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Analysis of Key Determinants of Insolvency Risk in Commercial Banks: An Insight from Pakistani Banking Sector

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ABSTRACT

Banking organizations operate in an unpredictable and risky environment, necessitating the development of strategies to enhance performance and prevent bankruptcy. This study aims to analyze the factors affecting Pakistan's commercial banks' financial stability, focusing on the key reasons for insolvency risk and the impact of risk on the bank's revenue generation factor. Unsatisfactory risk control strategies can decrease efficiency and lead to insolvency. The study analyzes data from 22 commercial banks using the two-step generalized method to measure strategies to reduce insolvency risk. It reveals that credit risk and loss risk negatively impact financial stability, while liquidity risk positively affects it. Risk management is crucial, and bad loans are affecting performance levels. The income structure of banks also plays a significant role in financial stability. The results were analyzed using graphic and evocative statistics using EViews 9 software. Reducing the nonperforming loans ratio can efficiently regulate performance levels. The research forecasts that nonperforming loans and their provisions, as well as the income structure, have a substantial influence on financial stability. It is necessary to assess risk management methods to mitigate the danger of bankruptcy.

Keywords: Insolvency Risk, Financial Stability, Non-Performing Loans, Income Structure, Commercial Banks.

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INTRODUCTION

The financial system is essential for each nation, irrespective of its level of development. Financial institutions in Pakistan, such as banks, have a vital role in the field of finance, and the stability of the financial system depends on their solvency. The banking business plays a crucial role in modern commerce by providing financial assets and facilitating the production of wealth. The financial importance of an organization is vital for making informed decisions in different banking sectors, and individual discoveries might influence the present economy. Financial ratios are used to analyze the economic states of organizations, but they may not always align with creditor claims and stakeholder equity positions (Ullah et al., 2021). Businesses face insolvency risks, and their stability is constantly monitored. To maintain a stable economy, a robust banking system is crucial. Banking organizations,

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including private, state, foreign, and business organizations, are key contributors to a country's economy. Private Banks, state banks, foreign banks, and various business organizations are examples of well-developed associations.

Over the past few decades, the economic position and scope of banking organizations have evolved, highlighting their critical role as the main pillar of an economy. They are the primary source of credit in developing countries and are essential for economic growth (Raza Bilal, Bt. Abu Talib, & Noor Azli Ali Khan, 2013). Financial organizations, particularly banks, are known for their lending activities, and they utilize their maximum funds for funding (Malimi, 2017). This highlights the importance of financial institutions in the modern world and underscores the need for their continued development and growth. Non-performing loans negatively impact the economy's growth, affecting customer confidence, disinvestment in good projects, and lending growth rate (Balgova, Nies, & Plekhanov, 2016). They are the main reason for bankruptcy and are a significant risk level faced by banking organizations (J. L. Campbell, 2007; Nikolopoulos & Tsalas, 2017). The financial stability rate is crucial for efficient resource allocation (Fraser, Gup, & Kolari, 2001). The key issue is the factors that influence non-performing loans, which are distinctive to the financial environment in developing nations and particularly relevant to the situation in Pakistan. The amalgamation of macroeconomic factors is forecasted to be the paramount driver impacting non-performing loans. The financial stability rate is also a significant indicator of operational and credit risk.

The banking sector in Pakistan is considered a fairly developed and moderate sector, with 95% of the financial sectors covered by the banking organization (SBP, 2015). However, non-performing loans have been growing rapidly in the last decade, reaching a maximum of 32% or 98 billion Rs in the last QTR 2023 (SBP, 2023). The current rate, which represents 10% of the ratio of non-performing loans, exceeds the established barrier and requires urgent attention. Additionally, the level of non-performing loans in Pakistan has risen from 15.9% in 2018 to 32% in 2023. (SBP, 2023). State Bank of Pakistan (SBP) intervention has led to increased bankruptcy situations in the banking sector due to the accumulation of non-performing loans and the overhang of these loans.

This research study is helpful for banking organizations, investors, management, and researchers as it assists in establishing ways to decrease the risk of bankruptcy in Pakistani commercial banks. This research examines the relationship between non-performing loans, provision for non-performing loans, and income structure to financial stability. The study aims to enhance the financial stability ratio of banks in Pakistan and decrease the risk of bankruptcy. The growing incidence of non-performing loans and the distribution of funding for non-performing loans can result in bankruptcy. The report offers a comprehensive analysis of strategies to decrease the insolvency ratio in banks and examines the correlation between financial stability, non-performing loans, provision for NPLs, and revenue structure. Examining the elements that contribute to risk and formulating remedies may support the preservation of financial stability and facilitate progress. The research is advantageous for the management of banking businesses in attaining substantial development assessment outcomes.

THEORETICAL FRAMEWORK AND STUDY HYPOTHESIS

Non-performing Loans and Financial Stability

(Barr & Siems, 1994) found that nonperforming loans have become a significant factor in banking defaults, causing global expectations to rise over the past three to forty years. (Vinh, 2017) attributed the bankruptcy of economic institutions to the state of economic organization, which contributes to the

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risk of damaging the economy as a whole. Monitoring nonperforming loans is critical for financial development and discovering regions where economic stability and the monetary foundation are affected. Recognizing the fundamental causes of these nonperforming assets is critical for managing these assets and supporting financial progress.

Nonperforming loans (NPLs) pose a significant financial and monetary issue, influenced by bank-specific features, macroeconomic components, and administrative structure. These include slacked NPLs, advances to resources proportion, weighted normal loaning rate, credit strategy, credit store percentage, absolute resources, reoccurrence on resources, and return on equity. Macroeconomic determinants include real GDP per capita, financing costs, growth, joblessness rate, real GDP development, blended customer costs, share costs record, and 3-month currency market financing cost. Portfolio theory implies that external factors, such as mismanagement or bad management, may contribute to a rise in nonperforming loans (NPLs) and increasing operational expenditures (Berger & DeYoung, 1997). This is due to the absence of competent management at the top level, which leads to wasteful checks and inadequate control of operating expenses. Poor guaranteeing and checking abilities can lead to high NPLs (Berger & DeYoung, 1997).

Both poor management and mismanagement theories anticipate a negative link between NPLs and cost productivity (Zamore, Beisland, & Mersland, 2023). Banks shoulder the weight of holding back on assets assigned to checking loans, guaranteeing, and are prepared to face the ramifications of default on loans and any issues later (Barr & Siems, 1994). A cross-country analysis by (Moinescu, 2012) also finds that gross domestic product development is an important determinant explaining NPLs across CEE nations. Short-term financial performance also affects the number of NPLs throughout the CEE banking system.

So, based on the literature, Non-performing loans (NPLs) may severely influence financial stability by diminishing bank profitability and solvency, leading to tighter lending conditions and higher borrowing prices (Kozarić & Dželihodžić, 2020). This may undermine investor trust, boost financing costs, and pose systemic risk inside the financial system, and also the larger economy may suffer due to diminished investment and consumption, delaying economic growth and rising unemployment (A. Campbell, 2007). High NPL levels may also lead to a drop in asset values, hurting personal wealth and economic stability, and incurring increasing regulatory and supervisory issues for banks (Muasya, 2009; Velliscig, Floreani, & Polato, 2023).
H1: Non-performing loans negatively affect the financial stability of banks.

Provision for Non-performing Loans and Financial Stability

(Barr & Siems, 1994) the study found that nonperforming loans have become a significant factor in banking defaults, causing global expectations to rise over the past three to forty years. (Zhou, 2014)) attributed the bankruptcy of economic institutions to the state of economic organization, which contributes to the risk of damaging the economy as a whole. Monitoring nonperforming loans is crucial for financial growth and understanding areas where economic stability and the monetary base are damaged. Recognizing the underlying drivers of these nonperforming assets is essential for controlling these assets and promoting financial growth.

Nonperforming loans have various consequences, such as a firmer monetary system and an uncertain financial framework (Adebola, Yusoff, & Dahalan, 2011). In 2009, unqualified creditors were given high-risk lending rates, which were secured against over-estimated resources (Ndegwa, 2014). However, when these loans turned into nonperforming loans (NPLs), they became bankruptcy

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generators. This financial intensity led to the transformation of high-risk loans into nonperforming advances, highlighting the importance of considering the nature and impact of nonperforming loans on the financial system (Ndegwa, 2014).

Nonperforming loans (NPLs) adversely influence bank performance, impacting liquidity and productivity. A rise in NPLs might lead to decreasing economic proceeds. Nonperforming loans should be granted judiciously to guarantee bank viability. Mismatches between asset and liabilities maturities lead to liquidity risk and undermine the banking system's credit rating and reputation (Badar, Javid, & Zulfiquar, 2013). When a bank anticipates an advance misfortune, it should be recorded as an advance misfortune arrangement (PNPL) on the asset report. If the head and compensation on the loan are gross liabilities, the advance amount can be decreased by charging it to the non-performing loan provision on the asset report. (Angklomkliew, George, & Packer, 2009).

H2: Provision for nonperforming loans negatively affects the financial stability of banks.

Income Structure and Financial Stability

Since the 1970s and 1980s, the Western banking sector has endeavored to compete, restore, and restructure its framework in response to financial advancements and regulations, this has resulted in a change in non-interest remuneration and its benefits, which are associated with diverse sources of revenue, including checks, money orders, letters of credit, investment banking, borrowing, and securitization (Stiroh, 2004). Banks have implemented increased fees for both current and new services, leading to a substantial shift in their revenue streams. During the 1980s, banks paid a non-interest rate of 19% of total compensation (DeYoung & Roland, 2001). However, this rate steadily increased to 43% by 2001. This issue is crucial to the integrity and sufficiency of the financial system and a substantial challenge for administrative experts (DeYoung & Torna, 2013). Previous literature has mostly focused on the risk or portfolio productivity benefits of banks in the United States, however, there is little empirical support for the notion that using typical income activities to expand money may effectively mitigate risk (Apergis, 2014; Lepetit, Nys, Rous, & Tarazi, 2008).

Market operational risk and legitimate risk have a significant impact on the increase of banks' risk profile and the instability of their profitability, additionally, the author highlights that consumers may encounter exchange expenses, which is why loan payments are projected to stay stable (Stiroh & Rumble, 2006). Between 2000 and 2007, there were 50 consolidation and acquisition exchanges in the area, resulting in a fall in the overall number of banks from 41 to 23 (Bindabel, 2017; Javeria, Siddiqui, & Rasheed, 2019) so, in 2006 Pakistan Financial Area Union was developed to solve this problem. This analysis explores the influence of unconventional revenue affects on the risk profile in Pakistan's banking sector. It finds that more dependency on venture pay for exercise production is associated with reduced risk,
while charge and commission pay for exercise creation raises the bank's risk. The goal of this article is to empirically examine the influence of pay structure on risk and offer accurate evidence on the financial sector of Pakistan. Underlying pay includes both traditional and non-conventional revenue streams for a bank.
So, it can be hypothesized that:

H3: Income structure has a positive effect on the financial stability of banks.

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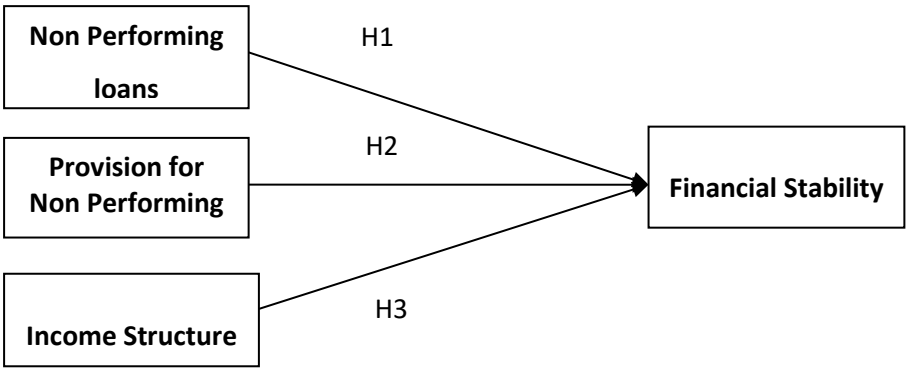

Figure 1: Theoretical framework of research

METHODOLOGY

Data Collection and Sample Size

This research study analyzes the connection between financial stability, NPL and PNPL, and income structure in Pakistani commercial banks. Data was taken from 22 banks listed on the SBP website from 2012 to 2023. The secondary data was acquired from yearly reports and publications from the banks. The research attempts to evaluate and assess the financial stability ratio, a factor that might lead to insolvency and bankruptcy. The research indicated that the danger of insolvency grows owing to growth in non-performing loans and provision for non-performing loans, which may diminish the revenue structure and impair the financial stability ratio. The sample size comprises all 22 commercial banks listed on the SBP website.

Data Analysis Tools

The EViews 9 software is used for descriptive panel data analysis, which efficiently measures the financial stability ratio of banks and factors causing insolvency risk. The results are used to generate a hypothesis based on the findings, ensuring the normality of the data and assessing the risk of insolvency, and the multiple linear regression model (GMM) is used to test the hypotheses of the research.

Measurement Scale of Variable

The measurement scales were adapted from the literature and the details are shown in the following table.

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Table 1: Measurement Scales of Study Variable

Variable	Abbreviation	Measurement	Source
Financial stability	Z-Score	Z-Score= ROA+E/A/S.D (ROA).	(Hoelscher & Quintyn, 2003)
Nonperforming loan	NPL	Nonperforming loans = 90 days late loans to nonaccrual loans/ Total amount of loans	(Chavan & Gambacorta, 2016; Klein, 2013).
Provision for Nonperforming Loans	PNPLs	PNPLs = provision for NPL/Gross loans	(Balla & Rose, 2015; Karim, Chan, & Hassan, 2010).
Income structure	INCs	INCs = 1-(net interest income-other opportunity income/Total opportunity income)	(De Jonghe, 2010; Laeven & Levine, 2007)

DATA ANALYSIS AND RESULTS

Descriptive Statistics of Data

Table 2: Descriptive Statistics of Bank-Specific Variables

	FS	PNPL	NPL	IS
Mean	44.16253	0.115354	0.152213	47817521
Median	26.08120	0.088140	0.118726	29551605
Maximum	442.7056	0.667000	0.970000	1.69E+09
Minimum	9.778526	0.011000	0.003000	265594.0
Std. Dev.	68.22736	0.129020	0.162651	1.31E+08
Skewness	1.373071	1.196956	0.845072	1.00290
Kurtosis	2.93087	3.066601	1.654661	2.99662

The research study examines the financial stability of commercial banks in Pakistan, focusing on nonperforming loans, provision for nonperforming loans, and income structure. From the above Table 2, the mean value of nonperforming loans is 0.15%, with a standard deviation of 0.16%. The minimum rating is 0.003000, while the maximum is 0.97%. The provision for nonperforming loans is 0.16%, with

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a standard deviation of 0.129020. The minimum rating is 0.001000, and the maximum is 0.67%. The income structure has a mean value of 47817521, with a standard rating of 1.31%. The minimum value is 265594.0, and the maximum value is 1.69%. The data is analyzed from the complete measurement of commercial banks' financial stability ratings from 2012 to 2023. The skewness and kurtosis values represent the normality of the data, indicating normality and following the hypothesis

Generalized Method of Moments (GMM)

The Generalized Method of Moments (GMM) estimator is used to address endogeneity problems in government expenditure and banking development indicators and, the estimator addresses potential reverse causality, omitted variable bias, and measurement errors (Hansen, 2010). The first leg of these endogenous variables is used as an instrumental variable, ensuring just identified models without over-identification restrictions.

Table 3: In-depth Variable Description by GMM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FS	0.257135	0.025861	-9.943101	0.0000
PNPL	-117.4920	65.61683	-1.790577	0.0259
PNPL	173.1415	72.53794	2.386910	0.0186
NPL	-0.588711	12.54990	-0.046910	0.0427
NPL	-250.7222	83.76209	-2.993265	0.0034
IS	7.16E-09	8.03E-09	0.891016	0.0247

Table 4: Cross-section fixed (first differences)

The period fixed (dummy variables)			
Mean dependent var	2.414031	S.D. dependent var	57.67445
S.E. of regression	54.80131	Sum squared resid	360382.0
J-statistic	92.75233	Instrument rank	92
Prob(J-statistic)	0.055972		

The GMM model is utilized to examine the impact of non-performing loans, provision for non-performing loans, and income structure on the financial stability of Pakistani commercial banks. The research used a fixed-period cross-sectional design, including 22 variables of strength and 132 observations spanning the years 2012 to 2023. The findings indicate that non-performing loans have a detrimental but substantial impact on the financial stability of commercial banks, and a rise in non-performing loans may lead to a fall in the financial stability ratio. The inclusion of non-performing loans negatively impacts the financial stability of commercial banks, whereas an improvement in the revenue structure may enhance the financial stability ratio.

The findings indicate that a substantial decrease in non-performing loans might lead to a 5% alteration in financial stability. A substantial decrease in the allocation for loans that are not being repaid might result in a 5% alteration in the overall financial soundness. An increase of one unit in income structure may lead to a 10% change in financial stability, with a probability (measured by the j statistics value) of 0.055972. The GMM model provides crucial insights into the impact of non-performing loans, provision for non-performing loans, and income structure on the financial health of Pakistani banks.

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Unit Root Tests

Table 5: Descriptives of Unit Root Test of Variable

Null: unit root (assumes common unit root process)

Variable	Method	t static at a level	Prob.**	Cross-sections	p-value
FS	Levin, Lin & Chut*	-25.6164	0.0000	22	144
NPL	Levin, Lin & Chut*	-7.36508	0.0000	22	148
PNPL	Levin, Lin & Chut*	2.05697	0.000	22	148
IS	Levin, Lin & Chut*	-8.60306	0.0000	22	148

*(Levin, Lin, & Chu, 2002)

The study examines the unit root calculation criterion in Pakistani commercial banks' panel data, finding that the unit rate is not used for financial stability data series. The auto lag selection, assessed using the Schwarz info criterion, is stationary at the level (Schwarz, 1978).

According to (Levin et al., 2002), the panel unit root measurement criteria have a significant reliance ratio of 99%, with a p-value rating of 0.000<0.01. The study of insolvency risk does not use the unit rate for nonperforming loans and provisions. The auto-log selection criteria, assessed by Schwarz info criteria, are stable, rejecting the null hypothesis and accepting an alternative hypothesis for both variables (Schwarz, 1978).

Test for Auto Co-relation between Variables

Table 6: Auto Correlations

Test order	m-Statistic	Rho	SE(rho)	Prob.
AR(1)	0.099698	3385.383767	33956.224241	0.9206
AR(2)	-1.059126	32281.445138	30479.338776	0.2895

The data analysis shows significant probability values and autocorrelation at 1 and 2 orders. The data is strong, as indicated by the smaller values than +1 and -1. The Arellano-Bond serial correlation test results for AR(2) are 0.0285, which is not significant and does not reject the null hypothesis of the absence of second-order serial correlation. This accurately measures the correlations of variables in the analysis.

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Table 7: Model Summary

Hypothesis	Path	Relationship	Sign
1	NPL>z-score	significant	negative
2	PNPLs> Z-Score	significant	negative
3	INCs> Z-Score	significant	positive

CONCLUSION

The research focuses on the financial condition of Pakistan's commercial banks, concentrating on three factors: nonperforming loans, provision of nonperforming loans, and revenue structure. The growth in nonperforming loans is generating a reduction in the financial stability ratio, and liquidity risk is created by several risk kinds. To analyze performance, organizational management, and start-ups, particular indicators should be utilized to evaluate them yearly, daily, three-monthly, and every year.

The increase in sales structure is leading to better financial stability and a good association with financial stability. There is no auto-correlation matrix in this study effort, and each independent variable greatly impacts the rate of financial stability. Liquidation risks are caused by different types of hazards, hence banks, their administrations, and policies need to be examined. Unique criteria should be applied to examine the efficiency and administrative functioning and start-ups. It is now necessary to address the issue of nonperforming loans and allow start-ups to repay their loans within a certain timeframe to avoid banks from adding to the problem of non-performing loans. Banks must also observe tight compliance laws, such as State Bank regulations and foreign account tax compliance acts (FATCA), to avoid significant fines that damage financial stability.

Information security is a big concern for the banking business, as technology has increased and clients increasingly utilize online money transfers and cash withdrawals instead of physically sending and withdrawing. Additional investigation is required to comprehend the reasons behind the comparatively lower financial stability of Islamic banks in Pakistan as compared to conventional banks, as well as the repercussions of this financial instability on the economy.

LIMITATIONS AND DIRECTIONS FOR FURTHER STUDIE

The study focuses on the financial stability of commercial banks, analyzing the effect of the non-performing loan percentage on their financial stability. The sample size is low, but it may be extended in future research. Cross-comparisons between several commercial banks could be exploited for future investigation. Techniques and start-ups will be extended for future research. The team should plan for recovering the loan ratio to decrease loan loss and boost the bank's revenue structure. The rate of insolvency ratio should be lowered owing to a growth in non-performing loans, which leads to bank bankruptcy. The research implies that tough restrictions and particular legislation may be adopted to minimize insolvency. The financial

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stability ratio is calculated by comparing the risk of bankruptcy with the non-performing loan ratio, with an increase in the ratio indicating a decline in financial stability.

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