

Liquidity Dynamics: Macroeconomic and Bank Factors in Pakistan's Commercial Banks

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Abstract: Financial system stability has been gaining crucial consideration on both national and international levels in terms of structural, institutional, and macroeconomic aspects. Money as a medium of exchange and banks as an intermediary cannot be comprehended by visualizing a world without it. It can be observed that old modalities of the banking system have been replaced by many innovations in the new millennium. To evaluate the soundness and steadiness of a banking sector, it is considered imperative to associate the banking system with its liquidity position. Therefore, this research is conducted to determine the influence of bank-specific and macro-environmental variables on the commercial (conventional and Islamic) bank's liquidity in Pakistan. The data is taken from 20 commercial banks over the period 2009 to 2020 and a fixed effect estimation technique is used. The study found that leverage (LEV) and capital adequacy ratio (CAR) have a negative but significant impact on the liquidity of the banks. Moreover, the exchange rate (FER) has a positive and significant effect on the liquidity of commercial banks. The outcome deducted from this study would be beneficial for bank managers in identifying and liquidity position of Islamic and conventional sector banks, policy maker which enforces banks to improve their performance as per the liquidity policies they made after reviewing the liquidity of banks, individuals as it tells which sector is profitable for investing and lending purposes.

Keywords: Banking Sector, Liquidity, CAR, Leverage, Bank Size, Pakistan.

1. Introduction

Financial system stability has been gaining crucial consideration on both national and international levels in terms of structural, institutional and macroeconomic aspects (Aslam & Haron, 2021). The domestic financial system is becoming flexible for capital flow volatility because it needs to be strengthened for a large magnitude and mobility of internal capital flows towards it (Ahmad, Aslam, Haq, & Billah, 2019). Therefore, to have a national level strong macroeconomic and monetary policy performance, a sound financial system is the key part of the financial infrastructure (Javaid, Anwar, Zaman & Gafoor, 2011).

Money as a medium of exchange and bank as an intermediary cannot be comprehended by visualizing a world without them. Banks deal in money, accept deposits from customers who have surplus savings and advance loans to clients who require them (Rehman, Aslam, & Iqbal, 2021). The banking sector is considered to be the lifeblood of modern trade as it is a major source of finance for other sectors (Tahir, Hussain, Iqbal, Aslam, & Masri, 2020). The concept of efficiency is becoming more important in this increasingly growing phenomenon of globalization, both for financial and non-financial institutions, including banks. The success and growth of the banking sector mainly depend upon a sound competitive market approach (Aslam, Shahzad, & Rehman, 2020).

It can be observed that old modalities of the banking system have been replaced by many innovations in the new millennium (Gul, Irshad & Zaman, 2011). Therefore, to evaluate the steadiness and soundness of a banking sector, it is considered imperative to associate the banking system with its liquidity position. The majority of countries have a financial system that is based on the banking system, therefore, it is important to study the determinants of liquidity in the banking sector (Aslam, Asif, Sultan, Nasir, & Iqbal, 2023). The liquidity of banks is significantly considered at both micro and macroeconomic levels (Aslam, Kalim, & Fizza, 2019). In micro and macroeconomic stability and economic growth, the function of a banking sector turns out to be very important when the banking sector share boosts in a financial system. Undoubtedly profits are an essential part of a

competitive banking sector. A sound banking stream tolerates negative financial upsets and becomes the cause of durability in the financial system, ultimately strengthening the economic system (Akhtar, Ali & Sadaqat, 2011). Thus, liquidity is the state of any organization to pay its short-term obligation in time. It can be the convertibility of any asset into cash or cash equivalents (Aslam, Ur Rehman, & Iqbal, 2023). Liquidity problems can be both ways i.e. excess liquidity and shortage of liquidity; both create problems for the Islamic banks, as at times their assets are not at par with the liabilities and have also different maturities. This maturity gap plays a vital role in liquidity problems to arise (Ali, 2013).

The impacts of Gross Domestic Product (GDP) on the liquid asset holdings of the banks have been highlighted by many previous researchers in their study (Calomiris and Wilson, 1998; Vodova, 2011). GDP is taken to measure the economic cycle and a high GDP indicates that an economy is experiencing expansion whereas a low GDP means a recession is occurring within the country (Jain et al., 2023). Aslam, Ur-Rehman, and Iqbal, (2021) found that GDP is positively correlated with the bank's liquid asset holdings in the commercial banks in Slovakia. On the contrary, Calomiris and Wilson (1998) research work found that during the recession period, a bank's liquid asset holdings tend to increase and then decrease when the economy starts to recover. Therefore, banks that grant more loans when the economy starts to recover will suffer a decline in bank's liquid assets (Maynard & Moore, 2005).

Islamic banking is an emerging form of banking based on Shariah principles/guidelines and is offering various solutions as an alternative to conventional banking products. The industry is growing with the passage of time and is a very essential component of economic growth (Aslam, Ur Rehman, & Iqbal, 2023; Khan & Aslam, 2018). Globally Islamic banking industry is growing in many economies especially in Saudi Arabia, Kuwait and Bahrain with compound annual growth rates (CAGR) of more than 48.9%, 44.6% and 27.7% respectively trend is also observed in some other emerging markets like Indonesia, Turkey and Pakistan with CAGR of 43.5% 18.7% and 22% (Ernst & Young Global Limited, 2015). Presently 22 banks are offering Islamic banking services in Pakistan including 6 full-fledged Islamic banks through 1075 branches & subbranches while 17 conventional banks through their 627 Islamic banking windows are operating in Pakistan (SBP, 2019).

Despite all the available tools for financing, investment and Interbank operations the situation is getting worse with each passing day, this has created serious concerns for the masses and the financial institutions as the excess liquidity can be fatal for any financial institution, especially an Islamic bank (Aslam, Haron, & Ahmad, 2020). There are various concerns of the Shariah scholars for some of the contracts like Murabaha that its usage should be minimized over time and should be eliminated, (Usmani, 2012) and have also focused that the Islamic banks should avoid the usage of the agency agreement as underlying contracts for all the Islamic banking transactions and should move forwards and initiate the trading activities, the same aspect has been focused by SBP in its plan for Islamic banking for 2014-2018 (SBP, 2014).

Most of the studies related to the efficiency of Islamic banks are based on a theoretical approach having less empirical support (Akhtar, Ali & Sadaqat, 2011). In Pakistan, there is less acknowledged literature on liquidity determinants of Islamic banking and its comparison with conventional banking has been also not recognized as much (Aslam, Azam, & Iqbal, 2020). Therefore, the present study helps minimize the gap between theory and empirical approach for Islamic banking and also it discusses liquidity determinants of conventional and Islamic banking both at internal and external levels.

2. Literature Review

Commercial banks play a key role in the economic development of any country. A well efficient banking system is more resilient; this is to say, it can be able to withstand various shocks and hence contribute to the stability of the banking system in the country. Empirical studies on determinants of bank liquidity were done in different countries with different social economic conditions using bank-specific, industry-specific and macroenvironmental factors. This empirical review takes into account both developed countries, emerging economies countries as well as in developing countries. Generally, the findings from different researchers were found to contradict different factors influencing the liquidity of commercial banks, even if the same approach is used (Qasim & Ramiz-Ur-Rehman, 2011; Venkatesh & Suresh, 2014).

Bank size is represented as the natural logarithm of total assets (Aslam, Ashraf, & Iqbal, 2022; Bhatti et al., 2023; Nikolaos. Papanikolaou, 2009; George, Carlos, & Matousek, 2011). The other bank-specific characteristic used for bank efficiency studies is the non-performing loan ratio, which is the ratio of loan loss provision to the total value of loans distributed. Changes in credit risk may enhance changes in the efficiency of commercial banks respectively, and the best alternative is the diversification of a portfolio, especially when the risks cannot be anticipated, Cooper et al, (2003). Various studies used this ratio to measure the efficiency of commercial banks, Pastor, 1992 (Mexico); Sufian & Habibullah, 2009 (Singapore); Sufian, 2011 (Singapore); Seelanatha, 2012 (Srilanka); Manthos, 2009 (Greece). Other bank-specific characteristics are such as capital adequacy, bank size, leverage, profitability, and noninterest expenses to total assets (Ahmad, Amjad , Aslam, 2018; Aslam & Haron, 2020; Pasiouras and Tsaklanganos, 2007).

Inflation rate and GDP were used by a good number of studies to measure the efficiency of commercial banks. Both inflation and GDP growth exert a positive and negative impact on the efficiency of commercial banks. Similarly, the GDP and Inflation rate were used in many efficiency studies such as Delis and Papanikolaou (2009) in Greece; Pasiouras (2009) within the UK; Sufian (2011) in Malaysia. Muljawan (2005) describes in his study the high expectation involved from the banking institution to perform well in the long term period so that would contribute to the economy through the process of intermediation.

The liquidity of a firm is directly affected by working capital management (Abdul & Mohamed, 2007). Mobeen-Ur-Rehman and Naveed (2013) also examined the effect of working capital on the profitability of manufacturing companies and through the help of analysis they concluded that there is a positive relation between working capital management and profitability. According to the “Trade-Off theory” a company continues to handle high profitability if it maintains a higher level of liquidity. A study was conducted by Sandrine Kablan (2010) to determine the role of bank efficiency in Sub-Saharan Africa. The primary objective of their study was to examine the level of financial development and bank efficiency in the region. The study employs stochastic frontier analysis and a generalized method of moments system to measure efficiency and financial development. The study finds that Sub-Saharan banks are cost efficient, and the economic as well as political environment has held back financial development in the region.

Ismael (2010) investigated the factors affecting liquidity risk management in Islamic banks in Indonesia. The study suggests that the “non-optimal organizational structure of Islamic banks to manage liquidity, the significant demand for liquidity withdrawals from depositors and fragility of Islamic banks to mitigate certain scenarios of liquidity withdrawals, and the limited Islamic money market instruments to manage the demand for liquidity from depositors” are the main causes of liquidity risk in Indonesian Islamic banks. The study also provides certain recommended policies such as institutional deepening and revitalizing the Islamic liquid instruments usage to improve the quality of liquidity risk management in Islamic banks.

Aspal and Malhotra (2012) conducted a study using the CAMEL rating system to measure the performance appraisal of Indian Public sector banks from 2006-2011. Their study was based on the sampling of nineteen public sector banks and the variables used were also based on the CAMEL approach which was calculated by different twelve ratios. Analysis has been done by using statistical tools like comparing means of sampled banks, F-test, One Way ANOVA and for testing normality and homogeneity Shapiro-Walk test and Levene’s test were used respectively. Findings showed that Baroda and Andhra Bank was the best performer and United Bank of India was the worst performer during the study period. Azam and Siddiqui (2012) researched to measure the profitability of local and foreign banks operating in Pakistan by making a comparison of performances between them. They took thirty-six commercial banks as a sample which is further divided into three (3) groups of different sector banks.

Roman and Sargu (2015) performed research to analyze the financial health of Romanian banks supported by the CAMELS framework. The sample selected was based on 15 commercial banks for the period 2004-2011. Ongore and Kusa (2013) studied the effect on the ownership structure of bank performance to fill the gap in this area of study. Shah and Jan (2014) conducted a study on the comparison between Islamic banks and conventional banks to evaluate their performance. Gul et al. (2013) suggested that firm size has a positive relation with profitability. It is found that bigger firms grow faster than smaller and younger firms grow more rapidly than older ones. Larger firms have more spirited power when contrasted with smaller firms in the field entailing

competition because that firm has an opportunity to make more profit. Vijayakumar and Tamizhselvan (2010) found that there is positive a association between the size of a company and profitability.

Venkatesh and Suresh (2014) did their work to assess the performance of selected commercial banks of the Kingdom of Bahrain. They used the CAMEL ranking system for the period 2006-2012. Ansar ul Haque (2014) conducted a study to examine the financial performance of some foreign scheduled commercial banks from 2009 - 2013. El Mehdi Ferrouhi (2014) in his research work examined the performance of Moroccan banks by adopting the CAMEL framework. The study was based on eleven years of data from 2001 to 2011. Muhmad and Hashim (2015) also studied the performance of the 35 domestic and foreign banks in Malaysia from 2008 through 2012 using CAMEL and analysed the CAMLE variable and bank performance relationship. The author used the POLS regression analysis and suggested that banks need to improve their management competency which is in contradiction to Rozzani and Rahman (2013).

Kamran, Johnson and Sammer (2016) investigated the impact of macroeconomic and bank-specific factors on the profitability of Pakistan's banking industry. The 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. The study found that bank-specific factors such as bank growth, deposits, and loans are insignificant to the profitability of banks, whereas macroeconomic factors have a significant influence on the bank's profitability in Pakistan.

Yakubu (2016) also examined the impact of internal and external factors on the commercial bank's performance in Ghana. The findings of the study suggest that internal factors contribute positively to the performance of commercial banks, whereas macroeconomic variables impact negatively commercial bank's performance in Ghana. Ahsan (2016) analysed the financial performance of three selected banks over a period of eight years (2007-2014) and found that the selected banks are strong in position on their composite rating system under CAMEL Rating Analysis. Through the help of different researchers' investigations, it is found that the size of a firm can be measured through total assets and sales.

Prasad and Ravinder (2012) did a study to investigate the performance of twenty nationalized banks in India from 2005-2006 to 2009-10. They also adopted the same framework used by many researchers in the past, which is the CAMEL framework. The result of their study shows that in terms of capital adequacy ratio, Canara Bank shows the best performance. Bank of Baroda stood first in terms of asset quality and liquidity. As per Asset quality, Andhra Bank gets the highest position. Punjab and Sindh Bank perform better in the context of management efficiency and Indian banks hold the top position in sustaining good earning quality.

Liquidity measures the corporate or company's aptitude to pay its short-term liabilities (Qasim & Ramiz-Ur-Rehman, 2011). When investors perform essential analysis on a company they show keen interest in having a look at the liquidity of a company because if the company is not paying its short-term debt liabilities then a higher risk of bankruptcy (insolvency) will occur. Gill and Mathur (2011) expected that a firm that can sustain a higher liquidity level will face fewer financing constraints. Different researchers consider different assets to be pertinent in computing liquidity. Working capital and liquidity could mean the same (Manyo & Ogakwu, 2013) or the same thing and relate to the management (administration) of current assets and current liabilities of an enterprise. As liquidity determines the profitability of a firm and hence management of liquidity is very important the requirement of liquidity depends upon the nature of the company and no exact rule exists for the determination of the best possible level of liquidity that a company can sustain.

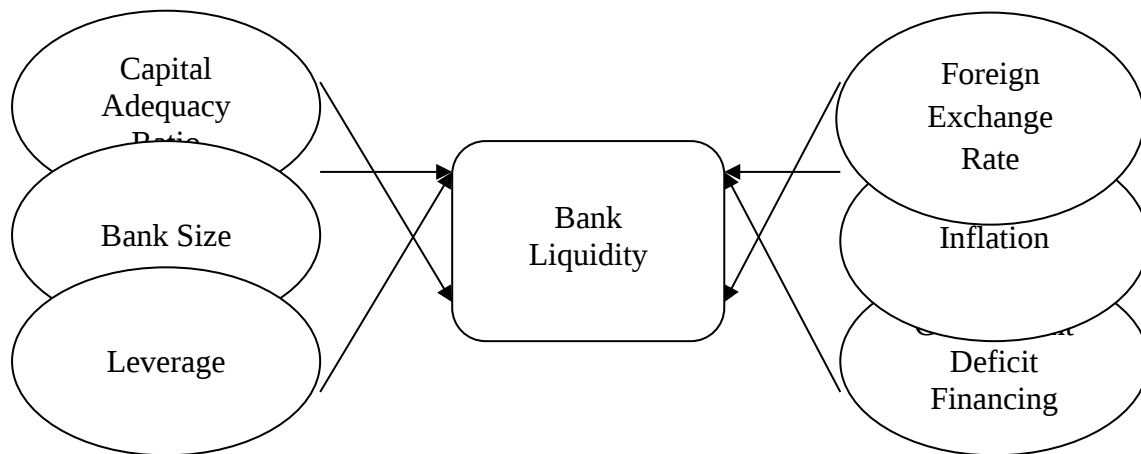
Liquidity risk covers excess liquidity i.e. when the banks have excessive depositor's funds (liability) in the shape of deposits of varying maturities, owners' funds (equity) but don't have enough explored financing/Investing venues for profitable business i.e. financing /investment (both assets in total) are relatively less than the total deposits & equity. Banks must pay the return to depositors for all types of deposits (except current account holders) kept by them in banks in the form of savings and term deposits. When the bank must pay on the deposits kept with the bank, but the bank has idle funds with him without any return then the bank's profitability is affected adversely, and the profits decrease over time if the situation prevails. Considering the above discussion, the following hypothesis is formulated.

H₁: A negative significant relationship exists between CAR and bank liquidity.

H₂: A positive significant relationship exists between bank size and bank liquidity.

- H₃:** A negative significant relationship exists between leverage and bank liquidity.
H₄: An insignificant relationship exists between inflation rate and bank liquidity.
H₅: A negative significant relationship exists between the exchange rate and bank liquidity.
H₆: A positive significant relationship exists between government deficit financing and bank liquidity.

2.3 Research Framework



3. Research Methodology

3.1 Study Sample

The population of the study is the banking industry of Pakistan with all the 35 scheduled commercial banks listed on the State Bank of Pakistan in Pakistan financial industry. The study sample consists of 4 Islamic and 16 conventional scheduled banks (local and foreign) considered for the study based on the availability of financial data for the period of 2009 to 2020. The bank-level data was collected from selected banks' annual financial statements and the macroeconomic variables data were taken from the World Bank indicators.

3.2 Research Variables

The objective of this study is to examine the influence of bank-specific and macroeconomic factors on the bank's liquidity in Pakistan. Therefore, bank liquidity is the dependent variable. The bank-specific independent variables are adequacy ratio, leverage, and bank size. The macroeconomic variables are foreign exchange, inflation, and government debt financing. The detail of the variables is given in Table 1.

Table 1: Research variables

Variables	Proxy / Ratio
Liquidity	Liquid assets to Total assets
Capital Adequacy Ratio	(Tier 1 + Tier 2 capital) / Risk weighted assets
Bank Size	Logarithm of total assets
Bank Leverage	Debt to Equity ratio
Inflation	Consumer price index (%)
Foreign Exchange Rate	Real effective exchange rate (%)
Government Deficit Financing	Deficit financing to Total GDP (%)

3.3 Research Equation

The model used in this analysis is as follows:

$$Liq_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 INF_{it} + \beta_5 FER_{it} + \beta_6 GDF_{it} + \varepsilon_{it}$$

Where,

α = Intercept
LIQ = Bank's Liquidity
CAR = Capital Adequacy Ratio
SIZE = Bank Size
LEV = Leverage
INF = Inflation Rate
FER = Exchange Rate
GD = Government Deficit Financing
 ε = Error Term

3.4 Descriptive Statistics

Table 4.1 provides the descriptive statistics of the variables. It includes measures of central tendency, measures of dispersion and measures of normality of the data. The liquidity (LIQ) variable has a mean value of 0.022, capital adequacy ratio (CAR) has a means score of 1.099, bank size (SIZE) has 17.985 mean value, leverage (LEV) has a mean value of 2.092, inflation rate (INF) with a mean value of 105.301, foreign exchange rate (FER) has 83.235 mean value and government deficit financing (GDF) makes a mean value of 4.90.

Table 2. Descriptive Statistics

Variables	LIQ	CAR	Size	LEV	INF	FER	GDF
Mean	0.022	1.099	17.985	2.092	105.301	83.235	4.900
Maximum	1.646	1.440	20.091	2.583	174.973	102.654	10.216
Minimum	0.254	-6.040	14.205	1.174	84.712	59.856	1.014
Std. Dev.	0.282	0.767	1.1728	0.962	8.060	16.252	4.900
Skewness	3.555	-7.842	-0.630	2.576	3.132	-0.286	-0.175
Kurtosis	18.001	72.149	3.373	10.589	4.175	1.589	0.209
Jarque-Bera	1205.775	22205.332	7.560	364.616	201.682	9.555	170.578
Probability	0.000	0.000	0.022	0.000	0.000	0.008	0.000

LIQ has a minimum value of 0.254 and a maximum value of 1.646. CAR has a minimum value of -6.040 and a maximum value of 1.440. Ban Size has a minimum value of 14.205 and a maximum value of 20.091. LEV has a minimum value of 1.174 and a maximum value of 2.583. The inflation rate has a minimum value of 84.712 and a maximum value of 174.97. FER has a minimum value of 59.856 and a maximum value of 102.654. Lastly, GDF has a minimum value of 1.014 and a maximum value of 10.216. The probability value of the Jarque-Bera test depicts that each variable has a normal distribution as the p-value is less than the 0.05 significance level.

3.5 Correlation Analysis

Table 3 provides the correlation analysis output for all independent variables taken for the study. From the table, it is evident that all variables have a correlation value less than the standard value of 0.70 which is mostly suggested by research as the maximum threshold. A value greater than 0.70 indicates the presence of correlation for each pair of variables. Therefore, there is no problem of correlation among the datasets.

Table 3. Multi-collinearity Analysis

Variables	LIQ	CAR	SIZE	LEV	INF	FER	GDF
LIQ	1.0000						
CAR	-0.2386	1.0000					
SIZE	-0.1096	0.2894	1.0000				
LEV	-0.3822	-0.0527	-0.0337	1.0000			
INF	0.0428	0.0027	0.0634	0.1171	1.0000		
FER	0.1359	-0.0885	-0.0625	-0.1479	-0.2855	1.0000	
GDF	0.1445	-0.0089	0.0584	0.1083	0.3261	0.2553	1.0000

3.6 Autocorrelation Test

Table 4 shows that the probability of Chi-square value was 0.000 which indicates that we do not reject H_0 . Hence, there exists an autocorrelation in the model. To overcome the autocorrelation problem, the first differences of all variables are taken. Afterwards, the Wooldridge test to test autocorrelation is again applied. As the p-value = 0.217 is greater than the 5% level of significance this time it means that there is no autocorrelation in the dataset.

Table 4. Wooldridge Test

Test Summary	F-statistics	Probability
Autocorrelation	4.757	0.000
No Autocorrelation (1 st Difference)	0.354	0.217

3.7 Breusch Pagan LM Test

To test whether a pooled Ordinary Least Square (POLS) or random effect model is appropriate, the Breusch Pagan LM test is applied. Table 5 shows the findings of the Breusch Pagan LM test shows that the random effect model is more appropriate compared to the pooled OLS model as the p-value = 0.000 is less than the 5% level of significance. Therefore, we concluded that there is sufficient evidence to select a random effect model.

Table 5: Breusch Pagan LM Test

Test Summary	Chi-Sq Stat	Probability
Random Effect Model	292.417	0.000

3.8 Hausman Test

Table 6 indicates that the p-value for the Hausman test is greater than 0.05 significance level, thereby we fail to reject the null hypothesis (Green, 2008). It means that a random effect model is used.

Table 6. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.779	6	1.000

3.9 Heteroskedasticity Test

Table 7 shows the results of White's test of Heteroskedasticity. The findings depict that the p-value is above the 0.05 significance level, thereby rejecting the null hypothesis in favour of the alternative hypothesis. It means no Heteroskedasticity at the 0.05 significance level.

Table 7: White's Test

Test Summary	Chi Sq. Stat	Probability
Homoscedasticity	12.73	0.208

4. Results And Discussion

4.1 Pooled Ordinary Least Squares (POLS)

As presented in Table 8, the explanatory power (R-square) of POLS regression is 0.2336. This indicates that a 23.36 per cent variance in the bank's liquidity is explained by the statistically significant explanatory variables. Moreover, the F statistics value = 5.98 and F statistics (sign) = 0.000 indicating that the model is a good statistical fit for the data. The regression model findings further show which bank-specific and macro-environmental factors are statistically significant and which bank-specific, and macro-environmental factors are not statistically significant. The coefficient value of CAR and the bank's financial leverage (LEV) have a significant impact on liquidity (LIQ), as their p-value is less than the 5% level of significance respectively.

Furthermore, there was no effect of bank size (Size), INF, FER and GDF on the commercial bank's liquidity in Pakistan.

Table 8. Pooled OLS model

Variables	Coefficient	P value
Capital Adequacy Ratio	-0.398	0.000
Bank size	-3.91E-06	3.92
Leverage	-1.456	0.000
Inflation	2.235	0.696
Foreign exchange rate	0.253	0.501
Government deficit financing	1.758	0.574
Constant	109.65	0.000
R Squared	0.2336	
F-Statistics	5.9878	
Prob F-Statistics	0.000	

4.2 Random Effect Model

Table 9 presents the results of random effect regression, where, the model explanatory power (R-square) is 0.1669. This indicates that a 16.69 per cent variance in the bank's liquidity is explained by the statistically significant explanatory variables used within this study. Moreover, F statistics value = 18.85 and F statistics (sign) = 0.000 indicating that the model is a good statistical fit for the data. The coefficient value of CAR and the bank's financial leverage (LEV) have a significant impact on liquidity (LIQ) at a 5% significance level respectively. However, FER has a statistically significant impact on a bank's liquidity at a 10% significant level. Moreover, CAR and LEV were found to be impacted negatively on liquidity, whereas FER was found to have a direct positive influence on the liquidity of the banks within Pakistan. Furthermore, there was no effect of bank size (Size), INF and GDF on the commercial bank's liquidity in Pakistan.

Table 9. Random effect model

Variables	Coefficient	P value
Capital Adequacy Ratio	-0.358	0.000
Bank size	-1.52E-06	0.874
Leverage	-1.19	0.000
Inflation	1.923	0.982
Foreign exchange rate	0.311	0.074
Government deficit financing	1.739	0.227
Constant	109.65	0.000
R Squared	0.1696	
F-Statistics	18.8536	
Prob F-Statistics	0.000	

4.3 Fixed Effect Model

Table 10 shows the model explanatory power (R-square) is 0.7014. This indicates that a 70.14 percent variance in the bank's liquidity is explained by the statistically significant independent variables used within this study. Moreover, it is found that CAR, FER and the bank's financial leverage (LEV) have a significant impact on liquidity (LIQ), as their p-value is less than the 5% level of significance respectively. Furthermore, there was no effect of bank size (Size), INF and GDF on the commercial bank's liquidity in Pakistan. The table also reveals F statistics value = 6.23 and F statistics (sign) = 0.000 indicating that the model is a good statistical fit.

Table 10. Fixed effect model

Variables	Coefficient	P value
Capital Adequacy Ratio	-0.300	0.000
Bank size	-3.26E-06	3.92
Leverage	-0.609	0.000
Inflation	1.437	0.696
Foreign exchange rate	0.371	0.501
Government deficit financing	2.176	0.574
Constant	99.806	0.000
R Squared	0.7014	
F-Statistics	6.2345	
Prob F-Statistics	0.000	

4.4 Result Discussion

Hypothesis 1 (CAR and Bank Liquidity): The direction of CAR's influence on the bank's liquidity is negative, which means the greater the CAR, the lower the liquidity of the commercial banks. The findings of the current study in the context of commercial banks in Pakistan are consistent with the earlier work of Nuviyanti and Anggono (2014), who also figured out that CAR has a negative correlation to the liquidity of the banks. The present results indicate that the bank's capacity to lend money decreases along with its ability to absorb losses as the CAR falls. This diminished ability to withstand risks may result in heightened susceptibility to financial strain or unfavourable economic circumstances.

Hypothesis 2 (Bank Size and Bank Liquidity): The direction of bank size influence on a bank's liquidity is positive, which means the greater the bank size, the higher the liquidity of the commercial banks. It means that for every 1 unit increase in the bank size, the loan-to-deposit ratio (or liquidity of the banks) will increase by 1.52E-06 units or vice versa. This is supported by the study of Rauch et al. (2009) and Berger and Bouwman (2009) studies. Thus, a negative relationship suggests that larger banks might have trouble efficiently managing liquidity. The complexity of managing liquidity may increase with a bank's size, making it harder for the organization to adjust to shifting market conditions.

Hypothesis 3 (Bank Leverage and Bank Liquidity): The direction of leverage influence on a bank's liquidity is negative, which means the greater the leverage, the lower the liquidity of the commercial banks. This means that a 1% increase in the leverage of the bank results in a 1.119% decrease in the liquidity of the bank. Furthermore, the negative coefficient of banks' liquidity states against the hypothesis of 'bad management'. The negative relationship implies that the bank's solvency could be jeopardized as leverage rises. Greater debt-to-equity ratios may give rise to questions about the institution's capacity to pay its debts, which could have an adverse effect on investor confidence and market perception.

Hypothesis 4 (Inflation Rate and Bank Liquidity): The research hypothesis is **rejected** with a coefficient (β) of 1.912 and a p-value (Sig) of 0.982 at the 5% level of significance. Belete (2015) proposed that the inflation rate of the country impact positively on the liquidity position of the banks. He argued that an increase in the inflation rate leads to a real rate of return which triggers some bad phenomena such as credit rationing and thus the allocation of resources will not be efficient.

Hypothesis 5 (Foreign Exchange Rate and Bank Liquidity): The direction of foreign exchange rate influence on a bank's liquidity is positive, which means the greater the FER, the greater the liquidity of the commercial banks. This means that a 1% increase in the foreign exchange rate of the bank results in a 0.311% increase in the liquidity of the banks. Furthermore, the findings were found to be consistent with the past research work of Ashraf (2013). Thus, a positive relationship implies that banks may see increased liquidity as foreign exchange rates rise, particularly if their clients are involved in export-oriented businesses. Increased export income can result in more liquidity for companies and, consequently, for the banks that support these industries, thanks to higher exchange rates.

Hypothesis 6 (Government Deficit Financing and Bank Liquidity): The direction of GDF influence on a bank's liquidity is positive, which means the greater the bank size, the higher the liquidity of the commercial banks. Thus, a positive relationship implies that there might be a rise in the issuance of government securities when the government finances deficits. Being major participants in the bond market, banks may see an increase in demand for these securities, giving them access to a liquid and generally safe investment option.

5. Conclusion

The objective of this study is to determine the influence of bank-specific and macro-environmental variables on the commercial (conventional and Islamic) bank's liquidity in Pakistan. The data of the study was retrieved from audited unconsolidated financial statements of banks for bank-specific factors and from World Bank indicators for macroeconomic factors for the period 2009 to 2020. The study found that CAR and LEV have a significant impact on liquidity as their p-value at a 5% level of significance is less than 0.05 respectively. However, FER was found to be statistically significant at a 10% level of significance. Moreover, CAR and LEV were found to be impacted negatively on liquidity, whereas FER was found to have a direct positive influence on the liquidity of the banks within Pakistan. The outcome deducted from this study would be beneficial for bank managers in identifying and liquidity position of Islamic and conventional sector banks, policy maker which enforces banks to improve their performance according to the liquidity policies they made after reviewing the liquidity of banks, individuals as it tells which sector is profitable for investing and lending purposes.

For future investigation, the innovation in modelling techniques and inclusion of an even broader sample of economies could further help verify and improve upon the results of this research and may be able to provide a more accurate picture of the internal and external factors that impact the bank's liquidity. The inclusion of more literature supported macro-economic variables along with internal variables could better forecast the movements of liquidity decisions. External environmental impact may also be taken into consideration to measure the company's liquidity structure decisions through economic, social, industry, competition, and technological factors. This will lead to new and significant research that could help investors and financial analysts in decision making timely. The properly planned and implemented financing, investment and liquidity policies will not only assist the companies in attaining their primary goal of maximizing the wealth of shareholders but may also enhance the market value of the firm and economic stability.

The research study has its limitations. To reduce the variability of the dependent variable (liquidity), scholars and academicians may classify banks based on bank size, industry/sector, or risk level. Time and budget constraints limit the collection of the most recent data from internet sources. The research study excluded the non-financial firms from the sample due to different regulatory frameworks and financial ratio calculations.

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