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### Abstract

Banks exist to make a profit so that they can continue to operate, grow, and expand. Bank stability has been challenged over the previous two decades as a result of political intervention, nonperforming loans (NPLs), and interest rate changes. They need to monitor these micro and macro-level factors to identify and manage risk. Thus, the current study explores the impact of credit risk (NPL, Z-Score) and liquidity risk (LR) on the performance of South Asian banks measured with ROA and ROE. The sample of the study comprised a total of 35 listed banks of South Asian Countries (Pakistan (20) and India (15)) and the sample period spans 10 years from 2011 to 2020. The information was obtained from data stream and the financial statements of selected banks listed on the Pakistan Stock Exchange (PSX) and Bombay Stock Exchange (BSE). The findings show that credit and liquidity risk has a major impact on the performance of South Asian banks. Overall, credit risk has a negative impact on bank performance. However, the Z-score value in the estimation derived with ROE, on the other hand, demonstrates a positive connection with bank performance. The current study's findings suggest that bank management in developing countries should provide timely monitoring and supervision of their long-term borrowers to control credit risk.

**Keywords,** Bank Performance, Credit risk, Liquidity risk, South Asian Countries

### 1. Introduction

Financial institutions play a critical role in a country's economic prosperity. Similarly, banks supply financial information on the economy. Well-functioning banks help to enhance economic growth (Barth et al., 2004). Banks, in particular, exist to generate profit in order to continue operating, grow, and expand. Bank stability has been threatened over the previous two decades due to political involvement, nonperforming loans (NPLs), and interest rate changes. For banks and other financial institutions, risk and return management is critical to be profitable in the long run. Credit, liquidity, operational, interest rate, foreign exchange, and market risks all exist for banks. Cornett and Saunders (1999) divide these risks into three categories, financial, operational, and strategic. According to Hussain and Al-Ajmi (2012), credit and liquidity are the most severe concerns that banking institutions experience.

Credit risk is linked to a large quantity of assets that generate revenue could be a key driver with respect to a bank's performance amongst banking hazards. So far, a bank's credit competence has remained a topic of debate in banking and economics. Credit risk has been described in a variety of ways by various scholars and organizations. Most studies agreed with Basel's (1999) definition, which defines it as the risk of a debtor or counterparty failing to fulfil contractually pre-determined obligations according to agreed-upon conditions. Because a trade partner's inability to return its loan in full can significantly harms the other partner's business, credit and liquidity risk has long been a source of concern throughout the world (Tenguh & Achou, 2008; Ali & Naem, 2017). Credit risk is critical on behalf of creating a superior loan collection, which exists critical for commercial banks and the economy's overall success (Diest, 2013). The expanding body of research in finance and economics demonstrates that credit risk is the primary cause of banking disasters, which has previously resulted in economic failures, such as the global financial crisis of 2008 (Ali, 2011; Gizaw, Kebede & Selvaraj, 2015; Charles & Kenneth, 2013).

Liquidity risk occurs when a bank is unable to satisfy its current obligations. According to Drehmann and Nikolaou (2009), a bank's ability to settle its commitments immediately deteriorates over time. Banks must therefore efficiently manage liquidity risk to survive in the long run. Various scholars and practitioners have emphasized the need for liquidity risk methods to aid banks and additional financial organizations over time. Especially after the global financial crisis of 2008, when subprime mortgages were largely to blame for the liquidity crunch (Al-Tamimi, 2008). According to Al-Tamimi (2008), maintaining a well-organized risk management technique is not luxurious; it must be implemented timely in a way to enable seamless banking operation. A financial institute, like any other major economic sector, seeks to cover sustained expenditures, enhance return on advanced capital, and maximize shareholder value. To achieve these goals, the financial system must provide adequate liquidity risk protection to financial institutions such as banks (Hakim & Neaime, 2005; Ali, 2015; Ali, 2018).

Banks need to analyze since their performance a significant role in accelerating economic activity and growth. Caprio, Barth and Levine (2001) state that a poorly performing banking system drops economic growth, impairs poverty, increases the risk of negative shocks in the overall economy, whereas well-functioning banking systems outperform economic growth, eradicating poverty's foundations. No one can deny the function in the economy, banks or the significance of the services they provide. The purpose of products and services supplied by banks in the corporate world is particularly dominating and important. Banks are heavily contingent on the business sector to meet their operating financial needs, as well as to pay or receive transaction amounts, or to make up for any shortfalls in money required to complete a transaction or conduct any other commercial function. When a person or corporation has enough cash to invest, they may operate a business; but what happens when there is no capital to invest or a lack of funds. Banks operate in the business of taking payments and providing money to individual's areas that has a desire for it, that period when banks facilitate through credit. At this point, the bank extends loans to them to keep their business running smoothly.

It is now obvious that banks are critical to credit provisioning to investors and are of fundamental importance. Credit simplification has been and continues to be the support of banks, according to Richard et al. (2008). This is especially true in

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transitional and emerging economies, where capital markets are poorly structured and developed. When it comes to credit design and simplification, Dasah, Boahene, and Agyei (2012) agree with the previous viewpoints, stating that the major source of credit is still credit generation goal and every bank in the world's business, as interest received on loans and advances accounts for a significant portion of the bank's assets. Kargi (2011) used similar terms to support the notion that credit facilitation is a major source of revenue for banks.

Deposits and credit are accepted by banks all around the world. The goal of risk asset creation is to produce revenue while also guaranteeing liquidity, safety, solvency, and growth by issuing loans that meet the bank's risk asset acceptance criteria. Banks are subject to credit risk when they provide credit to their numerous clients, which have an impact on bank's profitability. The danger of a loan transaction's counterparty defaulting is known as credit risk. As per Kolapo, Ayeni and Oke (2012), credit risk which is split into default risk, exposure risk and recovery risk, is arguably the core of all hazards is substantial in terms of the magnitude of possible damages (Juanjuan, Manzura, & Hosna, 2009). Credit risk is classified into two components, according to Basel Accord (2006) and Raghavan (2005), size of risk, which is the remaining loan stability of the date of nonpayment, also defined as total loans and advances granted to clients, and quality of risk, which is whether the loans are performing or delinquent. Partial official capacity, ineffective credit rules, unstable interest rates, underprivileged administration, ineffective rules, short investment and liquidity levels, direct loaning, poor loan endorsing, lax credit valuation, poor loaning practices, government interfering, and insufficient central bank management that the main causes of credit risk (Kithinji, 2010; Ali & Bibi, 2017).

Credit risk can surge unknown the bank loans to debtors it does not have satisfactory knowledge about. It is the most significant risk, more so in developing countries where the non-performing loan level of the banking system is significantly higher above the sensible limit. Additionally, one of the most serious issues confronting the banking sector in emerging countries is the rising rate of loan defaults and subsequent loan losses, which harms bank performance. Following an increase, the number of large bad debts in the banking industry of emerging countries, as well as insider abuses, management's competency has been called into doubt. Bad debts arise when a bank's performance fails to collect loans provided to clients. The vast majority of emerging countries banks set aside a huge amount of money for loans and advances.

Credit risk creates economic declines by producing banks failure owing to customer defaulting risk, which is a detrimental influence on many countries' economic progress (Reinhart & Rogoff, 2008). Credit risk in this study is defined as the risk of debtor nonpayment preceding loan & not reimbursing the amount on loan. The word hedging refers to a business investment being protected minimizing its degree of risk, by obtaining an insurance policy. Modification is the distribution of financial possessions among several assets; it has been recognized as a way to reduce risk. The capital competence ratio is a dimension of a bank capability to grip faraway risks with its capital. As a result of the concentrated rivalry between banks to acquire clients, numerous modernizations in banking facilities have occurred (Musa & Aruwa, 2014; Audi et al., 2022).

Banks also enhance their internal governance processes to maintain transparency and proper standards to have customers pleased with goods and services, according to regulators. The capital competence ratio is a measure of a bank capacity to captivate distant risks through its capital. Because banks compete fiercely for clients, numerous innovations in banking services have sprung up as a result (Aruwa & Musa, 2014; Audi & Ali, 2017). Banks must also enhance their internal governance processes to maintain transparency and ethical standards so that their consumers are happy with their products and services, according to regulators. As per Rehman et al. (2019), for financial ingenuity and financial Innovation, institutions must have robust rules in place to defend and safeguard their interests. As a result, bank managers' lack of awareness of actual credit risk performance stances danger to the bank progress and customers interests. The most important success factors for financial institutions are recognition of relevant credit risk the development of strong credit risk management methods. Such as evading, variation, and capital adequacy ratio management to evade flaws the might main to operational disaster. Banks credit risks have a significant influence on their smooth routine since a few major clients defaulting on loans would cause them significant issues.

## **2. Literature Review**

Credit risk management is important for the financial sector's long-term existence and sustainability of organizations such as financial institutions, according to Achou and Tenguh (2008). Credit risk is essential for banks, according to Musyoki and Kadubo (2012), because it is an important element of lending facilitation. Credit and liquidity risk keeps banks' credit and liquidity risk exposure constant and boosts their risk-adjusted rate of return. According to Njanike (2009), inadequate credit risk was the primary cause of the financial crisis in 2003-2004. According to Juanjuan, Manzura, and Hosna (2009), the current financial crisis throughout the world has demonstrated that the credit and liquidity risk criteria and methods used by financial institutions are insufficient to satisfy the needs of today's complex financial system.

The GFC, as a sample of a general financial catastrophe, has heightened interest in systemic credit risk analysis. Systemic credit risk typically comes from the sufferings of one big bank, which fall over to another bank, and more weaken the operation of the complete financial system or level the creative potential of the actual economy. As a result, effectively identifying and regulating these systemically significant institutions is critical. The assessment of a bank bordering influence to systemic credit and liquidity risk is one of the fundamental concepts for systemic risk evaluations. Banks that contribute more are considered to be more systemically significant.

The influence of credit risk on bank performance was investigated by Musyoki and Kadubo (2012). The sample consisted of 35 banks, and the information was gathered over ten years (2011-2020). Rate of default, cost of bad debts, and cost per loan asset was used to assess credit and liquidity risk, whereas ROA was used to receive funds. All of the above factors have a statistically significant and unfavorable influence on bank performance, according to descriptive, correlation, and regression data. The findings of the prior study contradict the idea presented in earlier studies, which claimed that increased credit risk caused banks to perform worse. In the banking industry of developing nations, Bashir and Ahmad (2013) attempted to determine the ability to explain various factors particular to a bank driver of NPLR. To achieve the study's stated goal, panel data from 35 banks were collected

during ten years (2011-2020). The study's findings revealed that the NPL has a positive and substantial link with ROA, but a weak one and ROE has a negative link with it.

The ratio of return on asset of a company's net income to its total resource (ROA) evaluates how successfully banks can gain from it. A finite resource it's better for the bank's performance, the higher the return on assets, which is advantageous to the bank. Return on Equity is another metric's secondhand to evaluate bank performance (ROE) and that ratio of net income to total equity. It's the rate of return created by the equity of the owners.

The return on assets (ROA) is a dependent variable that compares a bank's income before interest and taxes to its total net assets. It evaluates how well banks are run to get the most out of their limited resources. The provisioning strategy of the credit institution has a major influence on this ratio meanwhile the net result comprises the cost of risk and the assets shown in the bank balance sheet net of the provision. It is used to assess a credit institution's performance. The return on equity (ROE) is a dependent variable that evaluates the return on a bank's investment by its shareholders. Since, it has been utilized frequently in prior research, ROE, like ROA and has been employed as a performance indicator in regression analysis. The phrase return on assets (ROA) refers to the profitability of a bank as a percentage of its total assets. It's the most popular indicator for evaluating the performance of banks and other financial institutions. It evaluates a bank's ability to generate profits via the use of both financial and physical assets. Return on Equity (ROE) is the ratio of net profit after taxes to average total equity for the fiscal year (Sylvie et al., 2010; Audi et al., 2021).

Banking performance and its link to risk are extremely significant because of the financial intermediary role banks play. Credit and liquidity risk is not a new issue, and several scholars have written extensively on it. However, this is not an old issue, and there is no need to write about it because credit is the heart of a bank's operations, accounting for up to 80% of a bank's budget. Because lending is a bank's primary operation, interest on loans accounts for a substantial portion of its profits. Credit and liquidity risk is mostly a result of lending. As a result, credit poses a major danger to bank profitability. Banks are fighting to survive and maintain an adequate level of profit in an environment of high and rising competition amongst them. This has resulted in a rise in banks' proclivity to take excessive risks, which has resulted in the failure and insolvency of a huge number of institutions. But risks do not always equate to losses; they may also be a source of significant rewards. If their returns are excellent, banks generally overlook the downside of credit and liquidity risk and do not assess whether credit and liquidity risk has a positive or negative influence on returns. When credit and liquidity risk is hidden behind profits, banks may be able to obtain greater returns, but credit risk has lowered these returns, especially because there is no consensus among scholars on the type and extent to which credit risk affects bank performance. As a result of growth in bank's credit risk, liquidity and solvency issues affect bank's stability. Credit and liquidity risk is much more important since it has a direct impact on financial institutions' solvency, which is why credit and liquidity risk is such a high risk in financial institutions. Credit risk, according to Chijoriga (2008) is more significant than other risks since it directly impacts the solvency of financial institutions, making it a particularly serious risk in financial organizations.

### 3. Methodology

The current study explores the impact of credit risk (NPL, Z-Score) and liquidity risk (LR) on the performance of South Asian banks measured with ROA and ROE. The sample of the study comprised a total of 35 listed banks of South Asian Countries (Pakistan (20) and India (15)) and the sample period spans 10 years from 2011 to 2020. The information was obtained from data stream and the financial statements of selected banks listed on the Pakistan Stock Exchange (PSX) and Bombay Stock Exchange (BSE). The findings show that credit and liquidity risk has a major impact on the performance of South Asian banks.

The general goal of this study was to examine the influence of credit risk on bank performance in emerging markets. The study employed a quantitative research approach to attain this goal. This study used independent variables (credit risk) to examine their impact on bank performance (ROA and ROE). A higher NPL ratio and Z-score indicates higher credit risk while a higher liquidity ratio means lower liquidity risk.

**H1,** There is a significant impact of non-performing loans (NPL) on bank performance

The NPL particularly reveals how banks operate handle credit risk. It does after all specify the percentage of non-performing loans in terms of the total loan amounts Kaaya & Pastory (2013). When the quantity of this ratio rises, it sends a bad message to bank management since it suggests that banks are more likely to fail to recover funds given to consumers. Profitability was expected to suffer as a result of non-performing loans. When the quantity of this ratio rises, it sends a bad message to bank management since it suggests that banks are more likely to fail to recover funds given to consumers. Provisions are triggered by loan default occurrences, and larger levels of non-performing loans are connected with higher provisioning rates, according to previous practices (Hasan and Wall, 2004).

**H2,** There is a significant impact of Z-score on bank performance

One of their initial studies, Billett, Garfinkel, & O'Neal, E. S. (1998). Quantify bank bankruptcy credit and liquidity risk by using a credit risk (Sinkey & Nash, 1993; Kassem et al., 2019; Roussel et al., 2021). They offer an upper-bound likelihood of book-value liquidation since bankruptcy happens only in one conclusion of the delivery. De Nicoló and Tieman (2006) used the z-score as an indicator of credit risk-adjusted performance in their respective investigations. As a result of this study, the z-score is now extensively utilized as a measure for bank credit risk-taking across a variety of academic fields. Boys and Graham (1988) and Boys et al. (1993) utilize the z-score as a predictor of bankruptcy and investigate the credit risk implications of bank field companies combining with non-bank financial firms.

**H3,** There is a significant impact of liquidity risk on bank performance

This might have a negative impact on the bank's performance as well as its reputation (Jenkinson, 2008). If funds are not available to repay depositors on schedule, depositors may lose trust in the bank. In such cases, the bank's reputation may be jeopardized. According to Dahir et al. (2018), the potential bank fail is driven by liquidity risk. According to Ly (2015) and Chen et al. (2018), liquidity risk has a detrimental impact on bank performance. Likewise, Adelopo et al. (2018), Onsongo et al. (2020), and Saleh

and Abu Afifa (2020) discover that liquidity risk has a negative and considerable impact on financial performance. Marozva (2015) found that the LTD ratio has a negative and significant impact on bank financial performance. The amount of liquid assets is thought to have a beneficial impact on bank financial performance (Bourke, 1989; Kosmidou, 2008; Sajid & Ali, 2018).

**H4**, There is a significant impact of bank size on bank performance

Major corporations have a competitive edge over small firms due to their massive market share and large earnings. Furthermore, larger organizations have more sophisticated resources, allowing them to benefit from monitoring markets, improve representation, and so on (Bayyurt, 2007). However, investigations have shown that small businesses produce lower returns and are riskier (Banchuenvijit, 2012; Saliha & Abdessatar, 2011). According to Lehn, Patro, and Zhao (2009), bank size has a positive relationship with financial performance; however, (Aljifri & Moustafa, 2007; Nisar et al., 2021; Senturk & Ali, 2021; Mehmood et al., 2022) create a negative relationship between business sizes.

**H5**, There is a significant impact of growth on bank performance

These significant revelations have sparked investigations into the many pathways via which economic globalization affects economic development (Dreher, 2007; Dreher and Gaston, 2008; Dreher et al. 2008; Martens and Raza, 2010). In general, those studies suggest that various metrics of economic globalization have a beneficial effect on economic growth. It's important to note that globalization is also linked to income disparity (Gaston and Dreher, 2008). In essence, globalization benefits those who participate in it, but it also disadvantages those who do not (Gaston and Khalid, 2010). An investigation of the linkages among economic globalization & banking sector routine is noticeably lacking from the literature.

**H6**, There is a significant impact of leverage on bank performance

According to Duffie (2010), the Global Financial Crisis was caused by excessive risk-taking by highly leveraged financial institutions. In this study, they show a close relationship between leverage and bank performance. The motivations for taking on excessive risk are determined by the speculator's leverage, for obvious reasons that business size increases risk-taking returns. The simple conclusion is that leverage must be reduced in order to limit risk-taking. Leverage increases the transfer of shocks and the size of crises in this scenario. Another study indicated that low-leveraged institutions incur fewer risks, ensuring the financial sector's stability. Furlong and Keeley (1989) discovered that increasing bank capitalization reduces asset risk.

The return on assets (ROA) is a ratio that compares the entire value of a ratio of a company's assets to its pre-tax profits (EBIT). The ratio is used to assess how successfully a firm uses its assets to generate income before it must meet contractual obligations. It goes like this, (Apps, 1996).

$$ROA = EBIT / \text{Total Assets}$$

Return on Equity is another metric's secondhand to evaluate bank performance (ROE) and that ratio of net income to total equity. It's the rate of return created by the equity of the owners. Return on Equity (ROE) is the ratio of net profit after taxes to average total equity for the fiscal year (Sylvie et al., 2010).

$$ROE = \text{Net Income} / \text{Total Stockholders' Equity}$$

### 3.1. Control Variables

The current study used company size as a control variable since studies have demonstrated that it has a significant impact on economic performance. Representatives from all across the world have continued to plan the impact of business size on economic success. Major corporations have a competitive edge over small firms due to their massive market share and large earnings. Furthermore, larger organizations have more sophisticated resources, allowing them to benefit from monitoring markets, improve representation, and so on (Bayyurt, 2007).

**Table 1: Variables Description**

Sr No	Study Issue	Variables	Symbols	Definition / Calculation	Reference/s
1	Financial Performance	Return on Assets	ROA	Net Income divided by Total Assets	(Bokpin & Arko, 2009; Enobakhare, 2010)
2		Return on Equity	ROE	Net Income divided by Total Stockholders' Equity	(Otman, 2014; Mackay, 2012)
4	Credit risk	Z-Score	ZS	Natural logarithm of return on assets (ROA) ÷ capital-to-asset ratio / SD of ROA over three years	Kabir et al. (2015)
5		Non-performing loans ratio	NPL	Nonperforming loans/total loans	Noman et al. (2015)
6	Liquidity Risk	Liquidity Ratio	LR	Deposit to total asset ratio	(Alzorqan, 2014) (Marozva, 2015)
9	Control Variables	Bank Size	BS	Natural logarithm of the market capitalization	(Muthoni, Nasieku, Olweny 2018)
10		Growth	GW	Annual percentage change in total assets	(Nguyen, 2019)
11		Leverage	LEV	Equity to total asset ratio	(Hunjra et al., 2020)

It is the most commonly used metric to assess the performance of banks and other financial organizations. It assesses a bank's capacity to produce profits by leveraging both financial and physical assets. The ratio of net profit after taxes to average total equity for the fiscal year is known as return on equity (ROE) (Sylvie et al. 2010). These significant revelations have sparked investigations into the many pathways via which economic globalization affects economic development (Dreher, 2007; Dreher and Gaston, 2008; Dreher et al. 2008; Martens and Raza, 2010).

According to Duffie (2010), the Global Financial Crisis was caused by excessive risk-taking by highly leveraged financial institutions. In this study, they show a close relationship between leverage and bank performance. The motivations for taking on excessive risk are determined by the speculator's leverage, for obvious reasons that business size increases risk-taking returns. The simple conclusion is that leverage must be reduced in order to limit risk-taking. These conclusions, primarily from the standpoint of financial institutions, serve as the foundation for enterprises' equity requirements. It differs from the conventional notion that equity capital is required to mitigate economic downturns and absorb unfavorable shocks.

### 3.2. Mathematical / Econometric Model

$$(ROA)_{i,t} = \alpha + \beta_1(ROE)_{i,t} + \beta_3(ZS)_{i,t} + \gamma_1(LR)_{i,t} + \gamma_5(BS)_{i,t} + \gamma_6(GW)_{i,t} + \gamma_7(LEV)_{i,t} + \mu_{i,t}$$

Where ROA denotes Return on Assets which is our dependent variable. ROE, ROE dependent variables in our model, Where ROE stand for Return on Assets. Z-score (ZS), Non-performing loans ratio (NPL), Liquidity Ratio (LR). While, Bank size (BS) and Growth (G) are Leverage (LEV) control variables in our model.  $\mu$  Is error term.

### 3.3. Techniques

The study uses descriptive statistics to help it simplify massive amounts of data in a meaningful manner. In descriptive statistics, measures of central tendency, as well as measures of variability and shape, are used. Procedures of variability contain the standard deviation, variance, and range, among many others. The mean was the most used metric for determining central tendency but was affected in the presence of an outlier.

The correlation assesses the relative strength of the relationship. It normalizes the measurements, making it possible to compare two variables. Correlation analysis is a statistical technique for determining the strength of a relationship between two or more quantitative variables. A significant correlation indicates that two or more variables are strongly related, whereas a low correlation indicates that they are seldom related.

Multicollinearity was defined as the ability of independent variables to connect or interrelate with one another. It is a type of data disturbance that causes inaccurate data estimates if it is present in the figures. Many methods are used to detect multicollinearity in data. The simple coefficient of correlation is one technique.

## 4. Empirical Results

**Table 2: Descriptive Statistics of Overall Banking Sector**

	Mean	Maximum	Minimum	Std. Dev.	Obs.
ROA	0.0141	0.8845	-0.1995	0.0619	315
ROE	0.9364	7.936	-2.333	1.5592	315
ZS	30.226	76.73	-5.337	3.766	315
NPL	0.0856	0.8823	0.0018	0.0891	315
LR	0.9539	2.183	0.0007	1.0472	315
BS	16.466	24.084	10.352	4.1958	315
GR	0.4981	43.429	-0.965	3.1832	315
LEV	0.0598	0.6356	0.0006	0.0657	315

Note, ROA is Return on Assets, ROE is Return of Equity, ZS is the Z-Score, NPL is Non-performing loan ratio, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage.

Data on the variables may be found in Table 2. The mean value of financial performance shows that the variation in bank performance metrics is less, indicating that the data is without any outliers. The average value of financial performance (ROA and ROE) means that the banks perform well and generate profit, additionally; their Z-scores indicate that, on average, banks are in a stable position and away from being insolvent. Moreover, banks have on average a very small share of NPLs, indicating that the intensity of credit risk is minimal. However, the average value of liquidity ratio for banks in South Asian banks is higher which suggest that banks have lower risk in terms of liquidity. Higher values of bank size imply that banks with great size and growth are more profitable in the South Asian countries. While leverage value indicates that banks in South Asia prefer equity over debt financing.

**Table 3: Test of Multicollinearity**

Variable	VIF	1/VIF
BS	1.38	0.7247
ROE	1.35	0.7412
NPL	1.10	0.9105
ZS	1.09	0.9162
GR	1.03	0.9687
LR	1.02	0.9841

Note, VIF = Variance Inflation Factor

In table 3, results of the test of multicollinearity are presented using variance inflating factor diagnostic test which reveals that VIF values are less than 5, indicating that there is no multicollinearity concern in this study.

**Table 4: Correlation Matrix of Overall Banking Sector**

	ROA	ROE	ZS	NPL	LR	BS	GR	Lev
ROA	1							
ROE	0.2388	1						
ZS	-0.0623	0.2048	1					
NPL	0.0408	-0.1149	-0.1793	1				
LR	0.6368	0.0404	-0.0733	-0.0518	1			
BS	0.0786	0.4792	0.0865	-0.2407	0.0495	1		
GR	-0.0230	0.0742	-0.0605	-0.0675	-0.0383	0.1424	1	
LEV	-0.1180	-0.4094	-0.0511	0.1184	0.2940	-0.4163	-0.0835	1

Note, ROA is Return on Assets, ROE is Return of Equity, ZS is the Z-Score, NPL is Non-performing loan ratio, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage.

Table 4 shows the correlation matrix of all explanatory factors in the research, which was generated using data from Pakistan's banking industry. The correlation matrix is analyzed to check the issue of Multicollinearity between explanatory variables. The highest correlation is 0.6368 which is between return on assets and liquidity ratio, while the lowest correlation value is -0.0230 which is between return on assets and growth rate of assets. As a consequence of the correlation matrix's findings, there is no strong connection between explanatory variables, indicating that Multicollinearity is not a concern.

**Table 5: Two-step system dynamic panel estimation with ROA**

Variables	Coef.	Std. Err	t-Stat	P-Value
L1.	0.0813***	0.00086	(93.76)	0.000
L2.	0.1054***	0.00062	(169.58)	0.000
ZS	-0.0004***	0.00010	(-4.32)	0.000
LR	-0.0076***	0.00021	(-35.82)	0.000
BS	0.0050***	0.00031	(16.13)	0.000
GR	0.0001***	0.00001	(13.79)	0.000
LEV	0.9117***	0.02076	(43.90)	0.000
C	0.0473***	0.00650	(7.28)	0.000
Sargan	30.610			
Sargan p-value	0.5368			
AR1	3.3453	p-value	0.000	
AR2	1.1143	p-value	0.2651	

Note, L1. is the First Lag of dependent variable, L2. is the second Lag of dependent variable, ROA is Return on Assets, ZS is the Z-Score, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage. \*\*\*, \*\* and \* show significance level at 1%, 5% and 10%

Tables 5 provide the results of hypotheses testing using a two-step dynamic panel regression for the entire sample of banks in Pakistan and India. The Sargan test is used to ensure that the instruments are valid. Because the outcomes are insignificant, the instruments utilized in this investigation are valid. The study also uses the Arellano–Bond test to confirm autocorrelation. It is found that the Arellano–Bond first-order autocorrelation (AR1) is significant and Arellano–Bond second-order autocorrelation (AR2) is insignificant, indicating no autocorrelation. In Table 4, credit risk is estimated with Z-Score, liquidity risk with liquidity ratio and bank performance with ROA. The outcome of the study reveals that credit risk is negatively related to the performance of banks in South Asian countries. These findings confirm the arguments of Bofondi and Gobbi (2003) and Hunjra et al. (2020) that banks must monitor their borrowers to avoid adverse selection and moral hazards problems induced by asymmetric information. Thus, hypothesis H2 is accepted. However, the outcomes of the liquidity ratio depict that as the banks' level of liquidity increases; it will ultimately lead to decrease the bank performance. This confirms H3. This indicates that the banks have adequate current assets to satisfy their current liabilities since if banks have an appropriate LR, they can efficiently deal with liquidity risk and improve their financial performance. These findings are supported with the result of Atemkeng and Nzongang (2006). Results of control variables reveal that bank size; assets growth are leverage are positively associated with the performance of banks. These results suggest that large size banks are more likely to undertake risky activities that might affect their performance. However, the banks in South Asia increasingly relying on debt to improve their performance. These findings are per Ashraf et al. (2016).

As a reliable measure of bank performance, Tables 6 show outcomes using ROA. The test hypothesis is shown in Table 6 with a two-stage GMM panel regression for the general banking sector in developing countries. The Sargan test results reveal that instruments are valid for the research. The study also uses the Arellano–Bond autocorrelation test. Arellano and Bond have a large autocorrelation (AR1), however, the autocorrelation of the second-order between Arellano and Bond is not significant, which does not indicate an autocorrelation of the first order. Table 5 is estimated using NPL as a credit risk proxy, while liquidity risk is measured with liquidity ratio and firm performance with ROA. Results indicate that credit risk measured with NPL revealed a

negative impact on firm performance and supported by the arguments of Saleh and Abu Afifa (2020), that higher NPL ratios are associated with more probability of default, and it will harm their performance. However, the results of the liquidity risk negatively affect bank performance. These also indicate that the bank has sufficient liquidity to respond to liquidity risk and are backed by the Atemkeng and Nzongang results (2006). These findings found support for the hypotheses H1 and H3. Analysis of the control variables indicates that bank size is negatively related to banks performance implying that banks large in size are more prone to be involved in risky activities and it leads to a decline in banks performance. Besides, assets growth and leverage have a positive influence on bank performance.

**Table 6: Table Two-step system dynamic panel estimation with ROA**

Variables	Coef.	Std. Err	t-Stat	P-Value
L1.	0.0524***	0.00045	(114.20)	0.000
L2.	0.1071***	0.00042	(251.51)	0.000
NPL	-0.0158***	0.00022	(-70.58)	0.000
LR	-0.0119***	0.00021	(-55.54)	0.000
BS	-0.0065***	0.00022	(-29.47)	0.000
GR	0.00072***	0.00000	(119.93)	0.000
LEV	0.67092***	0.01551	(43.25)	0.000
C	0.07581***	0.00446	(16.98)	0.000
Sargan	28.076			
Sargan p-value	0.6656			
AR1	4.0491	p-value	0.000	
AR2	1.0553	p-value	0.2913	

Note, L1. is the First Lag of dependent variable, L2. is the second Lag of dependent variable, ROA is Return on Asset, NPL is Non-performing loan ratio, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage, \*\*\*, \*\* and \* show significance level at 1%, 5% and 10%

**Table 7: Table Two-step system dynamic panel estimation with ROE**

Variables	Coef.	Std. Err	t-Stat	P-Value
L1.	0.6105***	0.00052	(121.64)	0.000
L2.	0.1828***	0.00037	(490.18)	0.000
ZS	-0.0306***	0.00008	(-75.18)	0.000
LR	-0.0607***	0.00147	(-41.09)	0.000
BS	-0.0257***	0.00125	(-20.51)	0.000
GR	0.02329***	0.00015	(47.74)	0.000
LEV	-4.9963***	0.12260	(-40.75)	0.000
C	0.4603	0.02543	(18.10)	0.000
Sargan	32.1109			
Sargan p-value	0.4612			
AR1	2.1441	p-value	0.0320	
AR2	1.3427	p-value	0.1794	

Note, L1. is the First Lag of dependent variable, L2. is the second Lag of dependent variable, ROE is Return on Equity, ZS is the Z-Score, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage, \*\*\*, \*\* and \* show significance level at 1%, 5% and 10%

Tables 7 provide the results of hypotheses testing using a two-step dynamic panel regression for the entire sample of banks in Pakistan and India. The Sargan test is used to ensure that the instruments are valid. Because the outcomes are insignificant, the instruments utilized in this investigation are valid. The stud also uses the Arellano–Bond test to confirm autocorrelation. It is found that the Arellano–Bond first-order autocorrelation (AR1) is significant and Arellano–Bond second-order autocorrelation (AR2) is insignificant, indicating no autocorrelation. In table 4.6, credit risk is estimated with Z-Score, liquidity risk with liquidity ratio and bank performance with ROE. Credit measured with Z-score reports a negative impact on bank performance. It depicts that banks in this region have tight loan policies in place to ensure that borrowers are in a position to return loans to banks following the agreed-upon terms and conditions. As a result, banks are appropriately executing lending policies, and clients are complying with those policies. As a result, the banks are making good use of their deposits and profiting. However, the results of the liquidity ratio show that when the bank's liquidity level grows, it will eventually lead to decrease bank performance. This also indicate that the bank has sufficient liquidity to respond to liquidity risk and are backed by Kosmidou (2008). Results of control variables reveal that bank size and leverage are negatively associated with bank performance while assets growth is positively associated with the performance of banks. These results suggest that large size banks are more likely to undertake risky activities that might affect their performance. Additionally, the banks in South Asia were increasingly relying on debt to finance their operations but it leads

to a decline in their performance. These findings are per Muthoni, Nasieku and Olweny (2018). However, growth in assets of banks going to enhance their performance and profitability.

**Table 8: Table Two-step system dynamic panel estimation with ROE**

Variables	Coef.	Std. Err	t-Stat	P-Value
L1.	0.6013***	0.00271	(221.70)	0.000
L2.	0.0488***	0.00252	(19.32)	0.000
NPL	-3.5682***	0.07878	(-45.29)	0.000
LR	-0.1642***	0.00555	(-29.57)	0.000
BS	-0.0207***	0.00321	(-6.47)	0.000
GR	0.0169***	0.00019	(85.48)	0.000
LEV	-12.60***	0.46313	(-27.22)	0.000
C	1.564***	0.05488	(28.51)	0.000
Sargan	29.8198			
Sargan p-value	0.5773			
AR1	2.2537	p-value	0.0242	
AR2	1.5593	p-value	0.1189	

Note, L1. is the First Lag of dependent variable, L2. is the second Lag of dependent variable, ROE is Return on Equity, NPL is Non-performing loan ratio, LR is liquidity ratio, BS is Bank Size measured with Total Assets, GR is Growth and LEV is Leverage, \*\*\*, \*\* and \* show significance level at 1%, 5% and 10%

As a reliable measure of bank performance, Tables 8 show outcomes using ROE. The test hypothesis is shown in Table 7 with a two-stage GMM panel regression for the general banking sector in developing countries. The Sargan test results reveal that instruments are valid for the research. The study also uses the Arellano–Bond autocorrelation test. Arellano and Bond have a large autocorrelation (AR1), however, the autocorrelation of the second-order between Arellano and Bond is not significant, which does not indicate an autocorrelation of the first order. Table 7 is estimated using NPL as a credit risk proxy, while liquidity risk is measured with liquidity ratio and firm performance with ROE. The results show that credit risk as measured by NPLs has a negative influence on firm performance, which is backed by Hunjra et al. (2020) claim that greater NPL ratios are connected with a higher possibility of default and affect their performance. However, the liquidity risk results suggest that when the bank's liquidity level increases, then bank performance is decreased. These results are supported by the Kosmidou (2008) outcomes; also imply that the bank has sufficient liquidity to respond to liquidity risk. Control variable results show that bank size and leverage are negatively linked with bank performance, whereas asset growth is favorably associated with bank performance. These findings imply that large banks are more prone to engage in riskier activities that could harm their performance. Furthermore, banks in South Asia have been increasingly reliant on debt to fund their operations, which has resulted in a downturn in their performance. These findings are attributed to Ashraf et al (2016). Bank asset expansion, on the other hand, will improve their performance and profitability.

## 5. Major Findings & Discussion

The findings of this study reveal that credit risks and liquidity risks are significantly associated with the performance of banks in South Asian emerging countries including Pakistan and India. Analysis reveals that most of the results estimated with ROA and ROE depict similar results except the Z-score, bank size and leverage. In relation to ROA as a measure of bank performance, Z-score and NPLs are negatively related to bank performance. These results imply that banks that are facing a higher level of non-performing loans in their balance sheet or credit risk are experiencing performance declines. These findings confirm the arguments of Saleh and Abu Afifa (2020) and Hunjra et al. (2020) that banks need to monitor their borrowers to avoid adverse selection and moral hazard problems induced by asymmetric information. Thus, hypotheses H1 and H2 are accepted. These results are supported by the theory of asymmetrical information according to which effective screening becomes crucial when collecting authentic information from prospective borrowers. Failure to discern a good borrower from a bad borrower, on the other hand, may result in problems of adverse selection and moral hazards. These issues result in a significant accumulation of nonperforming accounts in banks. However, the outcomes of the liquidity risk depict that as the banks level of liquidity risk increases, it will ultimately lead to decrease bank performance. This confirms H3 and these findings also indicate that bank has enough liquidity to respond to liquidity risk and are supported with results of Atemkeng and Nzongang (2006) and Kosmidou (2008). Their findings also support for the balanced portfolio theory which suggests that when banks hold diversified asset portfolios, they are more likely to maintain their liquidity position. Likewise, the study found the same findings in results estimated with ROE. However, credit risk measured with Z-score reports a positive impact on bank performance. This shows that banks in this region have tight loan policies in place to ensure that borrowers are in a position to return loans to banks following the agreed-upon terms and conditions. As a result, banks are appropriately executing lending policies, and clients are complying with those policies. As a result, the banks are making good use of their deposits and profiting.

## 6. Conclusion

Financial institutions are seen as critical players in any country's economic growth. Similarly, banks, as part of financial institutions, play an important function in an economy. In developing economies, the banking industry represents a lifeline for



economic growth and development. However, the operation of banks is not without difficulties, as they confront a variety of issues, one of which is the possibility of failure. If the bank fails to survive, it will have a detrimental impact on the economy as a whole. The main purpose of the study was to investigate the impact of credit risk, liquidity risk on the performance of listed banks operate in South Asian Emerging economies including Pakistan and India. Banks Performance is measured with ROA and ROE, Credit risk with NPL ratio and Z-score, Liquidity with liquidity ratio and control variables include bank size, growth and leverage. The results indicate a significant impact of credit risk as well as liquidity risk on the performance of banks in South Asia. Overall, credit risk hurts bank performance in emerging South Asian economies. In relation to ROA as a measure of bank performance, Z-score and NPLs are negatively related to bank performance. These results imply that banks that are facing a higher level of non-performing loans in their balance sheet or credit risk are experiencing performance declines. However, Z-score in the model estimated with ROE reveals a positive relationship with bank performance.

## 7. Recommendations

It is suggested that banking management in developing economies, particularly in South Asian nations, should examine credit and liquidity risks to sustain and improve bank performance and avoid bank failure. Bank executives must assess, manage, and minimise firm-specific risks in the best interests of all stakeholders. Banks' top management must give proper and clear instructions that risk managers may simply understand and implement to manage credit risk. Banks' top management must give proper and clear instructions that risk managers may simply understand and implement to manage credit risk. Furthermore, it is urged that bank management provide timely monitoring and control of their long-term borrowers to avoid credit risks. Additionally, the study proposes that banking management, policymakers, and practitioners adopt clear policies for granting loans and requiring clients to return borrowed amounts on time. If banks fail to regulate their long-term borrowers, the credit risk would worsen, perhaps leading to a liquidity crisis.

## 8. Practical Implications

The study has implications for banks management in developing countries to control credit risk, bank management should provide the timely monitoring and control of their long-term borrowers. Additionally, bank management should focus on the liquidity situation at regular intervals to maintain sufficient current assets to satisfy current liabilities and a necessary balance between loans and deposits to manage liquidity risk. This will assist banks in improving their liquidity position. Due to the uncertainty in the banking environment in developing economies, management must be cautious to pay greater attention to such risks to retain profitability and avoid bankruptcy and bank failure.

## 9. Limitations and Future Directions

Considering that the study is primarily concerned with developing South Asian countries, a comparison of the risks encountered in developed and developing South Asian countries could be an interesting future study. Further studies could look into bank risk using market risk measurements. A comparison of conventional and Islamic banking may also yield different findings when the same variables are used.

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