Impact of Non-Performing Loans on Interest Income of Banks: Empirical Investigation of Commercial Banks in Pakistan

Zill-i-Jannat[*], Najia Alam[†]

Abstract

Banking sector is crucial to the stability of the economy. Non-Performing Loans (later on NPLs) have a direct impact on how well the banking system in developing countries facilitates financial intermediation. A major portion of Pakistan's whole financial system is the banking sector. Therefore, this study used the information asymmetry theory and the bad management hypothesis to determine how NPLs impacted banks' profitability. The study based on panel data of ten commercial banks working in Pakistan from 2007 to 2023. The Ordinary Least-Squares (OLS) regression method was used for data analysis. A strong negative link observed between NPLs, Return on Equity (t=-4.179, p=0.0001) and Return on Assets (t=-3.132, p=0.0006). The findings are consistent with the theoretical predictions. It is suggested that commercial *banks should manage bad debts to maximize shareholder wealth. The conclusions of the study have both conjectural and administrative implications for the personnel involved both as practitioners and policy-makers.*

Introduction

Banks serve as the primary financial intermediaries that facilitate business transactions. To deliver essential financial services, banks must have access to funds and loans represent the vital means through which they generate revenue (Guy, 2011). In addition to serving as a primary source of income for banks, a significant part of their operating profit is derived from loans, therefore they are essential for maintaining their operations (Abd Karim et al., 2010). Loans represent a major source of revenue and profit for the banks. Conversely, they also entail a degree of risk as they do not consistently yield the expected returns. When the borrowers do not repay their loans within the prescribed timeframe, these loans are classified as bad debts and referred to as NPLs. They cease to provide any financial benefits to the bank (Zain & Ghazali, 2018). The

---

[*] Ph.D. in Management Sciences, Department of Business Administration, Sarhad University of Sciences & IT, Peshawar, Email: afridi99_fwbl@yahoo.com, https://orcid.org/0009-0004-5536-4212

[†] Faculty Member, Working Folks Grammar School & College, Peshawar, Email: najiaalam344@gmail.com, https://orcid.org/0009-0000-5697-7767

creation of bad debts and their write off affect the interest income of banks (Ombaba, 2013). According to the study by Lata (2014), it was found that default loans and profitability of banks are closely linked with each other in the commercial banks of Bangladesh. The outcomes of the study indicated that default rate in public sector commercial banks was 50 percent higher than that observed in private and foreign commercial banks. When the loans become NPLs, the banks become unable to collect interest on such loans and less amount of money available with banks for further lending and to pay their operating expenses. Such doubtful debt is an indicator of a credit quality of the loan portfolio of the banks. It is therefore important to understand factors influencing the level of bad loans for improving the function of banks. As a matter of interest the NPL and its determinants across the globe is an important theme in the academic literature (Škarica, 2014). The amount of overdue loan in bank is one of the indicators of banks' performance. Lower the amount of NPL, better the financial health of the economy. The higher the level of bad debts, the bigger the damage caused to the bank. During 2001, leading banks of the Nepal collapsed because of the large chunk of bad debts. As a result, the reform program was adopted by Nepal Rastra Bank with the support of the World Bank and International Monetary Fund (Koju et al., 2018). The rising amount of NPLs poses a highest risk to financial institutions. As a result of these NPLs banks stop further lending and stricter lending terms on genuine borrowers. Consequently, this study aims to examine the impacts of NPL generation on interest income of commercial banks.

The banking sector in Pakistan is currently dominating the financial sector. The considerable role is performed by the banks in the overall financial growth. As at June 2022, on the funding side the deposit base of the banks enhanced to 6.8% as compared to 5.7% in the year 2021. On the other hand, the meager rise in advances is observed and the demand for loans is declined both in public and private sectors. The banks became risk averse as they projected growth in default rate in the public and private sector and made their investment in risk free government securities. Asset quality badly deteriorated, with increased share of NPLs. There was a fresh increase of Rs 88.3 billion in NPLs and the total provision of Rs 26.40 billion was made during the year 2021 (SBP,2022). The primary source of income for banks is the interest revenue obtained from their active loans. The interest income earned and the seed money are totally lost when the loans payment become irregular. Other areas of banking operations are also impacted by default loans both directly and indirectly. The income, public trust, credit creation and loan loss provisions are negatively affected by banks' NPLs. The purpose of this paper is to analyze the impact of NPLs on ROA and ROE of commercial banks of Pakistan. This study adds

in a number of ways. The first is to close the gap in the literature by offering fresh empirical data on the banking sector of Pakistan. Secondly, significant statistical technique was used for data analysis. Third, the study focused on the NPLs in Pakistan's banking sector that are susceptible to economic, political and financial instability. Finally, this study will help to provide guidance to policy makers and practitioners on how to control the problem of NPLs to boost banking activities in the country.

Research Questions

Following research questions are raised:
- Does NPLs affect the ROA of commercial banks in Pakistan?
- Does NPLs affect the ROE of commercial banks in Pakistan?

Objective of the Study

The proportion of the default loans with the overall financial outlay of any bank sheds light on the quality of its assets and soundness of the banking system. The core purpose of this study is to examine the link between NPLs and interest income of banks. Following are the objectives of the study:
- To analyze the impact of NPLs on ROA of commercial banks in Pakistan
- To analyze the impact of NPLs on ROE of commercial banks in Pakistan

Research Hypothesis

The study tested the following hypotheses in the context of commercial banks in Pakistan:

H_1: There is no significant relationship between NPLs and ROA.

H_2: There is no significant relationship between NPLs and ROE.

Literature Review

The problem of loan default within the banking institution continues to be a significant concern. Numerous studies have been done on national and international level regarding NPLs. The comprehensive analysis has been undertaken regarding various factors of default loans, credit quality, and economic activity. The study by Chang et al. (2008) investigated that the high level of NPLs might destabilize the overall economic sustainability. While on the other hand, performing loans play the remedial role in the growing economy. The study conducted by Akter and Roy (2017) found that the main causes of NPLs were lack of loans monitoring and supervision. The weaknesses in the judiciary system and

dearth of efficient debt collection policy also contributed in raising the level of bad debts. Another equivalent study conducted by Adebisi and Matthew (2015) to analyze the impact of loan default in Nigerian banks. A strong link detected between loan losses and ROE. The study concluded that the movements of NPLs affect the maximization of shareholder wealth and there was no connection between default loans and return on assets. Messai and Jouini (2013), found that default loans are the result of high level of real interest rate, gross domestic product and lenient terms and conditions for credit in commercial banks of Spain. They further concluded that excessive financing by banking sector without proper analysis contributes to the raising level of NPLs.

When the unemployment level is escalated in the country, it can affect the repayment capacity of borrower. Therefore, there is strong connection between unemployment and level of loan losses (Ozili, 2018). The current crunch of loan defaults in the banking sector of Vietnam has badly hit its economy. Their ratio of NPL increases to 17.2 percent. To explore the main determinants of NPLs, the data of 200 banks was analyzed which were registered on Chi Minh City and Hanoi Stock Exchange. The time period covered from 2008 to 2017. The results of the study shown that macroeconomic factors including GDP and high interest rate have major influence in increasing the volume of default loans. In order to control the level of NPL, it was recommended that the Vietnamese banks should reduce the systemic risk and should draw experience from the global banks (Dao *et al.,* 2020).

The study by Khan et al. (2020) explained the role of banking stability in Pakistan. The results of the study have shown that there was a strong negative relationship between profitability indicators, operating efficiency and NPLs. Similarly, adverse but statistically insignificant relationship was found between income diversification, capital adequacy and NPLs in the banking sector. Ahmed et al. (2021) made a very important research study by using a global sample to see the influence of financial development on impaired loans. The findings of the study have shown that the two proxies of financial development, foreign banks and financial intermediaries were positively correlated with default loans. They were negatively associated with bank liquidity and regulatory capital. The findings of the study exhibited that the banks with high regulator capital and liquidity experience have less NPLs. In Benin during the period of 1988-90, 80 percent of the loans were non-performing and as a result three commercial banks were collapsed. Similarly, in Cameroon the NPLs portfolio reached to 70 percent and five commercial banks were closed (Ugoani, 2016). The significant positive relationship between NPL and inflation indicate that high rate of interest because of inflation might

impact the loan repayment capacity of the borrower (Radivojević et al., 2021).

In another study performed by El-Maude et al. (2017) in Nigerian banking sector and found the relationship between the macro and bank controllable factors. The findings of the study suggested that the relationship between loan to deposit ratio and NPLs was positive and insignificant. There are two major sources of banks' income. One is from lending activities and other from non-lending transactions. When income of the banks is higher than interest income, they will lower their risk by investing in high-risk projects. Such banks have better loan performing and inverse relation has shown between their income diversification and NPLs (Ghosh, 2015). Hu (2002), conducted a study and found no relationship between default loans and income divergence. In banks default loans are those risky assets that are not generate any income. According to Boahene et al. (2012), it can be concluded that loan default is a major cause of bank failure. Therefore, for credit risk management, the regulatory authorities of the banking sector prescribed minimum credit standards. The sound basis of credit risk management is important for controlling the prevailing and possible risks inherent in lending activities. Khan et al. (2020), emphasized that NPLs in the banking sector of Pakistan are significantly and negatively impacted by the profitability and operating efficiency. Additionally, Naili and Lahrichi (2022) demonstrated that how NPLs are influenced by the bank specific factors such as size, operating efficiency and ownership structure.

Theoretical Framework

This section describes the theoretical framework underpin the study. Several theoretical perspectives are used to explain the relationship between NPLs and profitability such as Information asymmetry theory and Bad management hypothesis are used for this research study.

Information Asymmetry Theory

According to Bergh et al. (2019), this theory is about the asymmetric information in business, wherein one has more information than the other. In the management research this theory is widely accepted and in the primary theories of management it is a fundamental statement. Another study by Hennessy and Wolf (2018) confirmed that the divergence of the data proved the presence of asymmetric information and this can cause the risk of moral hazard. The selection of the inappropriate borrower affects the overall lending portfolio of the banks and resultantly

NPLs will increase. Eventually, the interest income from the loans and capital deteriorated (Makri et al., 2014).

Bad Management Hypothesis
      The theory was presented by Berger and DeYoung (1997) According to this hypothesis, the adverse selection of borrower increases bank's NPL. Banks spend a lot of money on supervision and monitoring of bad debts, which tend to increase cost to income ratio and it shows that management is not strong. There are many internal and external factors for loan default in banks. However, it is argued that the impact of banking management is higher than any other factors (Koju et al., 2018a). On the basis of the past studies, it can be expected that there is a possibility of inverse relationship between default loans and return on assets.

Research Methodology
      This is quantitative research study based on commercial banks in Pakistan. A logical technique and a positivist philosophy are used. The banking sector of Pakistan constitutes a total of around 41schedule banks and held 40 percent of the total assets in terms of loans and advances. The top ten commercial banks selected as a sample with a high level of loans and NPLs. The secondary data collected from the annual reports of the banks for the period of 2007 to 2023. All the specific assumptions of OLS are fulfilled; therefore, this technique is used in this study.

Model Specification
      This study used a modified model that was also used by Kingu et al. (2018) and Hidayat et al. (2023)

$$ROA_{it} = \beta_0 + \beta_1 lNPL_{it} + +\varepsilon_{ii} \ \text{…………..} \ (1)$$

$$ROE_{it} = \beta_0 + \beta_1 lNPL_{it} + +\varepsilon_{ii} \ \text{…………..} \ (2)$$

Measurement of variables is given in table 1

Table 1: - Variables Description

Variable	Symbol	Measure	Source	Expected Sign
Non- performing loans	lNPL	Natural log of NPLs	Khan et al. (2020)	negative
Return on Assets	ROA	Net Profit/ Total Assets		negative

			Tangngisalu et al. (2020)	
Return on equity	ROE	Net Income/ Total shareholders' equity	Iskandar et al. (2020)	negative

Data Analysis and Discussion

Summary of Descriptive statistics

Descriptive statistics results are given in table 2. There are a total of 170 observations for each variable. The minimum, maximum, mean and standard deviation was used to show the overall trend of the data. ROA bottom value is 1.212 and highest value is 8.012. In case of ROE the value lies in the range of 4.920 to 9.601. The NPL lowest value is 3.445 and highest value is 8.756. The value of Std is recorded low at 1.484 and its mean is 4.270 in case of ROA. The Std value is 5.042 and mean is 5.972 in ROE. In case NPL the Std is 1.515 and mean is 9.848. The minimum mean of 4.270 is observed in ROA and highest is 9.848 in case of NPL. The lowest value of standard deviation is 1.484 in ROA and top value is 5.042 in ROE. The skewness for both the dependent and independent variables lies between -1.96 to +1.96 which shows the normality of data tend.

Table 2: -Review of Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	Skewness
ROA_{it}	170	4.270	1.484	1.212	8.012	-0.135
ROE_{it}	170	5.972	5.042	4.920	9.601	-1.531
$lNPL_{it}$	170	9.848	1.515	3.445	8.756	-0.138

Correlation Results

The correlation matrix of the variables included in this study is presented in table 3. The variables show a strong negative and significant relationship.

Table 3: Correlation Matrix

Variables	ROA $_{it}$	ROA $_{it}$	LNPL $_{it}$
ROA_{it}	1	-0.799* (0.0000)	-0.220* (0.0000)
ROE_{it}	-0.639**	1	-0.477*

Variables	ROA $_{it}$	ROA $_{it}$	LNPL $_{it}$
	(0.0001)		(0.0007)
$lNPL_{it}$	-0.043**	0.245*	1
	(0.0000)	(0.0004)	

Note: ***, ** and * represent 1%, 5% and 10% significance level.

Panel Unit Root Test
      To check the stationary of data, IPS test is applied. The results are given in table 4. All the selected variables are stationary at level.

Table 4: IPS Test Results

Variables	Statistics	p-value	Order of integration
ROA_{it}	-4.0612*	0.0000	I(0)
ROE_{it}	-3.0126**	0.0000	I(0)
$lNPL_{it}$	-5.4123**	0.0000	I(0)

Analysis of Regression Results
      The results of the regression analysis are presented in this section. Based on the regression results which are given in table 5, it can be concluded that independent variable NPLs regressed with the dependent variable ROA. The coefficient value is -0.1860. Thus, it can be inferred that, NPL and ROA are significantly and inversely related with each other. R^2 is 51.74, which means that 51.74% of the change in ROA is associated with NPL. The resting 48.26 percent of the change is linked with other variables. F-statistics was used to find out the overall reliability and validity of the model. The hypothesis tested at 5% level of significance and rejected that R^2 equal to zero. This finding supports information asymmetry theory and bad management hypothesis which argue that increase in NPL is a result of adverse selection, and is linked to management inability to control operating efficiency which in the long run leads to decrease in profitability. The outcomes support the hypothesis 1 and align with the research conducted by Tangngisalu et al. (2020)

Table 5:- OLS Results (ROA as dependent variable)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$lNPL_{it}$	-0.1860	0.1402	-4.179	0.0001
C	10.011	1.382	7.243	0

R-squared	0.5174
F-statistic	58.251
Prob(F-statistic)	0.0000

The regression results shown in table 6 highlight the relationship between the tested variable NPL and ROE. There is inverse relationship between the variables. The NPL value is -0.221. It means one unit change in ROE brings a change of 22.1 units in NPL. The value of R^2 is 0.4071. This shows that that 40.71% of the variation in return on equity is explained by the changes in loan losses. The remaining difference of 59.29 % is explicated by other variables. The results are supported by the study conducted by Quagliariello (2007) and Iskandar et al. (2020) which exhibited a strong and inverse relationship between ROE, ROA and NPLs.

Table 6: - OLS Results (ROE as dependent variable)

Variable	Coefficient	Std-Error	t-Stat	Prob.
$lNPL_{it}$	-0.221	0.1320	-3.132	0.0006
C	23.211	3.866	4.438	0.000
R-squared	0.4071			
F-statistics	42.891			
Prob(F-statistic)	0.0001			

Based on the results of the regression analysis, the economic equations can be established as follows:

Y (ROA_{it}) = 10.011 –0.186 ($lNPL_{it}$)

Y (ROE_{it}) = 23.211 –0.221 ($lNPL_{it}$)

In Table 6, the results of tested hypotheses are given.

Table 6: - Hypothesis Results

SNO	Hypothesis	Coefficient	Sig	Decision
1	No significant relationship between NPLs and ROA	-0.186	0.000	Approved
2	No significant relationship between NPLs and ROE	-0.221	0.000	Approved

Conclusion and Recommendations

This paper describes the relationship between NPLs and interest income of banks. To achieve the goal the panel data was used for the time period of December 2007 to December 2023. Both hypotheses were accepted, regarding the impact of NPLs on ROA and ROE. The regression results confirmed a significant and negative relationship between the NPLs, ROA and ROE for the bank's sector in Pakistan. Based on the results it can be concluded that asset value of the banks is affected badly by NPLs. The exposure of the bank to credit risk is measured by its level of NPLs. It increases the operating cost and ultimately leads to decrease in profitability. The results have shown a strong and inverse association between NPLs and ROE. It means that the shareholder wealth maximization is affected by the level of NPLs. The impact of loan default is not restricted to a particular bank but a large number of banks leaving a ripple effect on the economy. Therefore, banks should closely monitor the quality of loans and the efficiency of their credit risk management to control loan losses. The basic purpose is to safeguard the customer interests, their business as well as the overall economy of the country. It is suggested that to shrink the cost of default loans, the banks should increase non-interest income. They should also revisit their operations towards better performing cities, provinces and make their successes public. Also, there should be regular audit to clear the backlog of NPLs.

Implications of the Study

- The scheme of reward and punishment should be introduced by the central bank and it should be linked with the amount of fresh addition and recoveries in bad debts by the commercial banks.
- Banks need to identify the causes of NPLs for each sector, city, province and redirect their strategies accordingly before offering new credit products.
- Insurance products for crisis need to be developed. If the customers are in default their outstanding liability may be adjusted from the crisis insurance.

Directions for Future Research

- An analysis of outstanding loans and NPLs should be conducted across various sectors in relation to the different provinces of the country.

References:

Abd Karim, M. Z., Sok, G. C., & Hassan, S. (2010). Bank efficiency and non-performing loans: Evidence from Malaysia and Singapore. *Prague Economic Papers, 2*(1), 118-132.

Adebisi, J. F., & Matthew, O. B. (2015). The impact of non-performing loans on firm profitability: A focus on the Nigerian banking industry. *American Research Journal of Business and Management, 1*(4), 1-7.

Ahmed, S., Majeed, M. E., Thalassinos, E., & Thalassinos, Y. (2021). The impact of bank specific and macro-economic factors on non-performing loans in the banking sector: evidence from an emerging economy. *Journal of Risk and Financial Management, 14*(5), 217.

Akter, R., & Roy, J. K. (2017). The impacts of non-performing loan on profitability: An empirical study on banking sector of Dhaka stock exchange. *International Journal of Economics and Finance, 9*(3), 126-132.

Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance, 21*(6), 849-870.

Bergh, D. D., Ketchen Jr, D. J., Orlandi, I., Heugens, P. P., & Boyd, B. K. (2019). Information asymmetry in management research: Past accomplishments and future opportunities. *Journal of management, 45*(1), 122-158.

Boahene, S. H., Dasah, J., & Agyei, S. K. (2012). Credit risk and profitability of selected banks in Ghana. *Research Journal of finance and accounting, 3*(7), 6-14.

Chang, E. J., Guerra, S. M., Lima, E. J., & Tabak, B. (2008). The stability–concentration relationship in the Brazilian banking system. *Journal of international financial Markets, Institutions and Money, 18*(4), 388-397.

El-Maude, J. G., Abdul-Rahman, A., & Ibrahim, M. (2017). Determinants of non-performing loans in Nigeria's deposit money banks. *Archives of Business Research, 5*(1), 74-88.

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of financial stability, 20*(5), 93-104.

Guy, K. (2011). Non-performing loans. *Economic Review, 32*(1), 7-9.

Hennessy, D. A., & Wolf, C. A. (2018). Asymmetric information, externalities and incentives in animal disease prevention and control. *Journal of Agricultural Economics, 69*(1), 226-242.

Hidayat, C., Hikmah, K., & Pujiharjanto, C. A. (2023). The Influence of Return on Equity, Current Ratio, and Price Earnings Ratio on Stock Prices in Mining Sector Companies in 2019-2022 Listed on the Indonesian Stock Exchange. *Strata Social and Humanities Studies, 1*(2), 106-116.

Hu, J. (2002). Ownership and loans: evidence from Taiwanese banks and non-performing loans: evidence from Taiwanese banks. *3*(5), 405-420.

Iskandar, Y., Zaki, A., & Sinollah, S. (2020). The Effect Of NPL, ROE, CAR On Price Earning Ratio On Commercial Banks In Indonesia. *Agregat, 4*(2), 178-185.

Khan, M. A., Siddique, A., & Sarwar, Z. (2020). Determinants of non-performing loans in the banking sector in developing state. *Asian Journal of Accounting Research, 5*(1), 135-145.

Kingu, P. S., Macha, S., & Gwahula, R. (2018). Impact of non-performing loans on bank's profitability: Empirical evidence from commercial banks in Tanzania. *International Journal of Scientific Research and Management, 6*(1), 71-79.

Koju, L., Koju, R., & Wang, S. (2018b). Macroeconomic and bank-specific determinants of non-performing loans: evidence from Nepalese banking system. *Journal of Central Banking Theory and Practice, 7*(3), 111-138.

Lata, R. S. (2014). *Non-performing loan and its impact on profitability of state owned commercial banks in Bangladesh: an empirical study.* Paper presented at the Proceedings of 11th Asian Business Research Conference.

Makri, V., Tsagkanos, A., & Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone. *Panoeconomicus, 61*(2), 193-206.

Messai, A. S., & Jouini, F. (2013). Micro and macro determinants of non-performing loans. *International journal of economics and financial issues, 3*(4), 852-860.

Naili, M., & Lahrichi, Y. (2022). Banks' credit risk, systematic determinants and specific factors: recent evidence from emerging markets. *Heliyon, 8*(2), 1-16.

Ombaba, K. B. M. (2013). Assessing the Factors Contributing to Non–Performance Loans in Kenyan Banks. *European Journal of Business and Management, 5*(32), 155-162.

Ozili, P. K. (2018). Banking stability determinants in Africa. *International Journal of Managerial Finance, 14*(4), 462-483.

Quagliariello, M. (2007). Banks' riskiness over the business cycle: a panel analysis on Italian intermediaries. *Applied Financial Economics, 17*(2), 119-138.

Radivojević, N., Muhović, A., Joksimović, M., & Pimić, M. (2021). Examining the impact of movements of the commodity price on the value of the Baltic Dry Index during Covid19 pandemic. *Asian Journal of Economics and Empirical Research, 8*(2), 67-72.

Škarica, B. (2014). Determinants of non-performing loans in Central and Eastern European countries. *Financial theory and practice, 38*(1), 37-59.

Tangngisalu, J., Hasanuddin, R., Hala, Y., Nurlina, N., & Syahrul, S. (2020). Effect of CAR and NPL on ROA: Empirical study in Indonesia Banks. *Journal of Asian Finance, Economics and Business, 7*(6), 9-18.

Ugoani, J. (2016). Nonperforming loans portfolio and its effect on bank profitability in Nigeria. *Independent Journal of Management & Production, 7*(2), 303-319.

Zain, E., & Ghazali, P. L. B. (2018). Non-performing loans and its implications toward Bank Performance: Comparison on Islamic and Conventional Banks. *International journal of academic research in business and social sciences, 8*(12), 528-537.