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Higher Interest Rate & Credit Risk Management: Insights for Pakistan's Banking Sector from Us Silicon Valley Bank

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ABSTRACT

This paper examines the latest interest rate trends and credit risk management for the performance of Pakistan's banking industry and drawing lessons from the default of Silicon Valley Bank. In the ever-evolving landscape of the banking industry, the delicate balance between interest rates and credit risk management emerges as a pivotal force shaping the sector's performance. This research provides a roadmap for financial institutions to harness the moderating influence of interest rates on credit risk, ultimately enhancing performance and resilience. Pakistan's banking industry must learn from the experiences and apply them to their own risk management practices. The study emphasizes the need for enhanced risk assessment frameworks, including thorough borrower evaluation, stress testing, and scenario analysis. It was conducted by well-structured questionnaire from a sample of 230 seasoned, experienced employees of top ten banks of Pakistan. The results of multiple regression showed that three variables: Credit Risk Management (CRM hereafter), Bank Performance and Interest rate are interconnected, statistically significant, affect each other and interest rate contribute in performance and strengthen CRM techniques. The study is quite useful for understanding and comprehending the changes in Pakistan's banking industry over the past and in the latest scenarios of higher interest rates. Future contribution will be that this research will supply the foundation for other researchers who wish to dig into monetary policies and related disciplines.

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1. Introduction

Pakistan's banking industry is constituted of five public sector commercial banks with five local private commercial banks, side by side having Islamic windows and international banks (SBP, 2022b). Role of risk management, impact on bank performance, disturbed political scenarios and uncertain volatile economic environment are important to describe Pakistan's banking Industry (Saima, 2022). SBP is responsible for evaluating various aspects of the banking sector; its performance, quality of assets, stability, and solvency, rate of economic growth and

interest rates. Over the past two decades, Pakistan's banking sector has experienced different phases of growth and downturns, including the transition from an emerging-market status and fluctuations in the interest-rate corridor. Various measures were taken to set ceilings and floors for reverse-repo rates, implementing taxes on cash withdrawals, capital gains, and dividends. These regulatory developments have effectively managed interest rates, leading to both historically low and high rates being observed.

Khatun and Saadat (2020) declared that Pakistan's banking industry is lagging due to political incredibility, unstable interest rate policies. Banking industry is facing every single risk of the industry as credit risk, operational issues, foreign risk, interest rate disturbances, capital adequacy due to the day to day changing political scenario and volatile economic environment (Rehman, Muhammad, Sarwar, & Raz, 2019). Awan and Yaqoob (2021) described the economic state of Pakistan as economic crisis is "brewing" in Pakistan and researcher declared nineties (1990s) as "lost decade" due to the political blame game and Pakistan "landed in double digit inflation, deeper internal and external debt and ultimate slowdown in economic growth" with low and erratic fiscal growth, persistently high inflation, extreme poverty (Ahmed, Najmi, Mustafa, & Khan, 2019). NBP observed highest NPLs of the banking industry during 2005-16 KAMRAN, OMRAN, and MOHAMED ARSHAD (2018); declining gradually, but importance of interest rate risk is still the most important (SBP, 2021). Loss categories in NPLs have increased, cost of funds, politicized consumer financing and mortgage loans became more infected than the others. Nonperforming loans and defaulted banks gobble up the assets of industry (Bwoma, Muturi, & Mogwambo, 2017). Non-performing loans of Pakistan's banking industry from 2001 to 2022 give a clear-cut picture of infection ratio in different banks.

Table 1
Non Performing Loans in Pakistan Banking Industry 2001-2022

Years	NET NPLs (Bn)	%	NCBs	Privatized	Private	Foreign Banks	Specialized Banks	DFIs (%)
31.12.2001	78.847	10.46	13.85	14.34	7.76	0.92	37.27	31.54
2002	69.451	8.85	13.13	12.35	5.44	1.19	41.74	25.99
2003	79.309	6.9	5.2	7.9	4.4	0.4	34.2	15.6
2004	58.579	3.7	2.7	3.6	2.8	0.01	26.3	6.4
2005	49.523	2.7	1.9	2.4	2.1	-0.4	22.6	4.4
2006	44.857	1.8	1.5	1.4	1.6	1	14.4	15.7
2007	35.306	1.2	1.1	1.6	0.8	-0.6	10	5.6
2008	82.787	2.6	2.3	2.9	2.2	0.2	10.2	9.3
2009	134.369	3.9	3.8	5.2	3.3	2	10	11.3
2010	187.190	5.5	5.4	12.8	3.7	1.4	12.5	10.9
2011	207.810	5.6	5.5	13.5	3.8	1.1	14.7	13.1
2012	183.092	4.8	4.6	7.4	3.6	0.9	10.9	18.6
2013	131.844	3.2	3.1	5.6	2.2	-0.1	11.4	12.4
2014	125.896	2.8	2.7	5.9	1.7	-0.2	10.6	7.9
2015	94.660	1.9	1.9	4.5	1	-0.01	8.7	6.2
2016	93.497	1.7	1.6	3.4	0.9	-0.01	12.2	4.5
2017	79.815	1.2	1.2	2.4	0.7	-0.2	12.2	5.5
2018	114.488	1.4	1.4	1.7	0.8	-0.3	23.1	5.4
2019	145.176	1.7	1.7	1.8	1.3	-0.3	23.9	4.2
2020	100.233	1.2	1.2	0.8	1.1	-0.5	29.1	3.2
2021	84.860	1.0	1.0	0.7	0.9	0.51	22.94	2.1
2022	95.791	1.07	1.10	0.73	1.47	0.55	19.3	1.94

Source:- Prepared by Researcher, data by State Bank of Pakistan (Annual Report 2022)

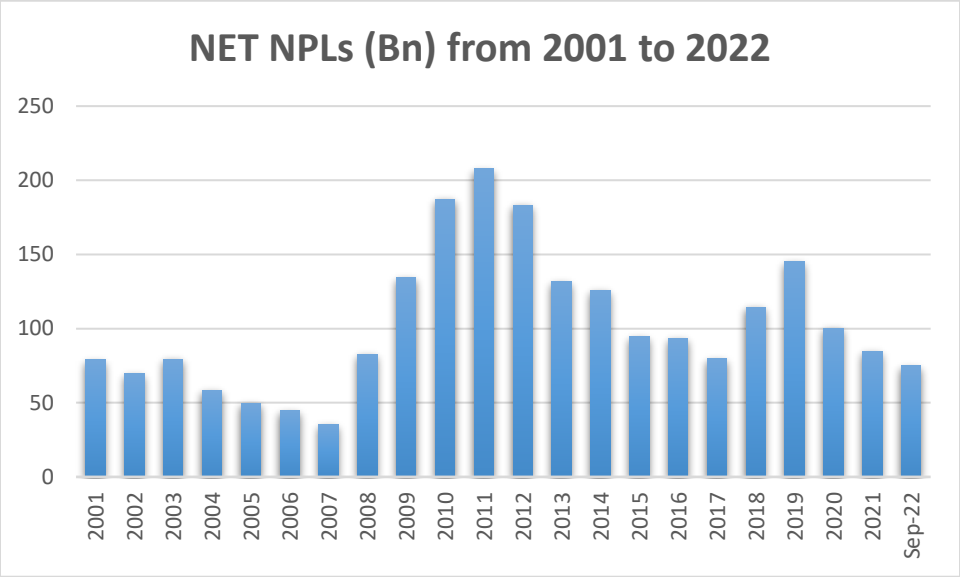


Figure 1: Net NPLs (Bn) From 2001-2022
Source :- Prepared by Researcher, data by SBP (2021)

This diagram not only depicts the effects of GFC 2007-08 but also higher NPLs with higher interest rates. However different bank responds differently to this.

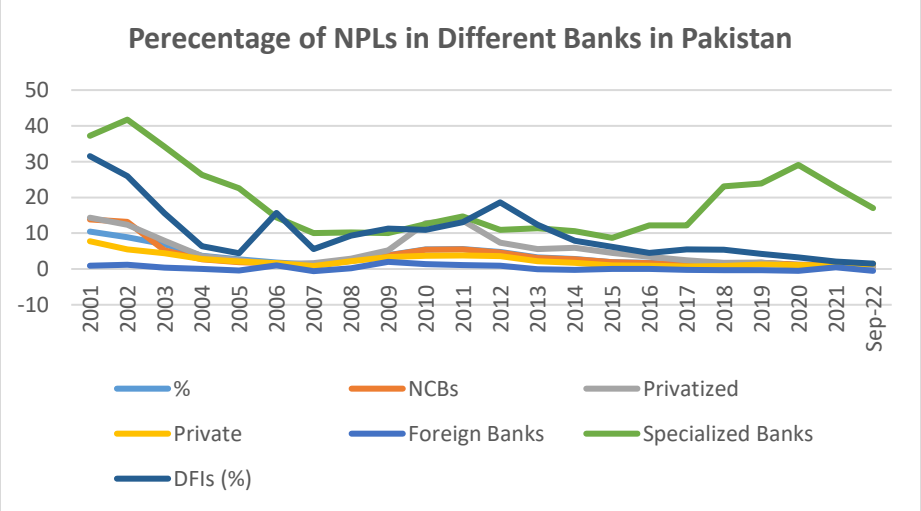


Figure 2: Percentage of NPLs in Different Banks of Pakistan
Source :- Prepared by Researcher, data by (SBP, 2022b)

ALI, BAGRAM, and ALI (2018) studied interest rate risk issues and bank performance of Pakistan and concluded that interest rate risk management can enhance the organizational performance. SenGupta (2020) declared that Pakistan's banking industry is lagging due to political incredibility and intervention, facing credit risk, operational issues, FEX risk, interest rate disturbances, capital inadequacy and volatile economic environment (Altaf, Ayub, Shabbir, & Usman, 2022). Financial meltdown, political instability, price hiking, corruption, economic unrest, poor management, illiteracy, low per capita income, less savings are contributing to low adaptation of risk management practices (Bagh, Naseer, & Khan, 2022). Pakistan's banking industry is facing negative and downgraded credit rating from B3 to Caa1 by different rating agencies in the last one year due to accelerating interest rate and default rumors of the financial transactions; not only alarming but also an indication that Pakistan's banking industry is following the footsteps of Silicon Valley Bank. Silicon Valley Bank (SVB), a bank of US $ 211.80 (bn)

assets, 173.10 (bn) US$ deposits, 195.49 (bn) US$ liabilities with 73.61 (bn) US$ loans and total investments of 120.05 (bn) US$ sold its securities and wound up as on 10th March, 2023 due to mismatched and higher interest rate wiped out the liquid securities. Increasing trend of interest rate (KIBOR) depicts the future of the banking industry of Pakistan; homogeneous trend of all KIBOR rates.

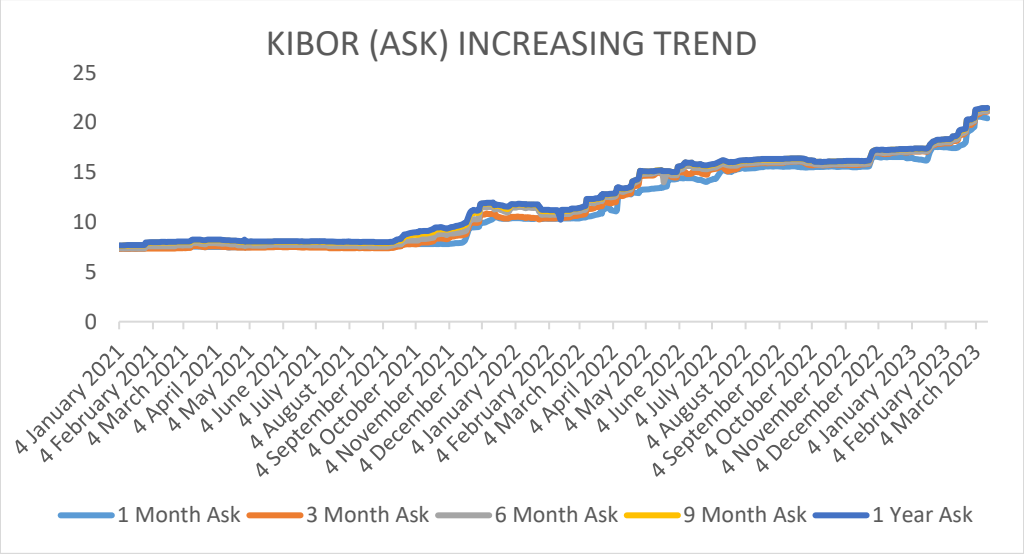


Figure 3: KIBOR (ASK) Increasing Trend
Source: Data from State Bank of Pakistan, Developed by Researcher

Increasing trend of interest rate is not projected and not accounted in long term financing, interest rate is going up quickly whereas on the other hand "import curfew" deteriorated the exports. Bank may fall short of MCR and high-cost deposits, growing infection ratio in borrowing portfolios. Pakistan's banking industry is well capitalized, reasonably buffered, but government's borrowing, higher exchange rates, quickly going up interest rates, insufficient hedging, resultant inflationary hikes and contagious effects are important which can create expected spiral rippled scenario.

SBP developed proper policies and prudential regulations but for the last 20 years the level NPLs has not fallen to a satisfying level (SBP, 2022a). According to Bank (2022), the average NPL ratio for Pakistan banks was 14.87% between 1997-2016, with minimum of 7.3%, in 2006 and maximum of 23.4%, in 2001.Pakistan has 24th position among the list of high NPL countries among 119 countries. Pakistan once was ranked as high as 7th in 2008. Hamza (2017) diagnosed Pakistan banking industry and proved negative relationship of ROA & ROE with NPL and statistically significant at level 5%.

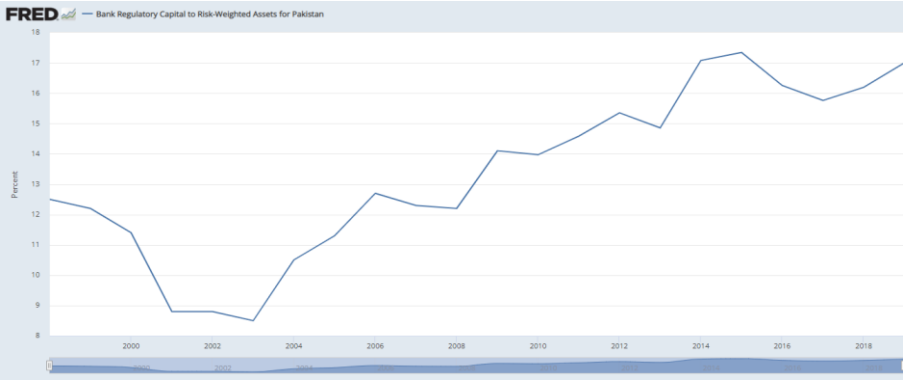


Figure 4: Risk Weighted Assets in Pakistan's Banking Industry

According to SBP (2022a), the total NPLs for all banks of Pakistan was Rs.585 billion out of NPLs 69% account for the balance sheet of private sector banks and 27 % is from public sector banks having negative impact on profitability and higher ROE (Shahid, Gul, & Naheed, 2019). SBP regulated the banking industry of Pakistan and advised Risk Weighted Assets (RWA) in relation to operational, market, interest rate and credit concerns.

2. Research Contribution

This research provides valuable comparative insights between Pakistan's banking landscape and the strategies employed by Silicon Valley Bank in the US. By examining higher interest rate dynamics and credit risk management practices, it offers actionable recommendations tailored for enhancing Pakistan's banking resilience and strategic decision-making in a global context. as it bridges the gap between local banking practices and the innovative strategies employed by Silicon Valley Bank in the U.S. Through a comparative analysis of interest rate dynamics and credit risk management, the article offers tailored insights and recommendations, equipping Pakistan's banking sector with knowledge to navigate challenges and optimize performance in a dynamic financial landscape. Here it is worth mentioning that Banking sector of the developed countries has an important contagious effect on all over world, so this analysis is very much needed. Zhonghai (2020) stressed that management of credit risk is a basis of survival and most important banking risks as well as interest rate (Bouteille & Coogan-Pushner, 2021; Silahtaroğlu, Dinçer, & Yüksel, 2021).

3. Research Methodology

Credit risk management is mostly researched on secondary data. Researchers inferred many models and proved its importance for profitability and support for the performance of the banking industry. Practices, procedure and controls of credit risks measurement in developing countries as in Pakistan in the presence of oscillated interest rates, higher volumes of NPLs, inflationary economy and many other risky hazards are different from bank to bank.

Table 2
Summary of Variables

Variables		Measurement
Bank Performance	(ROA)	Net Income / Average Total Assets Ekinci and Poyraz (2019)
	(ROE)	Net Income / Shareholders Equity Gazi et al. (2021)
	(ATO)	Total Sales / Average Total Assets Duho, Duho, and Forson (2023)
	(NPM)	Net Profit / Total income or Revenue Su, Lee, Chou, and Chen (2020)
Credit Risk Management	(NPLs)	NPLs / Total Loan Portfolio x 100 Islam, Alam, and Hossain (2019)
	(NLLs)	Net Loans & Leases Ahmadyan (2018)
	(RWAs)	Risk Weighted Assets Milojević and Redžepagić (2021)
Interest Rate	LIR	Lending interest Rate Belás, Smrcka, Gavurova, and Dvorsky (2018)
	IRS	Interest rate Spread Ermolova et al. (2021)
	NIM	Net Interest Margin Busch and Memmel (2017)

In respect of this section opted questionnaires as sampling techniques and 230 employees of different banks of Pakistan participated. The online Google form is created as online questionnaire to collect data from respondents.

In these questionnaires bank performance was gauged by ROA, ROE, ATO and NPM; credit risk management by the NPLs, NLLs and RWAs, interest rate by the LIR, IRS and NIM. Summary of variables is as following.

4. Research Findings

Bankers from different banks responded as per following. Exim bank is not one of top ten banks but senior most banker of credit group especially invited to respond.

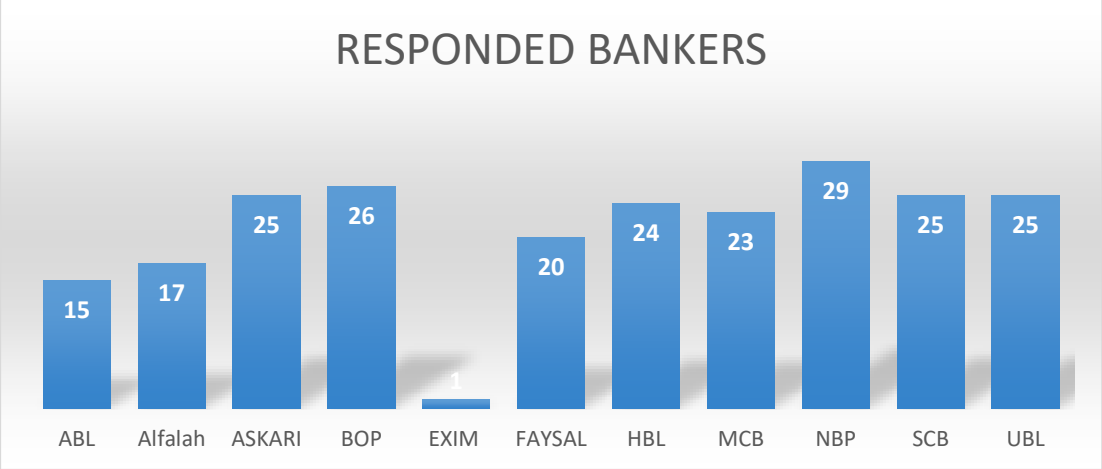


Figure 5: Bankers responded the Questionnair
Source: - Developed by Researcher as per responses of Questionnaire

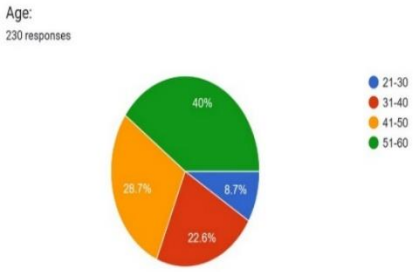


Figure 6: Age Groups of Respondents

There are four age groups as 21-30, 31-40, 41-50, and 51-60. Researcher has tried to include more experienced bankers; 8.7%, 22.6%, 28.7% and 40% respectively as per age groups; more learned and having more experience from all lines of credit. searcher has tried to get responses from maximum females; 23% of respondents.

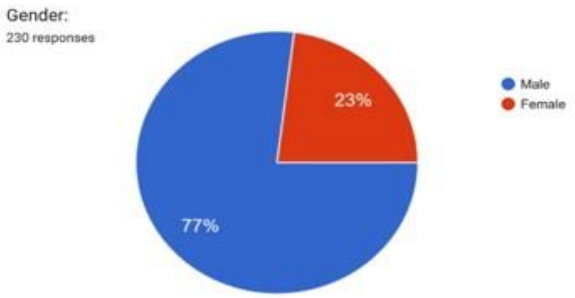


Figure 7: Gender Distribution of Respondents

All loops of credit are involved and participated; from dealing of walk-in borrowers, policy designing, exit strategy of relationship.

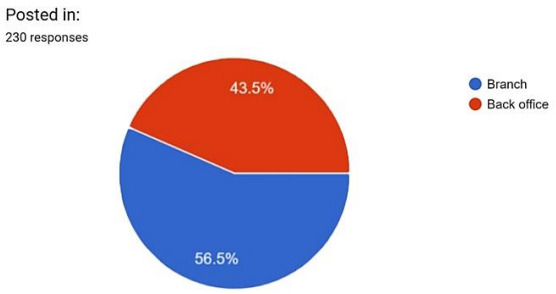


Figure 7: Placement of Respondents

Placemat of bankers is also important criterion which decides the stratification of credit loops and jurisdiction of staff; financial powers and sanctioning authorities.

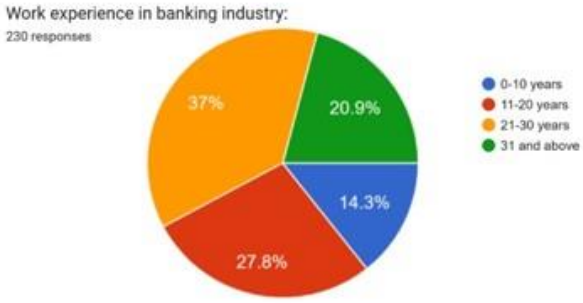


Figure 8: Work Experience in Banking Industry

Selection of the bankers was also gauged on work experience; 20.9% having 31 years and more experience, 37% having 21 to 30 years, 27.8 % of 11 to 20 years. It depicts the versatile credit experienced banking industry of Pakistan.

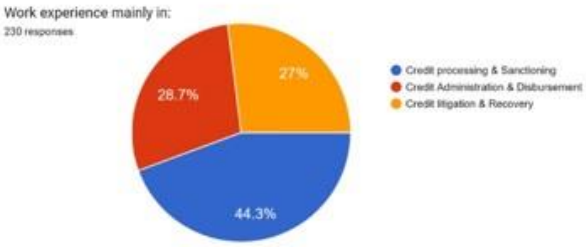


Figure 9: Departments of Work Experience

Researcher tried to trace experienced credit knowing bankers; 44.3% are from credit processing and sanctioning departments of branchers and regional offices, 28.7% are from credit administration, documentation and disbursement departments and 27% are from credit litigation and recovery departments.

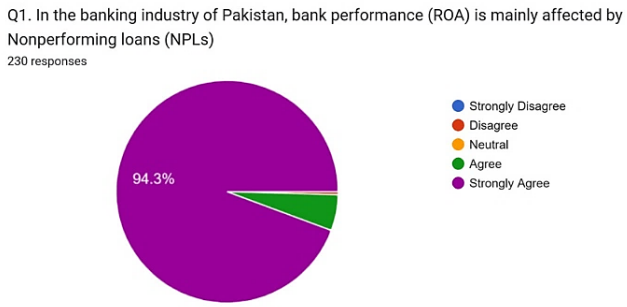


Figure 10: ROA mainly affected by NPLs

Non-Performing Loans (NPLs) prominently affect banks' Return on Assets (ROA), as they weigh down asset quality and profitability, potentially lowering ROA due to increased provisioning for potential losses and reduced interest income. Effective management of NPLs is crucial for maintaining a healthy ROA in the banking sector. All these respondent bankers are not only the experienced, working in different banks, having different credit processing techniques and from different Basel implementation procedures endorsed that NPLs negatively affect the performance of industry; i.e 94.3%.

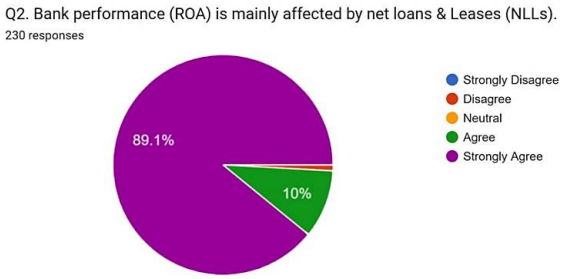


Figure 11: ROA mainly affected by NLLs

Net loans and leases affect the banking industry in a positive way and earn interest for the growth; 89.10% strongly agrees the importance and contribution in the performance of banking industry.

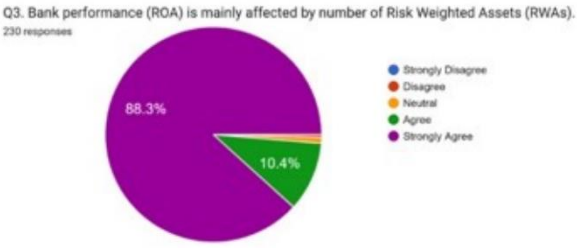


Figure 12: ROA mainly affected by RWAs

Pakistan's banking industry confirms that RWAs affect the performance of the banking sector; 88.3% strongly agreed.

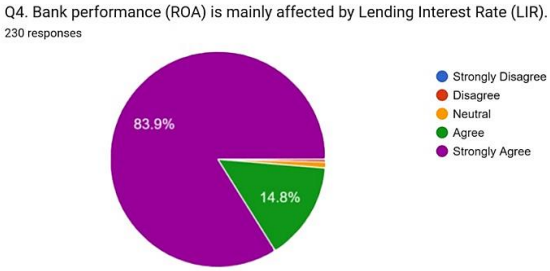


Figure 13: ROA mainly affected by LIR

Bankers confirmed that lending interest rate (LIR) earns and contributes in the performance (ROA) of the banking sector; 83.9% bankers endorsed.

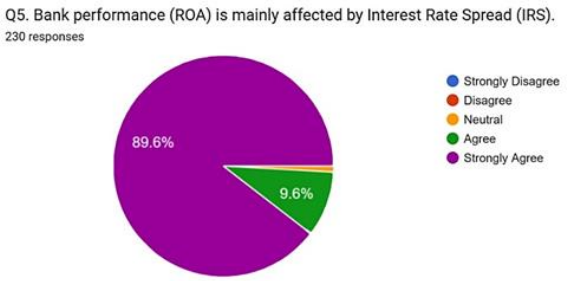


Figure 14: ROA mainly affected by IRS

Interest rate spread fills the gap of interest rate income and expenses. Bankers strongly agreed (89.6%) that IRS contributes in the performance of the banking sector.

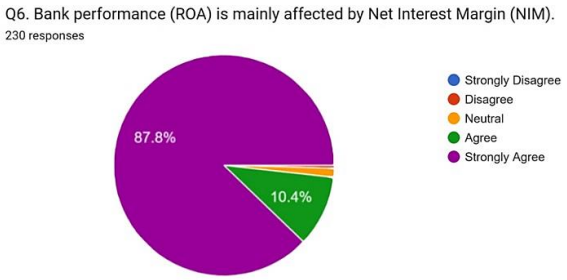


Figure 15: ROA mainly affected by NIM

Net interest margin also earns income in the banking industry as 87.8% respondents endorsed.

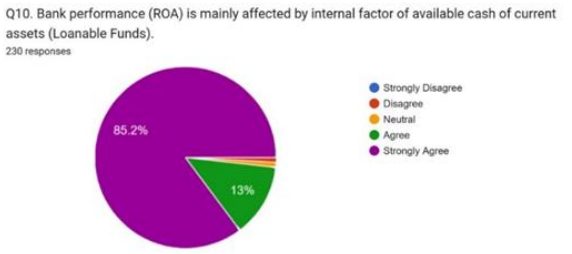


Figure 15: ROA mainly affected by Loanable Funds

Bankers declare that loanable funds are crucial for banking as a pool of available money that banks can lend to borrowers. Banks rely on these funds to finance loans, investments, and other financial activities, enabling them to stimulate economic growth and provide essential financial services to borrowers. The efficient allocation and management of loanable funds are fundamental to a bank's ability to generate interest income and maintain financial stability i.e . 85.2% strongly agreed and 13.% agreed.

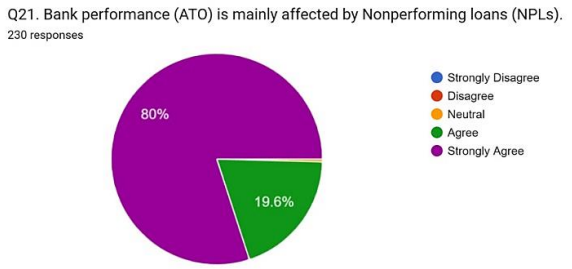


Figure 16: ATO mainly affected by NPLs

Nonperforming loans are an established negative element of the banking sector and it was also agreed by 99.6% (80% strongly agreed and 19.6% agreed) population of the questionnaire.

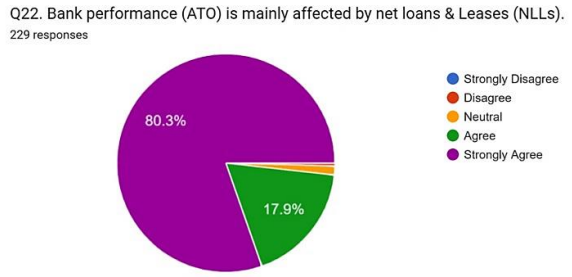


Figure 17: ATO mainly affected by NLLs

Assets also turn over due to the financing and lending which was endorsed and agreed by the 230 senior bank official of Pakistan's banking industry; 98.2% (80.3% strongly agreed & 17.9% agreed).

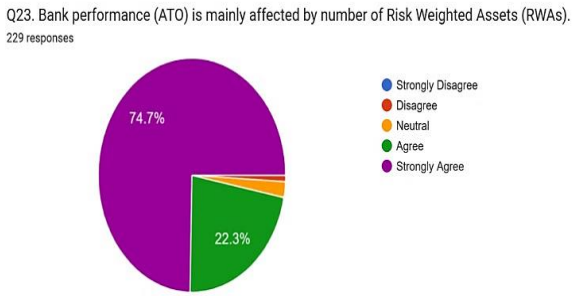
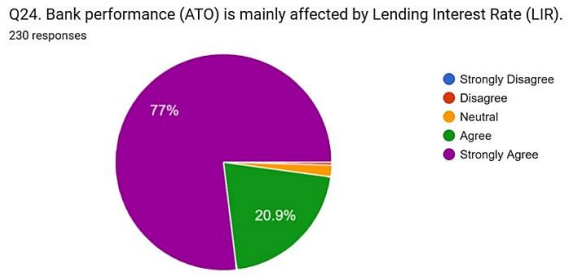


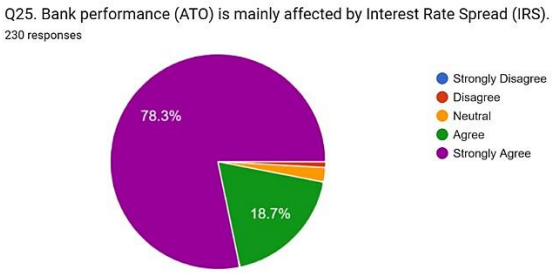
Figure 18: ATO mainly affected by RWAs

Risk weighted assets are also one of the categories of assets as endorsed by the bankers that assets turn over in to the profit is positive and significant i.e. 97% (74.7% strongly agreed & 22.3% agreed).



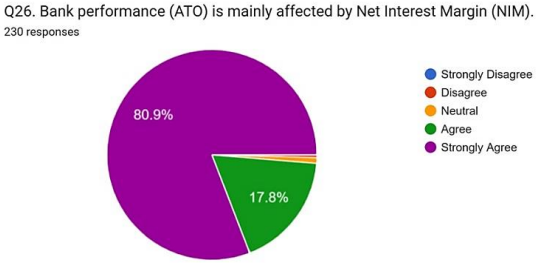
We used to lend assets to the borrowers at a specific interest rate which turn the assets into positive growth and performance of industry as endorsed by the 97.9% (77.00% strongly agreed & 20.9% agreed).

Figure 19: ATO mainly affected by LIR



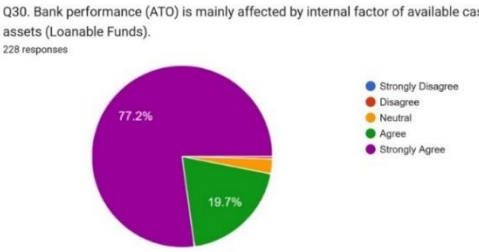
Interest rate spread contributes in the performance and banking assets turn into profit if it is properly managed i.e 97% (78.3% strongly agreed & 18.7% agreed).

Figure 20: ATO mainly affected by IRS



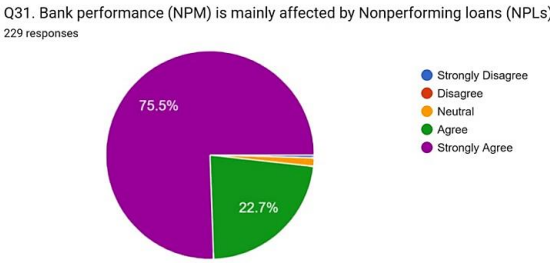
Net interest margin contributes positive production of banking sector as commented by the bankers i.e. 98.7% (80.9% strongly agreed & 17.8% agreed).

Figure 21: ATO mainly affected by NIM



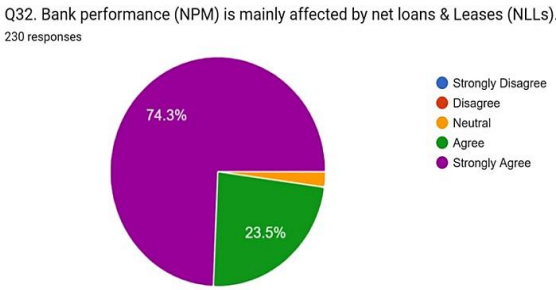
In banks, the availability of loanable funds significantly influences the Asset Turnover Ratio (ATO) by driving lending activities. Adequate loanable funds facilitate higher lending volumes, potentially elevating the ATO as assets are deployed more effectively, while a shortage can limit lending and impact the ATO negatively due to reduced asset turnover.

Figure 22: ATO mainly affected by Loanable Funds



Nonperforming loans also affect the bank performance and endorsed by bankers 98.2% (75.5% strongly agreed & 22.7% agreed).

Figure 23: NPM mainly affected by NPLs



Net profit margin is also affected by net loans and leases and endorsed by the senior bankers of Pakistan's banking industry 97.8% (74.3% strongly agreed & 23.5% agreed).

Figure 24: NPM mainly affected by NLLs

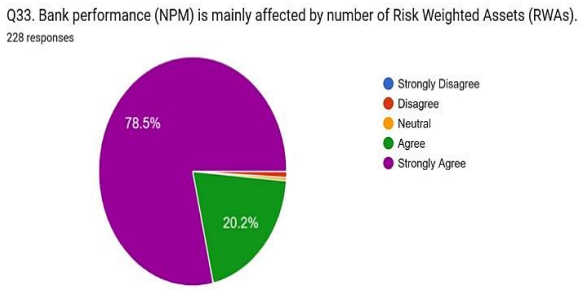


Figure 25: NPM mainly affected by RWAs

Net profit margin (NPM) is also affected by RWAs and endorsed by the senior bankers of Pakistan's banking industry 98.7% (78.5% strongly agreed & 20.2% agreed). Risk weighted assets affect the performance of banking in different ways; retention of assets for security and its non-tradable phenomenon.

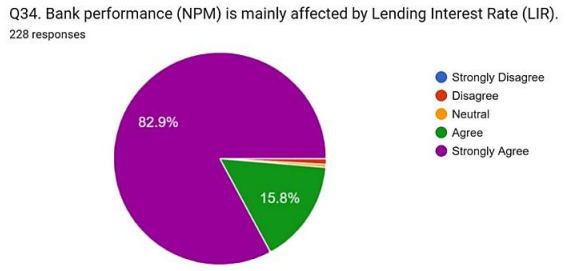


Figure 26: NPM mainly affected by LIR

Lending interest rate also affect the net profit margin as bankers endorsed i.e. 98.7% (82.9% strongly agreed & 15.8% agreed). This percentage calculates the difference between revenue earned as income after paid all expenses.

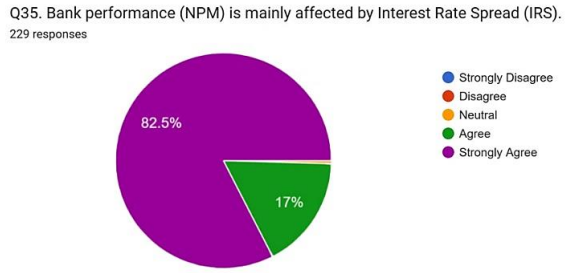


Figure 27: NPM mainly affected by IRS

Interest rate spread also affect the performance of banking industry on the same direction; spread of interest rate is difference between rates of nominal average borrowing and lending interest rates and NPM is a difference of incomes of industry after payments of all expenses. This phenomenon is endorsed by 99.5% (82.5% strongly agreed & 17.0% agreed).

Net interest margin is the marginal income after the payments of interest rate income and expenses and positively affect the performance of the banking sector in Pakistan i.e. 98.7% (82.6% strongly agreed & 16.1% agreed).

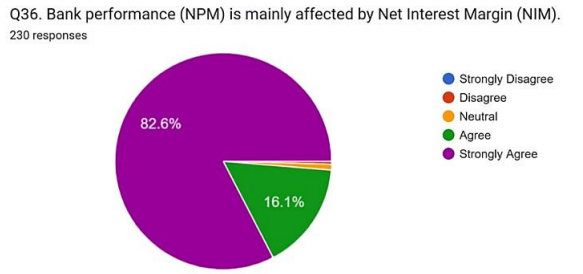


Figure 28: NPM mainly affected by NIM

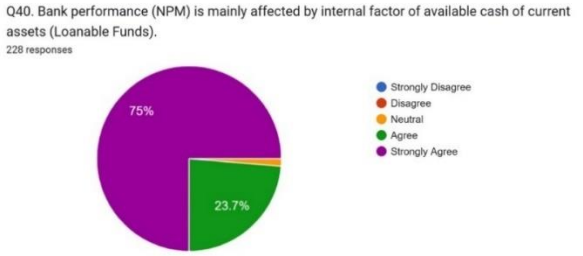


Figure 29: NPM mainly affected by Loanable Funds

Loanable funds significantly influence banks' Net Profit Margin (NPM) by shaping their ability to lend and generate interest income. A higher availability of loanable funds can lead to increased lending activities and interest earnings, potentially boosting NPM, while a scarcity might restrict lending and impact NPM negatively due to reduced interest income.

5. Estimation of Data

Statistical Package for the Social Sciences (SPSS) used for the evaluation of the data in this study. Right distribution of the data ensured by applying data normality test i.e., histogram and probability plots Reliability of the data examined by using test; Cronbach Alpha, regression, and correlation and moderation tests are also applied.

5.1. Reliability Analysis

Cronbach's alpha is a function which evaluates the number of test items, inter correlation, internal consistency, close related set of items as a group and is declared reliable scale of reliability. Cronbach's Alpha reliability analysis values are as following.

Table 3
Reliability Analysis of Variables of Primary Data

Reliability Statistics

Variables	Cronbach's Alpha Values	No of items
Overall Reliability	0.773	230
1. ROA	0.894	230
2. ROE	0.872	230
3. ATO	0.875	230
4. NPM	0.814	230
5. NPLs	0.768	230
6. NLLs	0.804	230
7. RWA	0.678	230
8. LIR	0.659	230
9. IRS	0.652	230
10. NIM	0.714	230

Note: ROA: Return on Assets, ROE: Return on Equity, ATO: Asset turnover, NPM: Net Profit Margin, NPLs: Non-Performing Loans, NLLs: Net loan & Lease, RWAs: Risk Weighted Assets , LIR: Lending Interest Rate , IRS: Interest rate Spread , NIM: Net Interest Margin.

Above table shows the reliability of the variables by using the technique of Cronbach Alpha. At the start of the table overall reliability of all the variables calculated which includes 10 variables and the Alpha value is .773 which is acceptable. Bank performance is measured by ROA, ROE, ATO and NPM Eger and Suchánek (2020) and their reliabilities are 0.894, 0.872, 0.875 and 0.814 respectively. These values show that these four dependent variables have excellent reliability. Credit risk management is measure by NPLs, NLLs & RWAs (Ben Lahouel, Taleb, Kočišová, and Ben Zaied (2022) and their reliabilities are 0.768, 0.804 & 0.678 respectively and trustworthy reliable. Interest rate is measured by LIR, IRS and NIM Aigheyisi (2017) and their reliabilities are 0.659, 0.652 & 0.714 respectively. These reliabilities are also acceptable, more than 0.5 Alpha value, shows that the data is normally distributed and gathered. Processing summary of this questionnaire is enclosed as following.

Table 4
Case Processing Summary

		No	%
Cases	Valid	230	100.0
	Excluded	0	.0
	Total	230	100.0

Listwise deletion based on all variables in the procedure.

Table 5
Pearson Correlation Analysis

	ROA	ROE	ATO	NPM	NPLs	NLLs	RWAs	LIR	IRS	NIM
ROA	1	.742**	. 517**	.598**	-.664**	.725**	-.696**	.762**	.664**	.641**
ROE	.742**	1	.619**	.614**	-.760**	.749**	-.714**	.726**	.653**	.728**
ATO	.517**	.619**	1	.594**	-.610**	.705**	-.710**	.689**	.616**	.769**
NPM	.598**	.614**	.594**	1	-.585**	.682**	-.722**	.720**	.591**	.674**
NPLs	-.664**	-.760**	-.610**	-.585**	1	.748**	.615**	.584**	.566**	.557**
NLLS	.725**	.749**	.705**	.682**	.748**	1	.739**	.695**	.624**	.690**
RWAs	-.696**	-.714**	-.710**	-.722**	.615**	.739**	1	.815**	.594**	.665**
LIR	.762**	.726**	.689**	.720**	.584**	.695**	.815**	1	610**	.663**
IRS	.664**	.653**	.616**	.591**	.566**	.624**	.594**	.610**	1	.660**
NIM	.641**	.728**	.769**	.674**	.557**	.690**	.665**	.663**	.660**	1

Note: ROA: Return on Assets, ROE: Return on Equity, ATO: Asset turnover, NPM: Net Profit Margin, NPLs: Non-Performing Loans, NLLs: Net loan & Lease, RWAs: Risk Weighted Assets , LIR: Lending Interest Rate , IRS: Interest rate Spread , NIM: Net Interest Margin. Correlation is significant at the 0.01 level (2 tailed), bank performance indicators, ROA, ROE, ATO, NPM have significant p values and prove that all are significant and strong performance indicators. NPLs proved that it has negatively correlated with the performance indicators i.e -664**, NLLs (net loans & leases) have a positive strong relationship with performance i.e .725** and RWAs proved to be negative as -.696. Here it is important that interest rate indicators proved to be positively participative in performance of the banking industry of Pakistan.

ROA is positively correlated with ROE (r=.742**, p<0.01), ATO (r=.517**, p<0.01), NPM (r=.598**, p<0.01), NPLs (r= -.664**, p<0.01), NLLs (r=.725**, p<0.01), RWAs (r= -.696**, p<0.05), LIR (r=.762**, p<0.01), IRS (r=.664**, p<0.01), NIM (r=.641**, p<0.01).

ROE is positively correlated with ROA (r=.742**, p<0.01), ATO (r=.619**, p<0.01), NPM (r=.614**, p<0.01), NPLs (r= -.760**, p<0.01), NLLs (r=.749**, p<0.01), RWAs (r= -.714**, p<0.01), LIR (r=.726**, p<0.01), IRS (r=.653**, p<0.01), NIM (r=.728**, p<0.01).

ATO is positively correlated with ROA (r=.517**, p<0.01), ROE (r=.619**, p<0.01), NPM (r=.594**, p<0.01), NPLs (r= -.610**, p<0.01), NLLs (r=.705**, p<0.01), RWAs (r= -.710**, p<0.01), LIR (r=.689**, p<0.01), IRS (r=.616**, p<0.01), NIM (r=.769**, p<0.01).

NPM is positively correlated with ROA (r=.598**, p<0.01), ATO (r=.594**, p<0.01), ROE (r=.614**, p<0.01), NPLs (r= -.585**, p<0.01), NLLs (r=.682**, p<0.01), RWAs (r= -.722**, p<0.01), LIR (r=.720**, p<0.01), IRS (r=.591**, p<0.01), NIM (r=.674**, p<0.01).

NPLs is negatively correlated with ROA (r= -.664**, p<0.01), ATO (r= -.610**, p<0.01), NPM (r=-.585**, p<0.01), ROE (r= -.760**, p<0.01), NLLs (r=.682**, p<0.01), RWAs (r=.615**, p<0.01), LIR (r=.584**, p<0.01), IRS (r=.566**, p<0.01), NIM (r=.557**, p<0.01).

NLLs is positively correlated with ROA (r=.725**, p<0.01), ATO (r=.705**, p<0.01), NPM (r=.682**, p<0.01), NPLs (r=.748**, p<0.01), ROE (r=.749**, p<0.01), RWAs (r=.739**, p<0.01), LIR (r=.695**, p<0.01), IRS (r=.624**, p<0.01), NIM (r=.690**, p<0.01).

RWAs is positively correlated with ROA (r= -.696**, p<0.01), ATO (r= -.710**, p<0.01), NPM (r=-.722**, p<0.01), NPLs (r=.615**, p<0.01), NLLs (r=.739**, p<0.01), ROE (r=-.714**, p<0.01), LIR (r=.815**, p<0.01), IRS (r=.594**, p<0.01), NIM (r=.665**, p<0.01).

LIR is positively correlated with ROA (r=.762**, p<0.01), ATO (r=.689**, p<0.01), NPM (r=.720**, p<0.01), NPLs (r=.584**, p<0.01), NLLs (r=.695**, p<0.01), RWAs (r=.815**, p<0.01), ROE (r=.726**, p<0.01), IRS (r=.610**, p<0.01), NIM (r=.663**, p<0.01).

IRS is positively correlated with ROA (r=.664**, p<0.01), ATO (r=.616**, p<0.01), NPM (r=.591**, p<0.01), NPLs (r=.566**, p<0.01), NLLs (r=.624**, p<0.01), RWAs (r=.594**, p<0.01), LIR (r=.610**, p<0.01), ROE (r=.653**, p<0.01), NIM (r=.660**, p<0.01).

NIM is positively correlated with ROA (r=.641**, p<0.01), ATO (r=.769**, p<0.01), NPM (r=.674**, p<0.01), NPLs (r=.557**, p<0.01), NLLs (r=.690**, p<0.01), RWAs (r=.665**, p<0.01), LIR (r=.663**, p<0.01), IRS (r=.660**, p<0.01), ROE (r=.728**, p<0.01).

5.2. Hypothesis Testing

Summary of hypotheses is enclosed with a literature support.

Table 6

Summary of Results of Hypothesis

Hypothesis	R^2	Beta	P		Literature Support
NPLs → ROA	-.440	.761	.000	Accepted	Khan, Siddique, and Sarwar (2020)
NPLs → ROE	-.577	.920	.000	Accepted	Hamza (2017)
NPLs → ATO	-.373	.807	.000	Accepted	Khan, Khan, and Tahir (2017)
NPLs → NPM	-.342	.631	.000	Accepted	Akhter and Roy (2017)
NLLs → ROA	.526	.720	.000	Accepted	Anggari and Dana (2020)
NLLs → ROE	.560	.784	.000	Accepted	Fatima (2022)
NLLs → ATO	.496	.805	.000	Accepted	Dahal and Bhaskar (2020)
NLLs→ NPM	.465	.637	.000	Accepted	Sintha and Simbolon (2022)
RWAs → ROA	-.485	.612	.000	Accepted	Dahal and Bhaskar (2020)
RWAs → ROE	-.714	.663	.000	Accepted	Schneider, Schröck, Koch, and Schneider (2017)
RWAs → ATO	-.504	.719	.000	Accepted	Saftiana and Jie (2022); Saleem and Masood (2023)
RWAs → NPM	-.522	.597	.000	Accepted	Rashid, Zobair, Chowdhury, and Islam (2020)

Note: ROA: Return on Assets, ROE: Return on Equity, ATO: Asset turnover, NPM: Net Profit Margin, NPLs: Non-Performing Loans, NLLs: Net loan & Lease, RWAs: Risk Weighted Assets , LIR: Lending Interest Rate , IRS: Interest rate Spread , NIM: Net Interest Margin.

Results represents the R square, beta values, and the significance of different independent variables and dependent variable. The values represent that NPLs has negative and significant relationship with ROA (R^2=-.44, P<0.01), the values depict that -44% of the change in the ROA occurred due to NPLs. The values represent that NPLs has negative and significant relationship with ROE (R^2=-.57, P<0.01), the values depict that -57% of the change in the ROE occurred due to NPLs. The values represent that NPLs has negative and significant relationship with ATO (R^2=-.37, P<0.01), the values depict that -37% of the change in the ATO occurred due to NPLs. The values represent that NPLs has negative and significant relationship with NPM (R^2=-.34, P<0.01), the values depict that -34% of the change in the NPM occurred due to NPLs. The

values represent that NLLs has positive and significant relationship with ROA (R^2=.52, P<0.01), the values depict that 52% of the change in the ROA occurred due to NNLs. The values represent that NLLs has positive and significant relationship with ROE (R^2=.56, P<0.01), the values depict that 56% of the change in the ROE occurred due to NLLs. The values represent that NLLs has positive and significant relationship with ATO (R^2=.49, P<0.01), the values depict that 49% of the change in the ATO occurred due to NLLs. The values represent that NLLs has positive and significant relationship with NPM (R^2=.46, P<0.01), the values depict that 46% of the change in the NPM occurred due to NLLs. The values represent that RWAs has positive and significant relationship with ROA (R^2=.48, P<0.01), the values depict that 48% of the change in the ROA occurred due to RWAs. The values represent that RWAs has positive and significant relationship with ROE (R^2=.71, P<0.01), the values depict that 71% of the change in the ROE occurred due to RWAs. The values represent that RWAs has positive and significant relationship with ATO (R^2=.50, P<0.01), the values depict that 50% of the change in the ATO occurred due to RWAs. The values represent that RWAs has positive and significant relationship with NPM (R^2=.52, P<0.01), the values depict that 52% of the change in the NPM occurred due to RWAs.

6. Discussions and Conclusion

Adverse impact of higher interest rates on the banking industry of Pakistan cannot be overstated. As this research has elucidated, elevated interest rates pose formidable challenges, undermining the financial stability, lending capacity, and overall growth prospects of banks. The compounding effects on borrowers, investment, and economic activities further exacerbate the vulnerability of the banking sector. Recognizing the pivotal role of a robust banking industry in fostering economic development, policymakers must carefully consider the implications of interest rate adjustments. Prudent monetary policies that balance the need for price stability with the imperative of sustaining a healthy financial environment are crucial for safeguarding the long-term vitality. . Higher interest rates as experienced by Sillicon Valley Bank may be the fate of Pakistan's banking industry and a a huge NPLs catastrophically may demolish the industry. Pakistan's banking must have lesson from the recent defaults of U.S banking series of Sillicon Valley Bank, Signature Bank and First Republic Bank, San Francisco; all caused due to higher interest rates. Apparently MCR of Pakistan's banking industry is strong, capital adequacy ratio is higher but still increasing KIBORS, growing NPLs, local Debt Restructuring with Foreign Debt are important issues which should be addressed in time.

6.1. Limitations and Future Research

This study sheds light on the detrimental effects of higher interest rates on Pakistan's banking industry, it is essential to acknowledge limitations such as data constraints and external economic factors. Future research could explore dynamic models, incorporating nuanced factors, to provide a more comprehensive understanding of the intricate relationship between credit risk management, interest rates and performance of banking sector in the context of Pakistan.

Authors Contribution
Munazza Saleem: Complete the draft.
Omar Masood: Supervise the student and proofread the draft.

Conflict of Interests/Disclosures
The authors declared no potential conflicts of interest w.r.t the research, authorship and/or publication of this article.

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