditions and so have a probability of default on loans (Ezeoha, 2011).

The government guarantees, being safety nets available to depositors and bank creditors, act as a moral hazard to induce high risk-taking behaviour undermining the bank stability (Benston, 1995; Anginer & Demircu-Kunt, 2018).

### **Empirical Literature**

Different studies have identified the macroeconomic determinants of non-performing loans, including loans growth to enterprises and households, inflation, unemployment, exchange rate, bank solvency, GDP growth, export growth, domestic private sector credit and government debt, external debt and interest rates (Abid et al., 2014; Ćurak et al., 2013; Lee & Rosenkranz, 2019; Louzis et al., 2012; Kjosevski et al., 2019; Mazreku et al., 2018; Vogiazas & Nikolaidou, 2011). In the same vein, some studies have identified the bank specific determinants of non-performing loans like bank size, profitability (ROA), export over import ratio, bank inefficiency, liquidity ratio and management quality (Abid et al., 2014; Ćurak et al., 2013; Koju et al., 2018; Kumar & Kishore, 2019; Patra & Padhi, 2016).

Non-performing loans reduce the bank credit provision (Cucinelli, 2015), expose the banks to extra and un-planned expenses, retard their ability to cover losses (Nikolov & Popovska-Kamnar, 2016), and so decrease the banks' solvency and stability. Financial inclusion can reduce such loans and accordingly the government role may protect the banks' assets quality and stability (Chen et al., 2018). These loans are the vital indicator of banks' financial stability (Ikram et al., 2016), negatively affect the banking system stability (Ozili, 2019), and are an indicator depicting the health of a country's banking system with implications for bank stability (Mazreku et al., 2018).

### **Control Variables (Bank Size and Profitability)**

Bank size and profitability are the significant determinants to favourably affect bank stability (Köhler, 2015; Miah et al., 2019) and the same are also identified as the most pertinent determinants affecting the Pakistani banks' stability (Ali & Puaah, 2019). Therefore, this study takes both these variables as control variables in relation to the effect of non-performing loans on the bank stability.

Agency theory implies negative relationship between bank size and bank stability, suggesting that managers try to pursue personal gains by intentionally making the size of the firm large (Jensen & Meckling, 1976; Jensen, 1986; Laeven et al., 2016). Stewardship theory implies positive relationship by considering managers as the firm resource (Donaldson & Davis, 1991) and regarding organisational structure as conducive to decisions enhancing stability (Adusei, 2015). The concentration-stability hypothesis suggests positive relationship by asserting that the concentrated banks have more market power and low default risk (Keeley, 1990), limit credit supply by relying on single quality investment to improve financial soundness (Boot & Thakor, 2000), possess diversified loan portfolios (Allen & Gale, 2004) and have more profitability limiting the taking of undue risk, hence reducing the systematic banking crises (Beck et al., 2006; Berger & Bouwman, 2013). The concentration-fragility hypothesis holds that few and larger banks in a concentrated market receive large amounts of subsidies that incentivise their risk taking behaviour (Beck et al., 2006), and hence (due to high market power) they charge high interest rates to their borrowers who in turn may take more risk while decreasing their stability (Bretschger et al., 2012). Therefore, the concentration-fragility hypothesis implies a negative effect of bank size on bank stability.

Some studies document positive effect of profit on bank stability like Kok et al., (2015) and Xu et al., (2019), who recognised that profit decreases risks by providing equity buffers to encourage reduced risk taking behaviour. However, Kirby (1974) explained the negative profit-stability link in terms of the risk-return hypothesis, suggesting that investors in pursuit of returns invest in high-risk securities with low stability of returns. Tan and Anchor (2016) also endorsed this hypothesis with their results that high profitability increases bank fragility and hence undermines their stability.

## **METHODOLOGY**

This study targets the entire banking sector of Pakistan consisting of commercial, Islamic, foreign and specialised banks. Data for the period from 2006 to 2018 was available. Therefore, the study covers the same period. Some of the banks had no available data to form the complete data set – some were new (established after 2016) and so their data was missing. Hence, all these banks were excluded. Therefore, the actual sample size was 29 banks.

### **Variables of the study**

A wide measure of bank stability is the z-score index, which equals Return on Assets (ROA) and capital ratio (Equity/Assets) divided by Standard Deviation ( $\sigma$ ) of ROA (Atoi, 2018; Boyd et al., 1993; Foos et al., 2010; Laeven & Levine, 2009; Lepetit & Strobe, 2015; Ozili, 2019). Laeven and Levine (2009) explained that the z-score is negatively related with probability of the bank insolvency, where insolvency represents the state wherein losses are greater than the equity and  $E < -\pi$ , where E is the equity and  $\pi$  is profit with  $-ROA < CAR$  expressing the probability of insolvency,  $ROA = \pi/A$ ,  $CAR = E/A$  and A = Assets. Also, in case the profit is

normally distributed then the inverse of probability of the insolvency will be equal to  $(ROA+CAR) / \sigma(ROA)$ . Lepetit and Strobe (2013) asserted that the z-score is an important tool to assess a bank's risk and the overall banking sector stability. They considered it a better and wide measure for cross sectional studies due to its simple calculation and reliance only on the accounting information, rather than the market-based measures of risk. They also regarded it an increasingly time varying measure applied in the panel studies. Therefore, this study uses the z-score as a measure of bank stability, which has been calculated using the following formula:

$$Z - Score = \frac{ROA + E/A}{\sigma(ROA)}$$

Non-performing loans have been a point of focus for Pakistan's central bank, the State Bank of Pakistan (SBP). SBP devised a guideline in 2010 regarding classification and the provision of loan loss, under which when a principal amount or interest becomes past due over ninety days or three months, then a loan shall be classified as a non-performing loan by the banks (Mehmood et al., 2019). SBP also issues a periodic document by the title of "Balance Sheet Analysis", consisting of yearly data of different ratios of non-performing loans depicting the individual and overall banking sector performance pertaining to the non-performing loans. These ratios are also used in this study as proxies of non-performing loans and are discussed below.

The loan loss provisions are the specific amount used as a cushion to cover the expected loss associated with a bank's loan portfolio, having implications for bank stability and requiring banks (by the regulators) to maintain sufficient these provisions against the expected loan losses (Ozili & Outa, 2017). The banks' impaired advances should be covered through the loan loss provisions (Mann & Michael, 2002), and they signal the managerial intentions of better banks' earning power to absorb future losses (Bouvatier & Lepetit, 2008). Curcio and Hasan (2015) documented that loan loss provisions reflect the changes in the expected quality of a loan portfolio as measured in terms of the quantity of non-performing loans. This all suggests that loan loss provisions contribute towards bank stability. Therefore, we have taken the following three proxies (table 1) related to provisions for non-performing loans.

Table 1: *Proxies of non-performing loans*

Proxies / Ratios	Formula
<p><b>Provision against NPLs and Gross Advances:</b> This ratio shows the quality of banks' advances. High ratio suggests sound bank management to allocate more provisions for the non-performing loans in relation to gross advances, to cover potential future losses associated with these advances.</p>	$= \frac{\text{Provision against NPLs}}{\text{Gross Advances}} \times 100$
<p><b>NPLs write-off to NPLs Provision Ratio:</b> This ratio should be low, as sound banks are those that periodically write-off low non-performing loans in comparison to the provisions they allocate for these loans, so the lower the said ratio, the higher the likelihood of bank stability.</p>	$= \frac{\text{NPLs write - off}}{\text{NPLs provision}} \times 100$
<p><b>NPLs Provision to NPLs Ratio:</b> This ratio highlights what portion of provision has been allocated against NPLs. Higher ratio is desirable as it implies a high amount of provisions allocated in comparison to the amount of non-performing loans, which may provide cover against future losses to strengthen bank stability.</p>	$= \frac{\text{Provision against NPLs}}{\text{NPLs}} \times 100$

The next measures representing independent variables are the non-performing loans in relation to the gross advances and total shareholders' equity. The non-performing loans to gross advances ratio should be low, as banks with more non-performing loans than the gross advances made may have poor credit management, which can negatively affect their financial stability. The high ratio of non-performing loans to the total shareholders' equity may suggest greater exposure to risk, as shareholders equity is low to absorb the future losses associated with non-payment of advances. However, the high ratio may also imply high profit potential as the bank is using a low capital (equity) basis to make more advances, and there can obviously be an increase in the level of non-performing loans coupled with advances, owing to the nature of a bank's business of making loans. Hence, this ratio may be interpreted by considering a range of other factors like the performance of the bank with itself over a period of time, or comparison to other banks in the industry.

Table 2: *Non-performing loans in relation to gross advances and total shareholders' equity*

Proxies / Ratios	Formula
<b>Non-Performing Loans (NPLs) to Gross Advances:</b> This ratio depicts the quality of a bank's loan portfolio. It indicates the NPLs percentage as gross advances that are made by the banks	$= \frac{\text{NPLs}}{\text{Gross Advances}} \times 100$
<b>NPLs to Shareholders Equity Ratio:</b> This ratio indicates the exposure of shareholders to the NPLs.	$= \frac{\text{NPLs}}{\text{Total shareholders' equity}} \times 100$

The Econometric Model is presented below:

$$Z - \text{Score} = \alpha + \beta_1 \text{PNGA} + \beta_2 \text{NWNP} + \beta_3 \text{NPN} + \beta_4 \text{NGA} + \beta_5 \text{NSE} + \text{SIZE} + \text{PROFIT} + \varepsilon$$

Where:

PNGA = Provision against NPLs and Gross Advances

NWNP = NPLs write-off to NPLs Provision

NPN = NPLs Provision (Provision against NPLs) to NPLs Ratio

NGA = Non-Performing Loans (NPLs) to Gross Advances

NPLSE = NPLs to Shareholders Equity

SIZE = Bank Size (Natural Logarithm of Total Assets)

PROFIT = Bank Profit (Return on Assets)

$\varepsilon$  = Error Term

### Control Variables

Bank size may have effects for the banks' systemic risk (Luc et al., 2014) and so have implications for their stability. In line with different studies (Adusei, 2015; Gonzalez, 2005; Köhler, 2015; Parvin, 2019; Zribi & Boujelbegrave, 2011) regarding the relevant measure of firm size, we have taken the natural logarithm of total assets as the proxy of bank size. The Return on Assets (ROA) appeared to be a key ratio to evaluate the bank profitability (Athanasoglou et al., 2008; Kohlscheen, 2018). ROA indicates profit per unit of the firm assets and depicts the management ability to utilise the bank's financial and real investment resources to generate profit (Tan & Anchor, 2016). Moreover, ROA is a comprehensive proxy of bank profit as it includes operational efficiency and the bank loan loss provisioning (García-Herrero, 2009). There has been use of ROA by the bank regulators (like central banks) and analysts to appraise the industry (sector) performance and predict bank failures (Gilbert & Wheelock, 2007). ROA is a common measure of bank profit and equals net income to total bank assets

(Ghebreorgis & Atewebhran, 2016). Considering this, we have taken ROA as the proxy of bank profitability.

## RESULTS

The following table shows the values of correlation coefficient between variables of the study.

Table 3: *The Correlation Matrix*

	Z-SCORE	NGA	NPLSE	NWNP	NPN	PNGA	PROFIT	SIZE
Z-SCORE	1.00							
NGA	-.71	1.00						
NPLSE	.01	.15	1.00					
NWNP	.08	-.16	-.03	1.00				
NPN	.01	-.05	.00	.02	1.00			
PNGA	-.78	<b>.95</b>	.15	-.16	-.02	1.00		
PROFIT	-.31	-.06	-.11	-.11	.07	-.02	1.00	
SIZE	.25	-.55	-.10	-.04	.04	-.53	.19	1.00

The correlation coefficient of 0.95 depicts a very strong linear relationship between NGA and PNGA, showing that the variables measure more or less the same thing. Including both the variables will lead to a multicollinearity problem and make all the other coefficients, and their respective standard errors, biased. We, therefore, retain the Non-Performing Loans (NPLs) to Gross Advances (NGA) ratio in our analysis and remove the Provision against Non-performing Loans and Gross Advances (PNGA) ratio.

Table 4: *The Common Constant Method*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	35.693	39.965	.893	.372
NGA	-2.955	.159	-18.538	.000
NWNP	-.134	.059	-2.272	.024
NPN	.0001	.003	.049	.961
NPLSE	.002	.0007	2.373	.018
PROFIT	-13.566	1.266	-10.710	.000
SIZE	1.037	2.042	.508	.612
R-squared	.641	Mean dependent var.		-5.102
Adjusted R-squared	.634	S.D. dependent var.		80.667
S.E. of regression	48.766	Akaike info criterion		10.632
Sum squared resid.	803817.7	Schwarz criterion		10.710
Log likelihood	-1827.027	Hannan-Quinn criter.		10.663
F-statistic	100.542	Durbin-Watson stat.		.734
Prob. (F-statistic)	.000			

We find, in table 4 presenting the common constant method of regression, that except for the NPN and SIZE variables, all the other explanatory variables are significant. The variables NGA and PROFIT have a very strong negative relationship with the dependent variable. The variable NWNP is also negatively connected and the variable NPLSE is found to have a very slight positive association with the Z-score.

This pooled regression, however, is based on the assumption that the intercept terms are constant, or the same, for each cross-sectional unit (in our case, banks) and for each year. This assumption is not very appropriate and we therefore attempt to estimate a model that accounts for both firm-fixed and period-fixed effects so as to allow bank-specific and time-specific heterogeneity in the sample.

Table 5: *The Cross-Section and Period Fixed Effects Model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-157.088	47.808	-3.286	.001
NGA	-.538	.122	-4.414	.000
NWNP	-.048	.021	-2.237	.026
NPN	-.0001	.0008	-.187	.852
NPLSE	-.0001	.0002	-.656	.512
PROFIT	-2.094	.531	-3.940	.000
SIZE	8.701	2.545	3.418	.000
R-squared	.971	Mean dependent var.		-5.102
Adjusted R-squared	.967	S.D. dependent var.		80.667
S.E. of regression	14.668	Akaike info criterion		8.333
Sum squared resid.	64330.74	Schwarz criterion		8.845
Log likelihood	-1391.407	Hannan-Quinn criter.		8.537
F-statistic	224.556	Durbin-Watson stat.		1.048
Prob. (F-statistic)	.000			

Looking at the cross-section fixed and time-fixed model presented in table 5, we find that the variable NPN is still highly insignificant. However, the variable NPLSE, which was slightly positively associated with the Z-score as per the common constant method, has now also turned insignificant. The variable SIZE now appears to be strongly positively related to the dependent variable. The rest of the variables, that is, NGA, NWNP, and PROFIT, have retained the same significantly negative association with the variable explained. What is worrying is that the intercept term “C” has also become highly significant with a huge negative beta coefficient.

Our next task is to ensure whether the application of fixed effects, as either cross-section based or time-period based, is needed at all. We do this by running the redundant fixed effects test. The output of this test is presented in table 6.

Table 6: *The Redundant Fixed Effects Test*

Redundant Fixed Effects Tests			
Test cross-section and period fixed effects			
<b>Effects Test</b>	<b>Statistic</b>	<b>d.f.</b>	<b>Prob.</b>
Cross-section F	117.417	(28,299)	.000
Cross-section Chi-square	857.166	28	.000
Period F	3.177	(11,299)	.000
Period Chi-square	38.141	11	.000
Cross-Section/Period F	88.129	(39,299)	.000
Cross-Section/Period Chi-square	871.240	39	.000

The redundant fixed effects test shows that both the cross-section F and the period F have highly significant values. The Chi-square values are also highly significant for the cross-sectional and time dimensions. In other words, all three redundant fixed effects tests that either restrict the cross-section fixed effects to zero, restrict the period fixed effects to zero, or restrict both types of fixed effects to zero, are highly significant with their  $p$ -values being zero to at least three decimal places. This shows that the said restrictions are not supported by the sample and that, therefore, the fixed effects model should be preferred, in our case, over the common constant method. It is, however, noticed that the parameters of the cross-sectional of the only fixed effects model are not qualitatively different from those of the common constant regression model. Therefore, it is probably the period fixed effects that make the fixed effects method different from the pooled method of regression.

We now move on to estimating the random effects model for our sample. As we did for the fixed effects case, the random effects could also be measured either along the cross-sectional or the time-period dimensions. We would, however, be exploring the random effects for the cross-sections, that is, the banks. Table 7 presents the results of our desired variables and their relationships using the cross-section random effects method of panel data regression.

Table 7: *The Cross-Section Random Effects Model*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.083	28.890	-.314	.753
NGA	-.884	.109	-8.108	.000
NWNP	-.015	.020	-.749	.454
NPN	-.0001	.0008	-.173	.863
NPLSE	-.0002	.0002	-.780	.436
PROFIT	-2.976	.524	-5.685	.000
SIZE	1.070	1.484	.721	.471
R-squared	.162	Mean dependent var.		-.881
Adjusted R-squared	.147	S.D. dependent var.		19.844
S.E. of regression	18.322	Sum squared resid.		113460.8
F-statistic	10.895	Durbin-Watson stat.		.746
Prob. (F-statistic)	.000			

Results of the random effects model, presented in table 7, are not very different from those of the fixed effects model. Both models depict a highly insignificant relationship of the variables NPLSE and NPN, for instance, with the dependent variable, that is, the Z-score. However, unlike the fixed effects model, the random effects show highly insignificant relationships of the intercept term ‘C’ and control variable ‘SIZE’ with the explained variable. This connotes that only NGA and PROFIT (a control variable) are significantly associated with our variable of interest. Nonetheless, prior to relying on results of the random effects model, we wanted to see whether the model qualifies with the Hausman test to show that the random effects are not correlated with the independent variables.

Table 8: *The Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	157.422	6	.000

The chi-square for the Hausman test given in table 8 is 157.42 with its *p*-value being less than

.001. This indicates that the random effects model is not very appropriate for our data and that the fixed effects configuration is to be preferred.

Finally, as the redundant fixed effects test and the Hausman test suggest, we engage the fixed effects model again, this time employing only the period fixed effects in the model. Table 9 provides results of the time-period fixed effects for our data.

Table 9: *Period fixed effects*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.958	41.512	.408	.683
NGA	-2.972	.161	-18.450	.000
NWNP	-.156	.067	-2.325	.020
NPN	4.36E-05	.003	.017	.987
NPLSE	.002	.0007	2.604	.009
PROFIT	-13.792	1.287	-10.718	.000
SIZE	2.078	2.132	.975	.330
R-squared	.655	Mean dependent var.		-5.102
Adjusted R-squared	.637	S.D. dependent var.		80.667
S.E. of regression	48.579	Akaike info criterion		10.655
Sum squared resid.	771684.7	Schwarz criterion		10.855
Log likelihood	-1819.990	Hannan-Quinn criter.		10.735
F-statistic	36.561	Durbin-Watson stat.		.735
Prob. (F-statistic)	.000			

To our surprise, we find that results of the period fixed effects are very similar to those we obtained using the common constant method. However, if these results are to be trusted, we would hold that, except for 'NPN' and 'SIZE', all the other explanatory variables have a statistically significant relationship with the Z-score. To explain further, our principal variable 'NPLGA', which shows the amount of non-performing loans and the control variable 'PROFIT', are strongly negatively related (with beta coefficients of -2.97 and -13.79 respectively) with the dependent variable. The variable 'NWNP' is also negatively related to the Z-score (coefficient = -.156,  $p$ -value = .02), and the variable 'NPLSE' has a very slight, negligible with respect to effect size, positive association of around .002 with the explained variable. In operational terms, therefore, one may argue that aside from the control variables,

the variable 'NGA' is the major influencer of our dependent variable, the Z-score, as per the results of this analysis, followed by 'NWNP'.

## DISCUSSION

Our results indicate that overall, the measure of non-performing loans have significant effect on the bank stability except the NPN, which is highly insignificant. Moreover, the very low value of the NPLSE coefficient shows its negligible effect on bank stability. The NGA ratio relationship with bank stability is negative, which suggests that the high level of non-performing loans may unfavourably affect financial stability. These results are in line with Ozili (2019), who also found the negative effect of non-performing loans on bank stability, suggesting that the regulator's capital requirement may bring about a reduction in the amount of non-performing loans. The results also conform to Fredriksson and Frykström (2019), who asserted that non-performing loans impair long-term economic growth and lead to the high uncertainty prevailing in the banking system that give rise to greater risks of financial stability.

On the other hand, the NWNP ratio also has significant negative effect on bank stability, which depicts that the high level of non-performing loans write-offs in comparison to low non-performing loans provisions negatively influences the bank stability. This is in line with Baudino and Yun (2017), who saw that non-performing loan write-offs result in losses that immediately decrease bank capital when the provisions for such loans are much too low and accordingly when the capital shield is thin – then it is difficult for the banks to absorb the future credit losses. Besides this, the results support the view that the high level of non-performing loans may decrease the financial results and capital, which enhances the bank risk profile, and due to a greater amount of these loans, the banks increase their interest rates so as to be protected from the loan write-off risks, in the view to provide a cover for the bank capital (Jolevski, 2017).

Concerning the control variables, we found the positive insignificant effect of size on bank stability. This positive result is in line with the stewardship theory and concentration-stability hypothesis. Results indicate the negative significant effect of firm profitability on bank stability. These results are inconsistent with other pertinent studies but are in accordance with Tan and Anchor (2016), who noted that in the case of the Chinese banking sector, the high profitability (ROA) causes an increase in the Z-score (bank stability) in terms of insolvency risk, in line with the risk-return hypothesis. Thus, following this hypothesis, the banks being investors, having a tendency to increase profit will invest in high-risk loan portfolios and hence impair their own stability (Kirby, 1974). Similarly, our results are also in accordance with Diaconu and Oanea (2015), who conducted a study with a sample of banks in different countries. They found that the countries with a high level of bank stability have reduced profit, therefore, a high profit does not necessary suggest a high level of stability.

Moreover, our results endorse the theory of information asymmetry, which views that the imbalance and information asymmetry between borrower and lender induce inefficient market behaviour, causing provision of low-quality loans to borrowers. In support, Cottarelli et al. (2005) document that in the periods of credit growth, banks will have high risk in relation to their loans' quality, reflected in the level of poor-quality loans.

Furthermore, the results reinforce the adverse selection theory, which also argues that due to information asymmetry, the banks select customers having low credit worthiness which in turn undermines the banks' stability. Similarly, our results are also in conformance with the moral hazard concept, which arises due to the provision of government deposit safety nets making so inclined banks undertake excessive risk, putting their stability at stake (Cooper & Ross, 2002; Anginer & Demirguc-Kunt, 2018).

## CONCLUSION

This study aims to examine the effects of non-performing loans on the stability of Pakistani banks covering the period from 2006 to 2018. The pertinent literature highlights the implications of such loans for bank stability, demanding due consideration. Different studies point out the alarming levels of non-performing loans of Pakistani banks, requiring the focus to investigate their influence on bank stability.

Our results indicate the negligible positive effect of one of the proxies, non-performing loans to equity on bank stability. But the amount of such loans and their write-offs were found to have significant negative effect on bank stability, calling for monitoring and controlling of such loans by the concerned regulators. The appropriate suggestive measure may require raising the banks' capital requirement under the umbrella of the Basel Accords. There are some relevant theories explaining banks' behaviour toward the provision of non-performing loans. In this view, our results are in line with the theory of information asymmetry and adverse selection theory, as the absence of symmetry of information between borrower and lender stimulates banks to provide below par quality loans while adversely selecting the less credible borrowers, owing to an incapacity to locate the credit worthy customers. The results also conform to the moral hazard concept, which arises when the deposit safety nets are provided as protective shields by governments, which encourages banks to unnecessarily indulge in the risk taking behaviour un-conducive to the bank stability. Lastly, pertaining to the control variables, we found the insignificant positive effect of the bank size and in line with the risk-return hypothesis, the significant negative effect of profit on bank stability.

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