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COVID-19 AND LIQUIDITY PERFORMANCE OF COMMERCIAL BANKS IN PAKISTAN DURING 2014-2023

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ABSTRACT

The stability of the financial system has been becoming increasingly important regarding institutional, structural and macroeconomic aspects on a national and worldwide scale. It is impossible to imagine a world without financial institutions particularly banks which take in funds, pool them and lend to other who need funds. As a result, it is thought to be essential to link a financial system's liquidity position to assess the stability and soundness of that sector. The primary purpose of this research is to examine the impact of bank-specific (internal) and macroeconomic (external) variables on the liquidity of commercial banks in Pakistan. The study has collected data for bank-specific variables from the financial audited reports of commercial banks, while data for macroeconomic factors is taken from Work Bank Indicators from 2014-2023. Empirical data supports that liquidity of commercial banks have been improved during the Covid-19 Period, however, the capital adequacy ratio, inflation and bank's leverage have a negative significant influence on the commercial banks liquidity. The study also suggests that the dollar exchange rate has a direct positive influence on the liquidity of commercial banks. However, the bank's size and government deficit financing have an insignificant impact on the liquidity. The study contributed that banks should adopt comprehensive risk management practices that account for both macroeconomic and bank-specific risks. In this regard, the implementation of stress testing and scenario analysis my help banks prepare for adverse economic conditions and mitigate liquidity risks.

Keywords: *Banks, CAR, Liquidity, Bank Size, Leverage, Pakistan.*

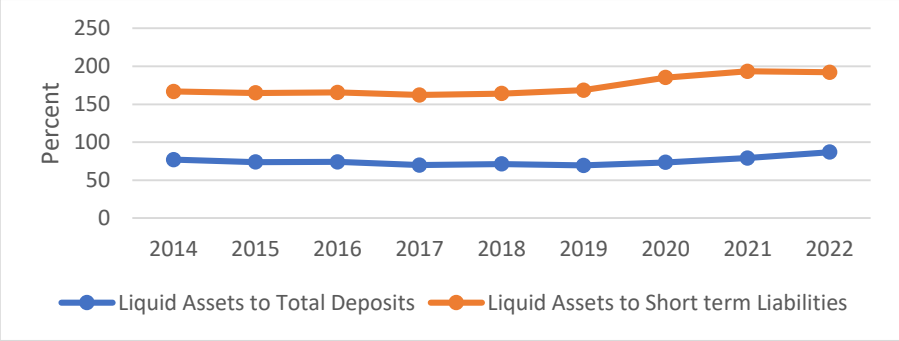
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1. INTRODUCTION

Recently, Covid-19 pandemic and formerly global financial crisis (GFC) impacted the liquidity of commercial banks worldwide. Liquidity is essential for banks to remain solvent and to meet their current debt obligations (Bianchi & Bigio, 2022). The lack of liquidity can result into bank insolvency, even if the bank is profitable in the long-run. For instance, many banks faced severe liquidity issues during the global financial crisis of 2007-08 despite having solid long-term assets (Al-Harbi, 2017). According to Akinwumi et al. (2017), liquidity supports the day-to-day bank operations, including lending, investment activities, and payment settlements. Operational stability is crucial for maintaining smooth financial intermediation and ensuring that the banking system functions efficiently (Bianchi & Bigio, 2022). It also serves as a buffer during financial crises. Banks with adequate liquidity can better withstand economic shocks and avoid the detrimental effects of a liquidity crunch. to link a financial system's liquidity position to assess the stability and soundness of that sector (Banerjee & Mio, 2018). Since the banking system serves as the foundation for the financial systems of the majority of nations, it is crucial to determine the factors that affect the banking sector's liquidity (Chen, Shen & Yeh, 2018).

Ajayi and Lawal (2021) ascertains that the banks with strong liquidity positions were able to navigate the sudden economic downturn more effectively in the Covid-19 pandemic phase. Furthermore, banks are also required to meet regulatory liquidity requirements to ensure stability in the financial system (Sidhu et al., 2022). In Pakistan, commercial banks also face the liquidity issues during the crises situation such as in Covid-19 period. In crises situation, commercial banks face less credit demand due to economic uncertainty and reduced business activity which results into excess liquidity in banks as fewer borrowers seek loans (Karim, Shetu & Razia, 2021). Further, economic downturns may also increase the bank's non-performing loans ratios, thereby affecting their liquidity position (Acharya & Steffein, 2020). Besides, State Bank of Pakistan (SBP) also implement lower policy rate measures that provide liquidity support through open market operations to stabilize the economy during the crises situation (Rafique & Fawad, 2022). Given these factors, commercial banks in Pakistan likely faced similar challenges in managing liquidity during the Covid-19 pandemic.

Figure 1: Trends in Liquidity Ratios



Source: State Bank of Pakistan, 2023

Empirical research on the factors influencing bank liquidity was conducted utilizing bank-specific, industry-specific, and macro-environmental variables in several countries with diverse social and economic environments (Ahmed et al., 2021; Assfaw, 2019; Aspal, Dhawan & Nazneen, 2019; Rani & Zergaw, 2017; Venkatesh & Suresh, 2014). The developed nations, growing economies, and developing nations are all considered in the current literature study. Generally speaking, even when the same methodology is applied, the results of various researchers on the many factors impacting the liquidity of commercial banks have been found to conflict (El-Chaarani, 2019; Venkatesh & Suresh, 2014). Thus, this study stands out by focusing on the Pakistani banking sector, which has not been extensively studied in the context of liquidity determinants. This regional focus adds to the diversity of global banking research.

Moreover, the integration of bank-specific (internal) and macroeconomic (external) factors in a single study provides a more comprehensive framework for analyzing liquidity (Chiahti et al., 2021). Many previous studies tend to focus on either macroeconomic or microeconomic factors in isolation such as Shah et al. (2018), Mahmood et al. (2019), and Rahman, Yousaf and Tabassum (2020). The study also employs advanced econometric techniques, unlike simple regression analysis, to analyze data over a significant period, capturing the dynamic nature of economic changes and their impact on bank liquidity. The provision of empirical evidence from an emerging market like Pakistan adds to the limited but growing body of literature on banking in emerging economies which can pave the way for comparative studies and broaden the understanding of global banking dynamics.

In banking operations, liquidity is a critical aspect which ensures that banks can fulfil withdrawal requests, manage unexpected deposit outflows, and meet regulatory requirements. Islamic banks in Pakistan often face unique challenges and opportunities in managing liquidity due to the distinct nature of their operations. For example, Tahir et al. (2023) argued that Islamic banks rely more on alternative liquidity management instruments such as Murabaha, Mudarabah, and Sukuk issuance compared to conventional banks. Despite the fact, there are not as many studies on the factors that determine liquidity in Islamic banking, and its differences from conventional banking are not as well-known. Because of this, the current research contributes to closing the theory-empirical gap in Islamic banking and addresses the internal and external liquidity determinants of Islamic and traditional banking. Therefore, a comprehensive understanding of the factors influencing liquidity in the Islamic banking sector is essential for ensuring the stability and growth of this segment of the financial industry in Pakistan.

The study of dual perspective helps in understanding the holistic picture of liquidity management. By focusing on Pakistan, the study adds valuable insights to the existing literature which is often dominated by studies conducted in developed economies. The specific economic, regulatory, and market conditions of Pakistan provide a unique context that can yield different findings compared to other regions. The findings offer practical implications for policymakers and regulatory bodies in Pakistan, thereby understanding the determinants of bank liquidity can help in formulating policies that ensure the banking sector constancy and efficiency. The study also highlights critical factors to consider for maintaining adequate liquidity for bank managers and stakeholders. This is essential for risk management and strategic planning, particularly in volatile economic environments.

The current study aims to determine the impact of bank-specific factors on the bank's liquidity in Pakistan. Moreover, it aims to analyse the impact of bank capital adequacy ratio (CAR), bank size (BS), and bank leverage (LEV) on the liquidity of the banks in Pakistan.

2. LITERATURE REVIEW

A crucial aspect of banking operations is liquidity management, which ensures that financial institutions able to meet their short-term obligations (Venkatesh & Suresh, 2014). However, the banking sector, particularly commercial banks, has faced various challenges due to specific institutional factors and macroeconomic volatility. Saleem and Rehman (2021) argued that the interaction between macroeconomic conditions and bank-specific factors is complex and multifaceted. During economic expansions, banks with robust capital adequacy and low NPL ratios can leverage favorable conditions to enhance liquidity. However, during downturns, even well-capitalized banks may struggle if macroeconomic factors are unfavorable.

A study by Jaffar and Rashid (2019) on Pakistani banks revealed that external variables (GDP growth, inflation, and interest rates) and bank-specific variables (CAR, NPL, ROA, and bank size) significantly influence liquidity. They found that macroeconomic stability enhances the positive effects of bank-specific strengths on liquidity, whereas macroeconomic volatility exacerbates liquidity risks for banks with weaker financial health. Hassan and Zahid (2018) determine the role of macroeconomic (external) factors on the liquidity of Pakistani banks. They concluded that GDP growth positively affects liquidity, while inflation and exchange rate volatility have negative impacts. They also emphasized that effective monetary policy is crucial for maintaining bank liquidity.

Shahbaz et al. (2019) explored the combined effects of macroeconomic and bank-specific factors. Their study confirmed that both sets of factors are critical in determining liquidity, with macroeconomic stability enhancing the positive impacts of strong bank-specific characteristics. Naveed et al. (2020) findings indicate that banks with higher CAR and ROA, and lower NPL ratios, tend to have better liquidity. They also found that larger banks are more resilient to liquidity shocks, supporting the notion that size matters in liquidity management.

De Vito and Gomez (2020) looked into how COVID-19 affected 14,245 listed companies in 26 different countries in terms of liquidity. Although the cash reserves of companies with some operating flexibility can be depleted in around two years, their current liabilities are increasing. It is suggested that in terms of lowering liquidity risk, loan guarantees and bridge loans are more economical options to prevent a serious cash shortage than tax deferrals. Li et al. (2020) suggested that with the onset of COVID-19 pandemic, businesses have been forced to take massive financial losses in anticipation of cash flow problems. Small banks are less affected by the rise in liquidity demands. The big banks have a concentrated demand for liquidity as they serve the biggest companies, which contributes to the banks' lack of liquidity. Nevertheless, the Federal Reserve and deposits have allowed the banks to handle it.

According to Abusharba et al. (2013), a higher CAR indicates a stronger capital base, which can enhance liquidity by providing a buffer against losses. Butt et al. (2020) found that Pakistani banks with higher CARs tend to have better liquidity management, as they

can absorb shocks and maintain depositor confidence. Abusharba et al. (2013) found that Islamic banks profitability and liquidity are positively related to CAR in Indonesian banking sector.

The bank size, often measured by logarithm of total assets, can influence its liquidity (Delis & Papanikolaou, 2009; Assaf, Barros & Matousek, 2011). Bigger banks typically have diversified asset portfolios and access to a broader depositor base, enhancing liquidity. Nyaundi (2015) found that bank size and CAR has a significant impact on the commercial banks liquidity ratio in Kenya. The findings also highlighted that bank size has the highest influence on liquidity of commercial banks followed by GDP rate and CAR. Akhtar et al. (2017) noted that in Pakistan, larger banks enjoy better liquidity due to economies of scale and greater market confidence, which attract more deposits.

Kamran, Johnson and Sammer (2016) study employed multiple regression analysis on the gathered data of 44 traditional and Islamic banks from the banking sector of Pakistan from 2005 to 2009. It is concluded that internal factors such as bank growth, deposits, and loan are insignificant to the profitability of banks, whereas macroeconomic factors have significant influence on the banks profitability in Pakistan. Yakubu (2016) findings suggest that internal factors contribute positively to the performance of commercial banks, whereas macroeconomic variables impact negatively on commercial bank's performance in Ghana. The similar findings are also reported by Mennawi (2021) and Moghaddam and Abbaspour (2017) study.

Inflation affects the liquidity of banks by eroding the real value of money (Al-Harbi, 2017). High inflation can lead to higher interest rates as banks try to maintain their profit margins, potentially resulting in lower loan demand and increased loan defaults (Hidayat, 2014). Hussain et al. (2019) found that persistent inflationary pressures in Pakistan have led to liquidity constraints in commercial banks, as the cost of funds rises, and borrowers struggle to repay loans. According to Vodova's (2011) empirical findings, there is a negative correlation in the Czech Republic between the inflation rate and banks' holdings of liquid assets, but not in Slovakia. Additionally, these findings are consistent to the earlier work of Ubegbunan's (1999) who found that the real value of bank earnings decreases dramatically in the period of high inflation.

Exchange rate volatility can significantly impact banks' liquidity, particularly in economies with substantial foreign currency transactions (Al-Homaidi et al., 2019). Khan and Sattar (2018) highlighted that in Pakistan, fluctuations in the exchange rate affect the value of foreign currency-denominated assets and liabilities, creating liquidity management challenges for banks. A depreciating local currency can increase the cost of foreign liabilities, straining liquidity. Bianchi and Bigio (2022) and Abbas, Iqbal and Aziz (2019) also found significant influence of exchange rate on the liquidity.

Government deficit financing (GDF) refers to the methods employed by governments to fund expenditures that exceed revenue (Ali & Alhaji, 2018). This often involves borrowing through the issuance of government bonds and securities. Austine et al. (2022) argued that when the government borrows more, banks may have fewer funds available for lending to businesses and consumers which lead to tighter liquidity conditions. Thus, the government offer higher interest rates on its bonds to attract funds which results into an overall increase in market interest rates, making borrowing more expensive for the private sector and reducing loan demand. Banks might face higher costs for raising funds, impacting their

liquidity positions negatively. According to Tan and Kong (2018), higher government borrowing can lead to increased interest rates, raising the cost of funds for banks which can squeeze banks' margins and affect their liquidity. The higher interest rates reduce the demand for loans from businesses and consumers which also lower banks' income from lending activities, impacting overall liquidity indirectly. Further, Khan, Abidin and Abid (2022) highlighted that deficit financing leads to excessive money creation which result in inflationary pressures.

3. MATERIAL AND METHODS

This study examines the influence of bank-specific (internal) and macroeconomic (external) factors on the liquidity of commercial banks in Pakistan, focusing on Islamic scheduled banks.

The linear regressed model is as follow:

$$LIQ_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 BS_{it} + \beta_3 LEV_{it} + \beta_4 INF_t + \beta_5 FX_t + \beta_6 GDF_t + \epsilon_{it}$$

Where:

LIQ_{it} is the liquidity measure of bank i at time t
$\beta_0$is the intercept
β_1 to β_6 are coefficients for the respective independent variables
CAR is the capital adequacy ratio
BS is the bank size
LEV is the bank leverage represented by debt to equity ratio
INF is the rate of inflation in the country
FER is the foreign exchange rate
GDF is the government deficit financing
ϵ_{it} is the error term.

The banking industry of Pakistan specifically all 35 listed scheduled commercial banks by State Bank of Pakistan (SBP) as of 30th June, 2023 were considered as the population of the study. The study employs a longitudinal design over a ten-year period from 2014 to 2023.

A purposive sample of 16 commercial banks with Islamic windows/branches and 4 Islamic scheduled banks from the population was selected based on their consistent operation and availability of relevant data from 2014 to 2023. The other commercial banks were not being considered because of data non-availability for the understudied period.

The data on bank-specific (internal) variables such as capital adequacy ratio, bank size and financial leverage were collected from the annual financial reports of the selected Islamic banks, whereas the data on macroeconomic (external) variables, including foreign exchange rate, inflation rate, and government deficit financing were sourced from the World Bank Indicators. Table 1 enlists the variables proxy and reference of earlier empirical studies using the same proxy for variables measurement.

Table 1: Data Variables

Variables	Measurement	Reference Studies
Liquidity (LIQ)	Liquid assets/ Total assets	Saba et al. (2012)
Capital Adequacy Ratio (CAR)	(Tier 1 + Tier 2 capital)/Risk weighted assets	Abusharba et al. (2013), Sarker et al. (2006)

Bank Size (BS)	Log of total assets	Akhtar et al. (2017)
Bank Leverage Ratio (LEV)	Total debt/Total equity	Kamran et al. (2016); Sarker et al. (2006)
Inflation (INF)	Consumer price index (in percentage)	Hidayat (2014)
Exchange Currency Rate (FER)	Real effective exchange rate (in percentage)	Abbas et al. (2019)
Government Deficit Financing (GDF)	Deficit financing/Total GDP (in percentage)	Nourin and Habib (2006)

4. RESULTS AND DISCUSSION

Descriptive statistics are fundamental in understanding the basic characteristics of a dataset, aiding in visualization, interpretation, and initial exploration before more advanced analyses are undertaken (Nick, 2007). These are aim to offer a concise summary of the data. Table 2 shows that liquidity (LIQ) mean value is 0.02, capital adequacy ratio (CAR) mean value is 1.09, bank size (BS) mean score is 17.98, leverage (LEV) mean score is 2.09, inflation (INF) mean score is 10.53, exchange rate (FEX) mean value is 83.23, and GDF mean score is 4.90. The skewness and kurtosis values are also within acceptable rate of -1 to +1 and -10 to +10, as suggested by Kline (2015) and Blanca et al. (2013), indicating no problem of normality in the dataset. Further, the probability value of Jarque-Bera test depicts that each variable has a normal distribution as p-value is lower from 0.05 significance level.

Table 2: Descriptive Analysis

	LIQ	**CAR**	**BS**	**LEV**	**INF**	**FER**	**GDF**
Mean	0.02	1.09	17.98	2.09	10.53	83.23	4.90
Std. Dev.	0.28	0.76	1.172	0.96	1.06	16.25	4.90
Skewness	0.55	-0.84	-0.63	0.57	0.13	-0.28	-0.17
Kurtosis	8.01	2.14	3.37	6.58	2.17	1.58	0.21
Jarque-Bera	1205.77**	22205.33**	7.56**	364.61**	201.68**	9.55**	170.57**

**** p < 0.01; ** p < 0.05, * p < 0.1

Panel regression analysis is a statistical method used to analyze datasets that contain observations over multiple time periods for the same individuals, entities, or units (Hsiao, 2022). These regression models are particularly useful for examining the dynamics of change and the effects of variables. The primary benefit of panel data analysis is that they can control for unobserved heterogeneity that could bias the results in purely cross-sectional or time series data by accounting for individual-specific effects (Berrington, Smith & Sturgis, 2006).

Table 3 provides the findings of panel regressed models: (1) pooled OLS (POLS), (2) fixed effect (FE), and (3) random effect (RE). Pooled OLS model assumes that there are no individual-specific effects and treats all observations as if they are from a single large dataset. Fixed effects model controls for time-invariant individuals characteristics by allowing each entity to have its own intercept. It removes the effect of those characteristics

to focus on the factors that vary over time. In contrast, **r**andom effects model includes both within-entity and between-entity variations.
Further, estimated models has passed through all the diagnostic tests, and found to be free from the hetroscedasticity, autocorrelation, non-normality and miss-specification errors.

Table 3: Panel Data Estimates

	Pooled OLS (POLS)	**Fixed Effect (FE)**	**Random Effect (RE)**
Dependent Variable: LIQ			
Constant	109.61***	99.86***	105.37***
	(0.000)	(0.000)	(0.000)
CAR	-0.398***	-0.300**	-0.358***
	(0.000)	(0.018)	(0.000)
BS	-0.001	0.0001	0.0001
	(0.370)	(0.262)	(0.598)
LEV	-1.456***	-0.609*	-1.119***
	(0.000)	(0.087)	(0.000)
INF	2.235**	1.473**	1.912***
	(0.206)	(0.217)	(0.982)
FER	0.253	0.371**	0.311*
	(0.150)	(0.046)	(0.091)
GDF	1.578	2.176	1.739
	(0.444)	(0.118)	(0.227)
R-square value	0.2333	0.7014	0.1699
F-statistics	5.987***	6.239***	18.853***
No. of Observations	200	200	200

**** $p < 0.01$; ** $p < 0.05$, * $p < 0.1$

In order to select the best model, study utilized the Breusch Pagan LM test to test whether POLS or RE model is appropriate or not. The LM test results suggests that RE model is appropriate compared to POLS because the significance value is less than 0.05 level of significance, $\chi^2 = 292.4$, $p < 0.05$. Thus, it is concluded that there is sufficient evidence to select RE model. Further study has employed the Hausman test which found that RE model is more suitable than FE model for further analysis.
The estimated random effect (RE) model indicates the (R-square) of the regression model is 0.1669 which means that the statistically significant explanatory factors utilized in this analysis account for 16.69 percent of the variance in the bank's liquidity.
Estimated model indicates that CAR and LEV have a substantial but negative impact on LIQ (liquidity) of the commercial banks. Similarly, FER does, have a direct positive influence on the commercial banks liquidity in Pakistan. The current study findings in the context of commercial banks of Pakistan are consistent to the earlier work of Nuviyanti and Anggono (2014), who also figured out that CAR has a negative correlation to the liquidity of the banks. Furthermore, the negative coefficient on bank's liquidity states against the hypothesis of 'moral hazard.' Thus, H_1 is accepted.

Hypothesis H_2 is also accepted as it has a p-value (Sig) of 0.000 at the 5% level of significance. The direction of bank size influence on bank's liquidity is positive, which means the greater the bank size, the higher will be the liquidity of the commercial banks. This is supported by the study of Rauch et al. (2009). Furthermore, the positive coefficient of bank's liquidity indicates the presence of 'too big to fail' hypotheses. The findings further depicted that H_3 is accepted. The direction of leverage influence on bank's liquidity is negative, which means the greater the leverage, the lower the liquidity of the commercial banks. This means that 1% increase in the leverage of the bank results into 1.119% decrease into the liquidity of the banks. Furthermore, the negative coefficient of banks liquidity states against the hypothesis of 'bad management'. Furthermore, there was a significant impact of INF on the liquidity of Islamic banks in Pakistan. Belete (2015) proposed that inflation rate of the country impact positively on the liquidity position of the banks. Additionally, there was no effect of BS and government deficit financing (GDF) on the commercial Islamic bank's liquidity. Thus, H_5 and H_6 are not supported. These findings found to be consistent to the past research work of Ashraf (2013) and Jaffar and Manarvi (2011).

5. CONCLUSION AND RECOMMENDATIONS

The banking system serves as the foundation for the financial systems of the majority of nations, and it is crucial to understand the factors that affect the banking sector's liquidity. The study employs a longitudinal design to examine the relationship between variables from 2014 to 2023. A purposive sample of 16 commercial banks with Islamic windows/branches and 4 Islamic scheduled banks from the population was selected based on their consistent operation and availability of relevant data. The findings concluded that CAR, inflation rate and leverage have significant impact on the liquidity at 5% level of significance; however, exchange rate has significant impact on liquidity at 10% level of significance.

The study's findings will help bank managers and policymakers who compel banks to perform better in accordance with the liquidity policies they created after assessing banks' liquidity, and individuals because they will reveal which sectors are lucrative for lending and investing. The study also offers several policy implications and recommendations to improve the liquidity management of commercial banks in Pakistan such as:

Policymakers should focus on maintaining macroeconomic stability through prudent fiscal and monetary policies. Controlling inflation, stabilizing interest rates, and managing exchange rate volatility are essential for creating a conducive environment for bank liquidity. Strengthening regulatory frameworks to ensure robust capital adequacy and asset quality can help banks manage liquidity better. SBP should enforce stringent CAR and NPL ratio requirements to enhance the banks resilience. Encouraging financial innovation and the development of liquidity management tools can help banks navigate liquidity challenges. For example, the introduction of new financial instruments and technologies can enhance liquidity forecasting and management capabilities. Banks should adopt comprehensive risk management practices that account for both macroeconomic and bank-specific risks. Implementing stress testing and scenario analysis can help banks prepare for adverse economic conditions and mitigate liquidity risks.

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