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Impact of Liquidity Risk on Bank profitability: Case study of Commercial banks of Pakistan

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Abstract: *Every sector of the financial system is responsible for putting appropriate financial procedures into place in order to adapt to the ever-changing conditions of the market. This study examines influence of liquidity position on profitability of 22 Pakistani commercial banks from 2006 to 2022 by applying Generalized Method of Moments (GMM) using annual data with an aim to enhance their profitability and maintain balanced approach. It is found that there is inverse and significant effect of liquidity; credit risk and firm size on bank's profitability while positive and statistically significant influence of bank's capital on bank's profitability. Gross domestic product is found to negatively influence bank's profitability due to fluctuations while lack of consumer price index anticipation entails negative impact on performance of Pakistani banks. Therefore, it is recommended that stable policies should be formulated for strengthening banking sector and for diversifying and balancing liquidity measures. The banking system in Pakistan will benefit from improved decision-making, longer-term growth, and financial stability as a result of importance of liquidity risk.*

Keywords: Liquidity Risk, Size, bank capital, credit risk.

Introduction

Financial services contribute to great extent in overall economic growth of a country. It is considered as the most prominent pillars for health of an economy. In this vein, banks play crucial role when it comes to making decisions related to investment, development of projects, spending and savings. The advancement in banking practices has heightened this role of banks even further. Banking sector performance is monitored globally for profitable administration, and banks improve performance and profitability to achieve these goals. Every business aims to increase firm value by minimising cost and profit time efficiently. Banking sector is bloodline of an economy as it directly or indirectly affects inflation, international trade transactions, currency valuation, stock market performance, investment environment and most importantly overall economic conditions of country.

In this perspective, for many years Pakistan's highly uncertain macro environment has been result of consistently depreciating Pakistani rupee, continually rising inflation

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and escalating energy costs that have adversely impacted business confidence and investments. These factors serve as drivers of banking sector's performance in the country. During 2022-23, Pakistani banks had performed well in terms of solvency, earnings and management of underlying risks. This results from a 14% increase in their asset base, including 52.7% of investments, and a 14.2% rise in banks' deposits (State Bank of Pakistan, 2023). Pakistani banks' local and overseas advances had seen a slight increase but private sector advances had fallen due to prevailing economic uncertainty, low business confidence and high-risk aversion of banks because of expected credit risk.

With accommodative monetary policy environment and liquidity measures taken by SBP (State Bank of Pakistan), including introduction of generous refinance schemes, changed policy rate for three quarters of 2021 and targeted fiscal support manifested by Ehsas Emergency Cash program, energy and construction packages, along with faster refunds for exporters, Pakistan's GDP that had dropped by 0.5% due of Covid-19 epidemic strongly rebounded with an impressive 3.9% economic growth in 2021. Studies (Wasim, Iftikhar, & Rizvi, 2022) had concluded that financial inclusion plays a critical role in fostering economic growth of a country; further heightening role of banks in expanding financial inclusion.

In addition, banking assets of Pakistani banks had grown tremendously in 2021 due to increase in deposits which are around 17.7%. This was due to (i) rise in overseas remittances (ii) launch of SBP's Roshan Digital Account initiative, a facility for overseas Pakistani for availing banking services in Pakistan (iii) Government's measure to discontinue PKR 15000 and PKR 7500 bearer prize bonds which resulted in massive encashment (iv) consumer's behavioural shift towards adoption of digital channels for meeting their banking needs. This was witnessed by increase in internet banking and mobile banking transactions by 143% and 55% respectively leaving extra funds in banking channel (KPMG, 2022).

Profitability of Pakistani commercial banking sector indicated by ROA (Return on Assets before tax), NIM (Net Interest Margin), ROE (Return on Equity) both before and after tax have persistently increased since 2020. This upward profit trajectory is attributed to rapidly rising interest incomes due to interest rates and policy rate that have been kept exceedingly high. Alongside this, operating expenses have also grown over the years because of expansion of banking network, huge human resources expenses and elevated inflation.

The expansion of financial institutions is a signal of how effectively they are managed. For the purpose of making wise judgements, a wide variety of internal and external elements that are responsible for determining the health of banks are taken into consideration. Banks are pivotal for expanding financial inclusion as it boosts trade activities of a country (Wasim, Iftikhar, & Rizvi, 2023). Keeping this in perspective, credit risk, liquidity risk, assets, investment, capital, growth in assets and loans are determinants in domain of internal environment while macroeconomic indicators such as stock exchange, political

and economic instability are key elements of external environment. These external factors can seriously dent banks' profitability but banks do not have full control over them.

The implementation of liquidity risk measures has been studied in several bank performance studies. Some research investigations use controlled parameters (Kosmidou, Kousenidis, Ladas, & Negkakis, 2017; Bhatt, Ahmed, Iqbal, & Ullah, 2023; Harb, El Khoury, Mansour, & Daou, 2023). Other studies show that liquidity risk affects bank profitability in different ways (Abu Khalaf & Awad, 2024; Demirgüç-Kunt & Huizinga, 2013). Review of existing studies has shown that consensus has still not been reached on whether liquidity boosts or damages profitability of firms as results found are mixed and ambiguous. These mixed results have varied according to the nature of markets and economies taken under study. Positive and significant relationship is found in developed financial systems but in sharp contrast to this, findings are opposite in emerging markets. This paper aims to examine association of working capital and performance in context of 22 listed commercial banks of Pakistan. Second, to evaluate circumstances which influence liquidity measures and profitability? Furthermore, this paper also highlights the determinants that play critical role in survival of financial systems. The primary aim of this research aim is to empirically examine the influence of liquidity on profitability in banking sector of Pakistan.

Objective of this paper

This paper focuses on the intricate relationship between liquidity and bank profitability of 22 listed Pakistani commercial banks in the post-Basel III era, which emerged as a result of the global banking industry's reaction to the Basel III regulations, which posed new challenges to banks' financial stability and, in particular, liquidity management. The demand for rule compliance increased, and banks' incapacity to meet Basel III liquidity requirements changed their operational strategies. Liquidity risk is one of the major concerns of banks, could pose challenges when trying to quickly and reasonably sell a stake. The capacity of a bank to pay its bills and return depositors' money is intimately related to liquidity. It also pertains to meeting all the short-run obligations on its maturity date or before it. When banks are unable to meet their day-to-day operations and fail to maintain their liquidity risk, eventually, their profitability decreases. A loan to total assets entails high risk exposures which stick to earn more interest revenue. This study uses an integrated liquidity risk to explain the performance of Pakistan's top commercial listed banks from 2006 to 2022. This research fills several major gaps in the literature. It is a rare temporal framework that offers a careful look at recent events like the COVID-19 epidemic. The sample's lifespan coincided with these occurrences, but their causes were not intentionally sought; the current research is naturally obliged to incorporate this timeframe.

The rest of the paper is organized as follows: Section 2 presents the literature review and hypotheses development. Section 3 explains the research design and methodology, followed by the results and a discussion in Section 4 of the study. Finally, the conclusion

is in Section 5.

Literature Review

Liquidity risk and its impact on profitability

The concept of liquidity risk encompasses the potential challenges associated with promptly liquidating a position at a reasonable price. This is closely linked to a bank's ability to fulfil all of its obligations and reimburse depositors. Liquidity risk becomes particularly apparent when a bank is experiencing difficulties in meeting liquidity demands, whether as a result of firm-specific, industry-wide, or general market liquidity duress. The interaction between risk management frameworks and profitability measures can theoretically be used to characterise the relationship between liquidity risk variables and bank performance.

Several studies have tried to scrutinize association between liquidity and profitability but results remain mixed and inconclusive. Francis and Osborne (2010) reported that greater liquidity diminishes bank's profitability. Banks are the weakest in the financial industry, thus large withdrawals pose a risk. Low profitability affects banking structure performance. In contrast, Osborne, Fuertes, and Milne (2017) claimed that high liquidity and future premium for compensating investors for decreased bankruptcy risk lower bank risk.

The relation between banks' its liquidity and profitability of banks is not fixed but is recurring, rather it varies due to distress levels of banks, bank's current liquidity position compared to overall banking industry. Thus, liquidity and profitability can be good or negative in the short-term depending on a bank's liquidity position compared to its optimal liquidity level. The relationship between profitability and liquidity can be very recurrent, with banks that improve liquidity also improving profitability during times of hardship. Another study (Anees, Iftikhar, & Rizvi, 2023b) found that steady liquidity requirements encourage bank government securities investment.

Numerous researches have examined corporate liquidity policies and company value to efficiently establish all the aspects that affect business performance. Different methods have been used to evaluate liquidity management and firm performance. Banks face liquidity risk when they cannot satisfy daily obligations (Diamond & Rajan, 2005). This risk arises at the time when deposits are taken in huge volumes. The shortage and excess of current assets are reasons that cause liquidity risk to fluctuate in banking system. In case when banks hold more current assets by issuing long-term debt and vice versa, eventually their liquidity declines. Moreover, Bourke (1989) empirically examined the influence of profitability with its factors and revealed that high liquidity entails more profits. Lartey, Antwi, and Boadi (2013) examined Ghana Stock Exchange working capital management and performance and found no correlation between liquidity and corporate profitability

in Ghana's banking system. In addition, Bordeleau and Graham (2010) found that retaining a particular amount of liquid assets boosted Canadian banks' profitability, while external economic conditions and capital structure significantly affected earnings.

H1: Liquidity risk has a negative and empirically significant impact on bank profitability

Credit risk and its impact on profitability

Credit risk is also the most controversial measure in corporate performance and several studies are empirically examined but no final conclusion is coping up. Every business has to bear challenges and risks posed by internal and external macro environment which can be mitigated by execution of efficient management approaches. One of the most prominent internal risks faces by businesses, particularly commercial banks, is credit risk. As this risk becomes high, it greatly affects the health of financial business.

Credit risk is one of the crucial internal risks faced by banks which not only affect the profitability of business entity but also performance of its financial discipline. Banks are highly dependent on deposits which are considered as the liability of banks. More than 80% of bank's capital structure mainly consists of debt, making it more delicate than other entities. The main source of bank's earnings is the gap between deposit rates offered by banks and lending rate which is often kept higher than deposit rates. This practice entails risk that makes it more persistent. It is observed that bank failures often occur due to credit risk. Poor quality of assets also contributes to credit risk (Anees, Iftikhar, & Rizvi, 2023a). Inefficient and poor management also contribute to bank failures. Also, the growth and expansion of banks is dependent on smart strategies to overcome credit risk. In Basel Committee on Banking Supervision 2000 mentions that a stable profitability and survival of banks is only possible when credit risk in effectively managed.

H2: Credit risk has a negative and empirically significant impact on bank profitability

Bank capital and its impact on profitability

Bank capital affects investor behaviour and boosts stability and sustainability confidence. Large capital banks diversify and expand through reinvestment (Pasaribu & Sari, 2011). Moreover, Berger (1995) claimed that bank profitability depends on equity, which drives performance. Capital creates more opportunities for businesses such as it enables expansion and development along with great performance. Moreover, capital elevates bank's stability and drastically reduces its financial threats making its stability more dependent on capital (Berger & Bouwman, 2009).

H3: Bank capital has a negative and empirically significant impact on bank profitability

Size and its impact on profitability

It is observed that large sized banks are able to efficiently manage their costs. Size strengthens bank, making it more capable to balance its operating and financing expenses. Thus, provide it an edge in the form of economies of scale found positive effect of size on profitability. Large sized banks find better opportunities to raise funds and reduce cost while Rahman, Yousaf, and Tabassum (2020) found larger size of banks earn fewer profits due to their inability of managing their huge. These results were also seconded by (Batten & Vo, 2019). Rahman et al. (2020) suggested that large size banks have to deal with more costs which ultimately shrink their profits as compared to their smaller counterparts. Additionally, (Anbar & Alper, 2011) found that bank size and non-sufficient funds directly affect company earnings, while loans indirectly affect bank profitability. It also proposed improving bank size and non-sufficient fund to boost efficient profits length.

H4: bank size has a positive and empirically significant impact on bank profitability

Macroeconomic environment and its impact on profitability

External factors greatly affect profitability of business structure. The anticipation of macroeconomic indicators in time increases performance and boost growth. Banks deals with interest rate which is the most crucial tool to generate revenues and reduce cost. When inflation rate is effectively anticipated it makes it easier for the bank to stabilize itself and sustain its position to maintain interest rate, thus, save itself from risks. According to (Ayele, 2012) instant bank's earnings is the sign of low financing cost that indicates the positive association with inflation rate while Jadah, Alghanimi, Al-Dahaan, and Al-Husainy (2020) revealed no positive influence of inflation rate on profitability.

Methodology and Data

Data

Bank data is collected annually during the period between 2006 and 2022. The data is obtained from several sources i.e. annual report of individual commercial banks, several reports of financial performance for financial firms published by State Bank of Pakistan, Economic survey of Pakistan and World Bank development statistics.

Variables selected

The measure concern of this study is performance of banks which is taken as dependent variable. It shows ability to use resources to generate income. Using ROAA (return on average assets) in study shows financial period differences. ROAA ratio is the net profit after tax divided by the average total assets. Return on average assets is used instead of

return on assets to account for changes in asset values during the fiscal year. Additionally, ROAA is the primary profitability measure for comparing bank financial performance.

Explanatory variables

Liquidity risk is used as the first explanatory variable in this study, which is measured by the ratio of advances to investment. Earlier, D. Kim and Sohn (2017) used above ratio for risk taken behaviour in the banking sector because it increases the liabilities payments. Researchers found unclear relationship between liquidity risk and performance of the bank.

Bank equity is also taken as independent variable of crucial concern. Bank profitability depends on equity, which drives performance. Capital allows firms to expand, develop, and perform well. Capital boosts bank stability and greatly minimizes financial risks, making its stability more dependent on capital. Earlier, this ratio was used by Aydemir and Guloglu (2017).

Credit risk is the most contested metric for banks performance, and numerous empirical studies have examined it without success. Furthermore, Berger (1995) elucidates that maintaining higher capital in a corporation mitigates the danger of financial loss and minimizes dependence on external sources. It is quantified by the ratio of non-performing loans to total loans; a previous proxy was utilized by Kashif, Iftikhar, and Iftikhar (2016).

Bank size affects regulatory capital, bank riskiness, and efficiency in numerous ways. Due to asymmetric information, banks and borrowers are more likely to experience unexpected losses. To avoid losses, banks prefer to boost the capital buffer, but monitoring and screening are other options. Due to economies of scale, larger banks can expand asset size, which boosts profitability indicated by Wasim et al. (2023).

Bank efficiency is assessed by overhead cost to total income. Employee salary, fringe benefits, property leases, and service fees comprise the non-interest expense. Banks with a high efficiency ratio are inefficient since their overall income is lower than their overhead cost. A bank that scores over 50% of the aforementioned is considered inefficient. Before, Louzis, Vouldis, and Metaxas (2012) employed this proxy.

Macroeconomic variables

Gross Domestic Product (GDP) shows how economic activity affects bank performance. According to the aforementioned research, banks that boost their capital buffer during booms lack regulatory capital during busts, making it harder to issue additional equity. Thus, they may reduce bank lending to ensure financial stability (Repullo & Suarez, 2013).

Inflation is another macroeconomic indicator. It reflects an economy's pricing level to correlate with bank performance. When prices rise, borrowers will struggle to pay their

loans. Thus, bank riskiness may increase, leading to insolvency. This means bank costs rise when borrowing costs rise and loan portfolio quality declines (Zhang, 2017).

Econometric methodology

This study examines impact of liquidity risk on banks' profitability by taking panel of 22 listed commercial banks of Pakistan from 2006 to 2022. For this, GMM (Generalized Methods of Moments) technique is applied as it accrues several advantages such as it removes endogeneity, reduces heteroscedasticity and corrects serial correlation problems and generates efficient and effective estimators as recommended by (Arellano & Bond, 1991). Two step system GMM has also been employed by (Ozili, 2017) and (Dietrich & Wanzenried, 2011).

Empirical model

Following regression model is employed in this paper as demonstrated in Equation 1

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 Z_{it} + \varepsilon_{it} \tag{1}$$

In this equation, Y denotes the dependent variable (bank profitability); α signifies the constant; β_1 β_2 are coefficients; X represents the explanatory variable for liquidity risk, while Z is the control variable indicating efficiency, credit, capital, size, GDP, and CPI; *epsilon* is the error term; and i and t refer to bank i and time, respectively. The existence of multicollinearity, endogeneity, autocorrelation, and heteroscedasticity in data indicates biassed outcomes in regression models. Model shown in standard form in Equation-ii while equation-iii represents the actual equations

$$Y_{it} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 X_{it} + \beta_3 Z_{it} + \varepsilon_{it} \tag{2}$$

$$\begin{aligned} \text{Bank Performance}_{it} = {} & \alpha + \beta_1 \text{Performance}_{i,t-1} + \beta_2 \text{CAP}_{it} + \beta_3 \text{EA}_{it} \\ & + \beta_4 \text{Price}_{it} + \beta_5 \text{CR}_{it} + \beta_6 \text{BS}_{it} + \beta_7 \text{BE}_{it} + \varepsilon_{it} \end{aligned} \tag{3}$$

Where $Y_{i,t}$ denotes the return on average assets (proxy of profitability) dependent variable, α is constant; β_1, β_2 , β_3 are coefficients while $Y_{i,t-1}$ indicates lagged value of dependent variable; X is explanatory variables (liquidity risk; credit risk); Z denotes control variables (bank capital, bank size; bank efficiency, economic activities and consumer price index) and ε is error term. The system GMM estimator ignores Arellano and Bond (1991) weak instrument issues and provides a more flexible variance-covariance structure for momentary situations. Thus, we choose the two-step system GMM estimator over the usual OLS technique for handling data endogeneity, heteroskedasticity, and autocorrelation. Authors used Blundell and Bond (1998) Generalized Method of Moments (GMM).

The aggressive standard error with panel-specific autocorrelation should yield consistent results. Autocorrelation is found using AR (1) on different residuals and the null hypothesis is that there is none. AR (2) is the most crucial test since it examines "first differences" in guesses. AR (2) identifies different autocorrelation levels (Mileva, 2013). We also used the Sargan Test to determine if data instruments are linked with error terms.

Results and Discussion

Table 1 portrays descriptive statistics of this study showing 374 observations in total, mean value, standard deviation, minimum and maximum value of each measure.

Table 1: Descriptive Statistics

Variables	Observations	Mean	Std. Dev	Min	Max
Bank Performance	374	0.0069	0.0179	-0.139	0.069
Liquidity risk	374	0.4215	0.112	0	0.8
Bank Capital	374	0.079	0.059	-0.03	0.49
Economic Activity	374	0.299	0.016	0.1	0.059
Price Level	374	0.0891	0.039	0.3	0.199
Credit risk	374	0.099	0.083	0	0.59
Bank Size	374	5.49	6.124	0	3.59
Bank Efficiency	374	0.301	0.112	0	1.19

Table 2 presents the correlation matrix between return on average assets and the explanatory variables. The findings indicated favourable values that are devoid of multicollinearity issues. No singular value reflects the strong correlation that causes the issue of multicollinearity. Correlation values reflect economic theory. Liquidity risk indicates that an increase in current assets correlates with higher anticipated profitability in the future. The direct correlation between gross domestic product and business performance indicates that constant growth leads to elevated profitability in the economy, whereas the consumer price index adversely affects earnings, reflecting inadequate management of external forces. Additionally, elevated negative credit risk signifies that a rise in non-performing loans results in diminished profitability. The advantageous effect of size results in stability through diversification and enhances performance.

Table 3 shows the bank performance as a result of the empirical results of the whole sample data for all banks from 2006 to 2022. Table 5 shows the empirical results for all banks' performance of banks from 2012 to 2022, whereas Table 4 shows the same data for the period from 2006 to 2012.

Table 3 to 5 present empirical results in context of 22 commercial banks of Pakistan and estimation revealed influence of liquidity risk on performance in banking sector. Be-

Table 2: Correlation Matrix

Variable	BP	LR	BC	EA	PL	CR	BS	BE
Bank Performance	1.000							
Liquidity risk	0.040	1.000						
Bank Capital	-0.156	-0.069	1.000					
Economic Activity	0.111	-0.116	0.002	1.000				
Price Level	-0.143	0.376	0.100	-0.741	1.000			
Credit risk	-0.516	-0.024	0.100	-0.066	0.108	1.000		
Bank Size	0.219	-0.276	-0.232	-0.056	-0.205	-0.0137	1.000	
Bank Efficiency	-0.532	-0.074	0.486	0.113	-0.079	0.312	-0.161	1.000

Notes: BP: Bank Performance, LR: Liquidity Risk, BC: Bank Capital, EA: Economic Activity, PL: Price Level, CR: Credit Risk, BS: Bank Size, BE: Bank Efficiency

cause of the significant influence it has on businesses, liquidity is one of the most essential themes in the world of financial markets. The findings come to the conclusion that liquidity risk has a large and detrimental effect on the profitability of the bank, as shown in Tables 3, 4, and 5. This shows that as liquidity increases it causes bank's profitability to decline. Findings are similar to (Al-Homaidi, Tabash, Farhan, & Almaqtari, 2018) while it contradicts findings of (O. Kim & Verrecchia, 1994). However, Sargan tests are applied to check presence of over identifying restrictions.

Furthermore, findings of this paper indicate that bank size indirectly and significantly influences the bank profitability. The maintenance of basic solvency measures with small-sized financial businesses is associated with a high anticipated profit in rising markets of the world. Gill and Mathur (2011) came to the conclusion that this is supported by their findings. Although Budhathoki and Rai (2020), Fidanoski, Choudhry, Davidović, and Sergi (2018), and Adelopo, Lloydking, and Tauringana (2018) came to the conclusion that there was a favourable effect.

The estimated result of bank efficiency is also negative, suggesting that an increase in efficiency (bank inefficiency) could also force down banks' risk-taking behaviour because their overhead costs have already increased and they cannot incur other regulatory costs due to their risk-taking behaviour. Altunbas, Carbo, Gardener, and Molyneux (2007) discovered that Pakistani banks are inefficient; therefore, managers have less motivation to take unnecessary risks.

The estimated coefficient of credit risk is negative, indicating that Pakistani banks improve retained earnings by taking excessive risks, supporting the risk-return trade-off theory. Moreover, Guidara, Soumaré, and Tchana (2013) found that loan expansion boosted profit, suggesting that loan issuing increases default risk. Kidane (2020) has suggested that the banks' risk management practices could mitigate the impacts of bad loans on eq-

uity returns and interest margins in this scenario. This has underscored the necessity of enhancing credit risk management and decision-making in the credit sector by facilitating the exchange of credit information and practical loan assessments.

In addition, the profitability of the bank is affected by the external forces. It has been demonstrated through the findings that both the gross domestic product (GDP). Whereas, Siddiqui, Iftikhar, and Iftikhar (2024) illustrates each country's annual percentage change, reflects the economic cycle. Credit expansion boosts economic growth and bank profitability. Moreover, the estimated coefficient of the consumer price index (CPI) has a negative and considerable impact on the profitability of the bank. It indicates that when unanticipated inflation rate negatively influences the performance of banks. Evidence indicates that inflationary expectations positively affect bank profitability. The substantial correlation between inflation and bank performance may be attributed to successful monetary policies that shield bank profits from fluctuating inflation rates. Likewise, interest rates exerted a favourable impact on ROAA. This partial contribution suggests that the banks' use of robust risk management strategies to mitigate interest rate volatility reduced the impact, as noted by Geng, Grivoyannis, Zhang, and He (2016).

Table 3: Estimation of Liquidity Risk on Profitability for Whole Sample (2006 to 2022)

Variables	(1)	(2)	(3)	(4)
Bank Performance L1	0.508***	0.471***	0.425***	0.417***
	(0.000)	(0.000)	(0.000)	(0.000)
Bank Capital	0.008	0.024	0.045***	0.057***
	(0.005)	(0.007)	(0.009)	(0.000)
Economic Activity	-0.117***	-0.108***	-0.076***	-0.043**
	(0.000)	(0.000)	(0.001)	(0.022)
Price Level	-0.059***	-0.055***	-0.059***	-0.047***
	(0.000)	(0.000)	(0.000)	(0.000)
Liquidity risk	-0.009***	-0.007**	-0.006**	-0.007**
	(0.000)	(0.010)	(0.095)	(0.013)
Bank Size	-	-3.49**	-2.49	-3.19
		(0.047)	(0.0454)	(0.024)
Bank Efficiency	-	-	-0.039***	-0.026**
			(0.000)	(0.066)
Credit risk	-	-	-	-0.017**
				(0.029)
Constant	0.0164***	0.018***	0.023***	0.023***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	280	280	280	280
ID	22	22	22	22
Instruments	231	231	231	275
AR(1)	0.0119	0.0257	0.0123	0.0105
AR(2)	0.2487	0.2954	0.195	0.1834
Sargan	0.98	0.8	0.98	0.99

Note: The dependent variable is Bank performance while bank capital, Economic Activity, Price Level, Liquidity risk, Bank size, bank efficiency and credit risk are treated as endogenous. The lagged dependent variable is instrumented by its lagged value. Bank size is treated as a predetermined variable, and Economic activity is assumed to be endogenous.
*** Coefficients are statistically significant at the 1% level. ** Coefficients are statistically significant at the 5% level. * Coefficients are statistically significant at the 10% level.

Table 4: Estimation of Liquidity Risk on Profitability for Whole Sample (2006 to 2012)

Variables	(1)	(2)	(3)	(4)
Bank Performance L1	0.655***	0.629***	0.489***	0.512***
	(0.000)	(0.000)	(0.000)	(0.000)
Bank Capital	0.010	-0.053***	-0.053***	0.004**
	(0.463)	(0.000)	(0.000)	(0.000)
Economic Activity	-0.701***	-0.651***	-0.504***	-0.592***
	(0.000)	(0.000)	(0.000)	(0.000)
Price Level	-0.170***	-0.149***	-0.119***	-0.150***
	(0.000)	(0.000)	(0.002)	(0.000)
Liquidity risk	-0.020***	-0.026***	-0.020**	-0.011***
	(0.000)	(0.000)	(0.063)	(0.001)
Bank Efficiency	-	-0.034***	-0.131**	-0.013**
		(0.000)	(0.068)	(0.006)
Credit risk	-	-	-1.58**	-0.025**
			(0.004)	(0.003)
Bank Size	-	-	-	1.58***
				(0.004)
Constant	0.053***	0.058***	0.077***	0.056***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	154	154	154	154
ID	22	22	22	22
Instruments	60	86	87	87
AR(1)	0.0154	0.0124	0.0119	0.0154
AR(2)	0.4578	0.789	0.458	0.3443
Sargan	0.8	0.98	0.98	0.99

Note: The dependent variable is Bank performance while bank capital, Economic Activity, Price Level, Liquidity risk, Bank size, bank efficiency and credit risk are treated as endogenous. The lagged dependent variable is instrumented by its lagged value. Bank size is treated as a predetermined variable, and Economic activity is assumed to be endogenous.
*** Coefficients are statistically significant at the 1% level. ** Coefficients are statistically significant at the 5% level. * Coefficients are statistically significant at the 10% level.

Table 5: Estimation of Liquidity Risk on Profitability for Whole Sample (2012 to 2022)

Variables	(1)	(2)	(3)	(4)
Bank Performance L1	0.300***	0.380***	0.291***	0.242***
	(0.000)	(0.000)	(0.000)	(0.000)
Bank Capital	0.040**	-0.054**	-0.065**	-0.024**
	(0.010)	(0.002)	(0.004)	(0.003)
Economic Activity	-0.044**	0.040**	0.056**	0.029**
	(0.012)	(0.013)	(0.071)	(0.011)
Price Level	-0.012**	-0.015**	-0.005***	-0.011**
	(0.343)	(0.342)	(0.711)	(0.250)
Liquidity risk	-0.009**	-0.016**	-0.031**	-0.024***
	(0.058)	(0.069)	(0.021)	(0.005)
Bank Size	-	-	-6.11**	-8.81***
			(0.008)	(0.003)
Bank Efficiency	-	-	-0.018***	-0.019**
			(0.006)	(0.013)
Credit risk	-	-	-	-0.024**
				(0.0906)
Constant	0.022***	0.024***	0.024***	0.023***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	242	242	242	242
ID	22	22	22	22
Instruments	140	154	154	155
AR(1)	0.0016	0.0121	0.0457	0.0325
AR(2)	0.1918	0.6545	0.875	0.658
Sargan	0.8	0.85	0.89	0.9

Note: The dependent variable is Bank performance while bank capital, Economic Activity, Price Level, Liquidity risk, Bank size, bank efficiency, and credit risk are treated as endogenous. The lagged dependent variable is instrumented by its lagged value. Bank size is treated as a predetermined variable, and Economic activity is assumed to be endogenous.
*** Coefficients are statistically significant at the 1% level. ** Coefficients are statistically significant at the 5% level. * Coefficients are statistically significant at the 10% level.

Conclusion and policy recommendations

The purpose of study is to examine the impact of liquidity on profitability in 22 commercial banks of Pakistan from 2006 to 2022. According to the findings of the study, the influence of liquidity risk on profitability is both negative and empirically significant. It suggests that as a bank holds greater liquidity, the profitability of the bank decreases. Moreover, credit risk is found to have inverse and statistically insignificant association with bank's profitability. Credit risk gets magnified when banks poorly manage and monitor

their loans. Furthermore, capital is reported to positively and significantly impact bank's profitability. This demonstrates that banks pay dividends to their shareholders from the profits that they have kept, which indicates that banks have capital in small and medium-sized businesses. Additionally, huge banks have substantial internal expenses and risks, which make it difficult for them to increase their operations. This makes it tough for them to expand.

Whereas, small sized banks with lower cost with higher expected future earnings and performance can easily expand their business operations. Gross domestic product and consumer price index both are found to inversely impact bank's performance because uncertain macro environment of Pakistan and unstable political makeup makes it difficult to accurately predict economic indicators.

Policy implications

Based on above findings, it is highly recommended that banks should become more technologically advanced in order to have competitive advantage over their rivals. Secondly, banks should try to enlarge their size as it would reduce their risk of non-performing loans. In addition to this, banks should efficiently utilize their available resources to minimize their risks and costs. Furthermore, banks must strive to create safe and sound environment for their customers so that they can carry out deposit, collection, lending, borrowing transactions or can avail other banking services without any fear or risk. Lastly, sustainable approach should be adopted by banks to enhance and diversify their earnings.

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