

PRIMARY RESEARCH

Bank Liquidity Risk Management in Pakistan: Does Loan Quality, Asset Quality and Funding Management Affect?

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Abstract.

Purpose: The study encompasses assessment of Liquidity Risk Management (LRM) comparatively among conventional banks (CnBs) and Islamic banks (IsBs) operating in Pakistan.

Design/Methodology/Approach: The impact of independent variables Asset Quality (AQAL), Funding Management (FMAN) and Loan Quality (LQAL) have been observed on LRM through multiple hierarchical regression model and descriptive analysis.

Findings: The results for CnBs show that the LQAL and FMAN has positive impact on LRM while AQAL has negative impact. Similarly, for IsBs, the AQAL and FMAN positively affect LRM while LQAL has negative impact on the same. Further, the average resulting values of financial ratios exhibit the outcome of comparatively better performance of IsBs than CnBs.

Originality/Significance: This may considered be the first study in terms of Pakistani Islamic and conventional banks liquidity risk management analysis with respect to significant variables like LQAL, FMAN and AQAL presenting a comparative analysis.

Research Limitations/Implications: The paper develops a framework through important variables LQAL, FMAN and AQAL for assessment of most sensitive banking risk aspect of Liquidity risk management and its assessment for massively growing Islamic banks.

Practical and Social Implications: The paper provides in-depth analysis and insight to banking industry stakeholders, regulators, Government policy makers, corporate management and visionary research scholars regarding present situation of management of liquidity risk in IsBs and CnBs.

KAUJIE Classification: L31

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INTRODUCTION

Banks are considered to be the most vital organ of any country's economy in today's competitive world. Economic fortune and financial stability heavily rely on banking sector throughout the world. It becomes more important in case of Pakistan as the services sector contribution to GDP is 72% for the year 2022 out of which 2.8% is contributed by banking sector showing a promising growth of above 6% in financial year 2018 in Pakistan. It also includes the Islamic banking industry which is a rapidly emerging phenomenon growing at around 14% in the year 2022 in Pakistan (State Bank of Pakistan, 2022). Literature provides evidence that Islamic banks' performance is better as compared to conventional banks while making contribution effectively in the stability of financial sector (Rashid et al., 2017). The reason being Islamic banks have Shari'ah compliant product structure backed by goods and capital in comparison to interest-based products of conventional banks. Islamic banks also show better performance being promoter of real sector investment instead of speculations (Ben Mimoun, 2019). The Islamic and conventional banks' financial vulnerability and profitability show significant association for both types of banks without any significant difference (Parmankulova et al., 2022). Comparison of conventional and Islamic banks also shows that Islamic banks are more risk-sensitive due to product nature, contract structure, governance practices, legal costing and liquidity infrastructure.

Further, the importance of liquidity risk management for banks can be assessed through Basel banking Accords (II & III) which consist of three regulatory pillars including Minimum Capital Requirement, Supervisory Review Process and Market Disclosure. These three pillars also insist regarding coverage of risks such as Credit risk, Market Risk, Operation Risk and liquidity risk, etc. for banks. Central banks or Federal Banks are required to assess banks' risks under Pillar II and keeping adequate capital for such risks under Pillar-I.

Therefore, the substantial growth of Islamic banking and the rising liquidity risk situation warrants in-depth research and subsequent development of a risk framework for managing liquidity risk in Islamic banks. The research has been conducted keeping in view liquidity risk and its management in both conventional and Islamic banks which are operating in Pakistani banking industry. The LRM over the years has become vital phenomenon for banks and the banking industry all over the world is now giving it the due importance it deserves. Therefore, enormous research is being carried out to address the LRM related issues. It has been considered an established fact for a long time that liquidity risk is a substantial threat to financial institutions' management and financial system stability (Khan et al., 2017). So, the development of liquidity framework can lead to resolution of the issues related to liquidity risk in the banking industry (Morgan & Pontines, 2013). Basel III framework has also given importance specifically to liquidity risk as an international regulation for better performance of banking industry (Boumediene, 2015).

Our research work also has been influenced a great deal by Abdel Megeid (2017) who explored Islamic & Conventional bank's liquidity management performance comparison of the Egyptian banking industry through liquidity ratio analysis showing much better efficiency of conventional banks. The regulatory authority (Central Bank of Egypt) introduced regulations following Basel accords that are way more strict for Islamic banks owing to their

Shari'ah compliant products nature. So, the conventional banks liquidity ratio results being comparatively better show that better liquidity risk management approach has been adopted by them than the Islamic banks in Egypt.

The phenomenon of liquidity risk can be understood through literature as the funds deposited or invested into a bank are callable on demand and usually have less maturity time period than the financing contract/loans which have been sold to clients. The depositor liquidity is insured by transferring maturities and it simultaneously increases bank's exposure to liquidity risk (Ali, 2004).

Liquidity Risk Management (LRM) consists of functions like making analysis of off-balance sheet positions of banks to indicate future cash flows and the required funds in order to meet the liquidity requirements. The LRM also analyze funding market access that the bank has and make assessments regarding availing the suitable funding opportunities. One of the essential strategic objectives of bank is to manage its assets and liabilities portfolios efficiently in order to enhance returns through calculated allocation of funds keeping in view acceptable risk levels (Tektaş et al., 2005). Rational depositors and trainings on LRM are the important variables showing impact on LRM in Islamic banking sector of Pakistan. Moreover the central bank gives sufficient regulation and rules for IsBs to control liquidity as well as the requirements of depositors (Masood et al., 2017).

Our research goal is aimed at improving LRM practices in Islamic banking Industry through comparative study of IsBs and CnBs keeping in view the analysis of asset quality, loan quality and funding management performance exhibited by both types of banks in Pakistan. The identification of short comings and improvements required by Islamic banks which are relatively new and faster growing phenomenon in Pakistan as compared to well established Conventional banking industry. Although Islamic banking industry has introduced liquidity management practices to mitigate liquidity risk but those are not enough to deal with the liquidity risk accordingly (Boumediene, 2015). Liquidity management of IsBs is not as stable as in CnBs which cause to activate liquidity risk Dolgun et al. (2020). So, this research will not only broaden the vision of policy and decision makers regarding future LRM issues but also developing the solutions accordingly.

LITERATURE REVIEW

“Risk” is elaborated as chances or likelihood of damage or any harm that happens due to exposures (internal or external) and it can be avoided taking precautionary measures. While operating in a competitive market, financial institutions face various risks. So, the risk may be elaborated as an uncertain outcome as a result of an exposure. When a firm is unable to meet its obligations or maturities, it gives rise to liquidity risk (Vento & La Ganga, 2009). This also shows that the availability of sufficient funds refers to “liquidity” of a firm/bank.

Risk Management

In the concept of “Risk management,” the banks manage to handle the risk and related payoffs

that involve the strategies used for identifying risks faced by banks and the policies deployed to manage and monitor the risk (Tektas et al., 2005). “Risk management” is meant to be the whole set of models and processes allowing banks to apply policies and practices on the basis of risks. The measuring, controlling and monitoring of risks is carried out by using all necessary techniques and management tools. It is assumed that risk is considered as an uncertainty which may generate losses. State-of-the-art quantified risk measuring tools have been innovated in banking sector in modern times (Bessis, 2011). Similarly, Gabbi (2004) explained the relationship of risk and its reliance on an organization’s place in the concerned market where it operates. As large organizations/banks not only have the capability to gather more market information but also to influence the monetary policy function therefore liquidity risk can be controlled keeping in view scale and scope of financial measures as per the organization’s marketplace. It is narrated by Zheng (2006) that liquidity risk is more prevalent in short-term yield spreads. Islamic banks have different nature of risks because of its different modes of banking as compared to its conventional counterpart. IsBs work on the basis of profit and loss sharing whereas the CnBs has to fulfil the obligations of customers regardless of its profit or loss state (Abedifar et al., 2013).

Moreover, Basel-III was implemented in December 2013 by SBP which included the condition of maintaining Capital Adequacy Ratio from 10.25% to 12.5% (December 2019). The second pillar of Basel II & III “Supervisory Review Process” provides coverage to the risks such as interest rate risk, concentration risk, liquidity risk, etc. Supervisors or central banks are required to review and assess whether the aforementioned risks under Pillar II are being properly managed, and the bank is attempting to keep adequate capital for these risks which also emphasises on the importance of financial stability determinants of our study like Solvency risk, Credit risk, Concentration risk & Liquidity risk. The liquidity level is measured by the ratio of liquid assets to deposits and short-term funding. The higher the liquidity, the more efficient and stable IsBs become (Trabelsi & Trad, 2017).

Financial ratio analysis has been an efficient tool for measuring a bank’s performance and profitability. Al-Sayed (2012) used Financial Ratio Analysis to make a performance comparison of Islamic and conventional banks using liquidity, solvency, credit and solvency ratios. The performance of Islamic banks in UAE was inferior to conventional banks in terms of solvency, credit and profitability but liquidity ratios results were in favor of Islamic banks. Tarek Al-Kayed et al. (2014) elaborated used data from 85 Islamic banks and found out that Islamic banks have a positive response to an increase in capital which shows the more the liquidity increases the more the profitability increases.

Nature of Risk (Islamic Vs Conventional Banks)

We briefly elaborate on the nature of risk that banks face specifically Islamic banks. Modern finance and Islam are in agreement in terms of values attached to return and risk. However, Islam does not allow risk-free rate attached to interest rate on loan products and other instruments.

The product nature of IsBs and CnBs is different but they do have the same functions. Transactions based on interest (*ribā*), uncertainty (*gharar*) and speculations/gambling (*qimār*)

are not allowed in Islamic Shari'ah compliant banking. The core difference between IsBs and CnBs is that IsBs implement profit and loss sharing mode of financing, specifically on the liability side of their balance sheet. Following Shari'ah-compliant operations structure does not make IsBs immune to all the risks faced by conventional banks. Among all risks, liquidity and credit risks are the most important ones to deal with in the banking sector. Banks liquidity risk arises from liability side of balance sheet. The banks involve in to liquidity distress whether its Islamic or conventional if these banks have financed too many distressed projects. At such a point, it's difficult for banks to meet the depositors' demand or call for withdrawal of funds. So, the default on a loan by the borrower increases liquidity risks (Imbierowicz & Rauch, 2014). Therefore, a higher liquidity risk is caused due to higher credit default ratio. The liquidity risk of IsBs increase more as it has to manage received deposits on which they have to pay profits but have limited investment venues. The money market also has limited options for IsBs as compared to CnBs, which makes it harder for IBs to raise funds during a shortage of liquidity. The IsBs like CnBs are also under regulatory compliance of the central bank (SBP) to maintain SLR (Statutory Liquidity Ratio) for which they have to keep funds in reserve and cannot invest to provide return to the depositor. Further, this reserve with SBP provides interest to CnBs, however, IsBs cannot accept this interest but their funds are bound and cant to generate revenue. This is another underlying difference of the banking practice of both types of banks.

So keeping in view the above differences, IsBs have to keep more cash on hand to overcome their liquidity risk. Errico & Farahbaksh (1998) observed special risk attached to equity like assets including *musharakah* and *muḍārabah* (Hassan et al., 2019). In both of these products of IsBs, we can't retain collateral or securities as property, building etc. to hedge risk. Therefore, owing to the moral hazard issue of being Shari'ah-compliant, IsBs are usually reluctant to invest in such projects. Further, the liabilities of IBs are based on *muḍārabah* contract, in which employs that losses would be shared among the bank and depositors. Even if the current deposits are based on *qard al-ḥasan* (where deposits are deemed interest free loan and has to be paid back on demand) and Wadi'ah (IsBs performs as custodian of deposits), still the liquidity risk prevails and requires timely risk management.

Liquidity Risk

Bank's liquidity deficiency is more supported by the securities market. Zheng & Shen (2008) narrated that a more realistic loss can be estimated if liquidity risk is taken into account through the utilization of adjusted contingent value at risk which results in an appropriate estimation of risk. Mounira & Anas (2008) explained certain risk management practices to IsBs for solidifying their risk management function like they need price transparency and liquidity to enhance secondary market business, and they can deal in *ṣukūks* and financial *takāful* (Insurance) as a medium of risk aversion or hedging.

Akhtar et al. (2011) mentioned regarding CnBs that they are showing healthier performance than IsBs in terms of profitability, return on assets and LRM. Abdullah & Ika (2011) made a comparison of Conventional and Islamic Banks in Indonesia. They performed a ratio analysis which included ratios like the loan to current ratio cash deposit ratio, and deposit ratio. It was

found that CnBs happen to be less liquid in comparison to IsBs.

Iqbal & Mirakhor (2011) viewed that LRM is considered a vital part of the risk management process in both IsBs and CnBs of Pakistan. His investigation included the support of variables like size of bank, Return on Assets, Return on Equity, and Capital Adequacy ratio (CAR) checked in terms of affecting the management of liquidity risk. It was deduced that LRM has a significant positive relationship with CAR, ROE, ROA and size of the bank for both Islamic and conventional banks and the significant negative relation is present with regard to non-performing loans in terms of same variables.

It must be the main focus of Banks to safeguard themselves from liquidity risk arising from the mismatch between the maturity of different assets in terms of time period where liquidity was essentially required (Anson, 2010). The liquidity management policy of a prudent bank strictly defines limits on maturity/currency mismatches and the liquid assets retained to assure that the bank can fulfil liquidity requirements across time, currency or locations of its operation (Mesquita et al., 2011).

Loan Quality

Loan Quality (LQ) is a critical factor that significantly influences the overall credit risk faced by banks which ultimately generates liquidity risk. Abiola & Olausi (2014) identified two primary causes of bank failures: low liquidity levels and poor asset quality (AQ). The researchers discovered that an increased number of banks with low skill and capacity human resources led to various problems such as financial crimes, a flawed credit appraisal system, and a rise in poor asset quality (AQ), resulting in more distressed banks. Additionally, Nkusu (2011) highlighted that LQ is influenced by economic factors, including inflation, but the impact can be ambiguous, displaying either a negative or positive relationship with non-performing loan (NPL) portfolios. Consequently, poor LQ adversely affects banks, leading to distress and failure. Thereby loan quality has to be managed to avoid risks like liquidity and credit risk.

Iannotta et al. (2007) conducted a study on 15 European countries to assess the impact of different ownership models and ownership concentration levels on bank profitability. The researchers found that private sector banks exhibited better LQ and lower insolvency rates compared to public sector banks in these European countries. Kopecky & VanHoose (2006) determined that regulators can contribute to improving LQ by enhancing the capital requirements for banks operating within their jurisdiction. Moreover, Diamond & Dybvig (1983) demonstrated a positive relationship between changes in overall LQ and loan rates. Furthermore, Love & Ariss (2014) found that an increase in gross domestic product and capital inflows improves banks' loan portfolio quality. Conversely, high lending rates generate adverse selection problems and decrease portfolio quality deteriorating the bank's risk levels. The theoretical evidence emphasizes the significant role of LQ in liquidity risk assessment and underscores the importance of considering LQ in the formulation of liquidity risk management policies.

Asset Quality

Asset Quality (AQ) is another crucial variable that influences the liquidity risk faced by banks. The CAMEL model, incorporating AQ as a factor, is widely used to assess bank profitability. AQ consistently plays a vital role in overall bank performance, credit risk, and liquidity risk across different countries and their banking systems. The literature determined that factors such as Capital Adequacy, Management Quality, asset quality (AQ), Earning Ability, and Liquidity framework impact the profitability of Saudi banks. They found that increased non-performing loans (NPLs) resulting from low asset quality (AQ) reduce bank profitability, and domestic banks in Saudi Arabia perform better than foreign banks.

[Agoraki et al. \(2011\)](#) conducted research emphasizing the importance of asset quality (AQ), market structure, and capitalization as more informative indicators of banking risk than profitability, efficiency, and management qualities. These theoretical insights underscore the crucial role of asset quality (AQ) in assessing overall credit portfolio and liquidity risk management (CRM).

Funding Management

The conventional banks are better in managing assets and in the performance of funding management. There several sources of funding for banks like deposits, statutory instruments, T-bills or money market primary securities etc. Islamic banks can only avail funding keeping in view Shari'ah compliance. Islamic banking, loan quality and funding management have positive effect on liquidity whereas asset quality affects it negatively [Abdel Megeid \(2017\)](#). Therefore, after a thorough review of the literature, we have been able to establish the importance and timeliness of our research study. We are now also able to develop a hypothesis in the light of our literature review keeping in view the theoretical and operational differences among IsBs and CnBs. Further, we can also hypothesize regarding the relationship of Loan quality, asset quality, funding management and Liquidity risk management being key variables of study.

Research Hypothesis

The banks generally play the role of financial intermediary and they perform the function of converting short-term deposit liabilities into long-term assets and this situation creates liquidity risk when bank is unable to meet depositors' maturities through liquidating the assets. This research's premier objective is to find out the comparative liquidity risk management of the conventional and Islamic banks in Pakistan for the period 2004-2018. The following research hypothesis will be tested;

H1: Performance of Conventional Bank is comparatively better than Islamic Banks regarding their Liquidity risk management practices.

H2: The bank loan quality, funding management, and assets quality significantly affect the liquidity risk management in terms of comparison of Pakistani Islamic and Conventional banks.

RESEARCH METHODOLOGY

This piece of research strives to compare the LRM among Conventional and Islamic banks in the context of Pakistan. Data has been acquired from Annual audited financial statements of CnBs and IsBs starting from the year 2004 to 2018 that covers a time period of fifteen years. Our sample consists of five (5) Conventional banks and four (4) Islamic banks. These banks are considered pioneer giants of the banking industry and the largest in their market. Correlation, descriptive analysis and regression analysis have been used in our research work. Twenty-four different liquidity-related ratios have been used to measure relationship among dependent and independent variables. [Abdel Megeid \(2017\)](#) has already used this approach by opting to use liquidity ratios to measure the Liquidity Risk Management Performance comparison of Egyptian banks. The “Financial Crises 2008” has been used as dummy variable for robustness check and for this purpose our data has been divided in pre (2004-2009) and post (2009-2018) crises periods and separate regression and descriptive analysis has been utilized for both periods to find optimally correct results. Following are the sample banks: CnBs include Allied Bank Limited, United Bank, Habib Bank, MCB Bank and Bank Alfalah whereas IsBs include Meezan Bank Limited, Bank Islami Pakistan, Dubai Islamic Bank and Al-Baraka Bank.

Both of our research hypotheses will be tested using descriptive, correlation and regression analysis. Moreover, following regression model has also been established to exhibit the relation between the dependent variable of LRM and the independent variables of LQAL, FMAN, and AQAL:

$$LRM = \alpha + LQAL\beta_1 + FMAN\beta_2 + AQAL\beta_3 + \epsilon \quad (1)$$

The variables in the equation are explained hereunder:

Independent Variables

LQAL = Loan Quality

FMAN = Funding Management

AQAL = Asset Quality

ϵ = Estimation error

Dependent Variables

LRM = Liquidity Risk Management

The aforementioned variables are measured using financial ratios detailed hereunder;

Independent Variables Measurement

1- Loan Quality (LQAL) of Bank:

For measurement of LQAL the study follows;

- **Total Assets Growth (R1):** The banks' total asset growth can be measured with regards to period growth patterns in connection with asset-liability mix, off balance-sheet volumes and prevailing economic situation where banking function are being executed.
- **Gross Loans Growth (R2):** Bank's interest-based earnings are optimized by increase in

Gross Loans. The rapid growth patterns show that the low-cost capital or liquidity/funding has been successfully acquired by Bank due to which the bank can provide less priced/Marked up loans to borrowers.

- **Non-Performing Loans (Impaired Loans) to Gross Loans (R3):** Non-Performing Loans /impaired loans fall in the category of 90 days/three months overdue as elaborated in prudential regulations developed by State Bank of Pakistan (SBP) are classified as Substandard. The NPL (Non-Performing Loan) classification objective criteria as per the State Bank of Pakistan further goes on to categorize the deteriorating loans in Doubt full (180days) and loss (365 days) Categories after Sub-standard classification. Increase in ration value depicts poor asset/credit investment which in return can damage liquidity.
- **Reserve for NPL to Gross Loans (R4):** The provisioning required by NPL loans under SBP classification categories is parked in “Reserve for NPL” account. The reserve increase shows escalation in NPL and deteriorating loans.
- **Reserve (NPL Impaired Loans) to Impaired Loans (R5):** Increase in NPL reserves in comparison with total impaired loans show the deteriorating quality of loan portfolio and leads to poor liquidity situation.
- **Impaired Loans loss Reserve for Impaired Loans to Equity (R6):** The ordinary or preferred treasury stocks, surplus revaluation reserves, retained earnings etc. are parts of the equity of the bank. The equity comparison with Non-Performing Loans (NPL) less the NPL Reserve amount shows the volume of impaired loans as compared to equity which is very sensitive indicator of liquidity.
- **Impairment Charges (Loan) to Gross Loans (Average) (R7):** The profit of the bank as reflected in the income statement of the bank also has the impact of NPL as the impairment charges reduces the bank’s income and it also has to be compared with the average gross loans so as to see the true picture of bank’s performance and for managing liquidity.
- **Net Charge-off to Average Gross Loan (R8):** The NPL recoveries to gross loan figures are very important indicator for improving liquidity. The net charge-off figure is obtained in lieu of bad debt expenses excluding recoveries of previous similar period charge-off amount.

2- Bank’s Funding Management

The independent variable Bank’s Funding Quality is measured by using following ratios;

- **Loans to Customer Deposit (R9):** The loan to deposit ratio is really helpful in assessing the bank’s liquidity position and gives an insight into the fund management strategy. The heavy and aggressive deployment of funds/deposits in advances/loans although can increase bank’s earnings but due to sudden negative economic or industry changes, it may cause liquidity crises and bank may not be able to fulfill depositor’s demand for their deposit.

- **Inter-bank Assets to Inter-bank Liabilities (R10):** The inter-bank assets and liabilities balance also shows the funding management capability and position of bank in terms of funds availability. The banks heavily make transactions in money market where short-term loan can be availed on interbank charge rate for liquidity management. The lending and borrowing of funds in the interbank market is facilitation for fulfilling liquidity demand. The increase in interbank assets provides safety against liquidity crises.

3- Bank Asset Quality

The independent variable Bank's AQAL is measured by using the following ratios;

- **Reserves for Loan Loss to Gross Loans (R11):** The loan loss reserve amount is compared to gross loans to determine the portfolio position and resulting liquidity thereof.
- **Loan Loss Provision to Net Interest Revenue (R12):** It is a ratio of comparison of Loan loss provision kept for bad debts that is treated as an expense with net interest revenue exhibited in the income statement of the bank. The lower ratio suits the bank's asset quality monitoring procedures of the bank.
- **Loan Loss Reserve to Impaired Loan (R13):** Loan loss reserve is a contra asset account, if this ratio of loan loss reserve and impaired loans is higher, it will be more useful for the bank.
- **Impaired Loans to Gross Loans (R14):** The impaired loans volume must be reduced as compared to gross loans as the resulting asset quality and liquidity may deteriorate if this comparison is imbalanced.
- **Net Charge-off to Average Gross Loans (R15):** The net charge off figure is obtained in lieu of bad debt expenses excluding recoveries of previous similar period charge off amount. This ratio of Net Charge-off to Average Gross Loan is very important measure of bank quality. Improved condition of bank loan quality can be determined from decreased amount of Net Charge-off amount.
- **Net Charge-off to Net Income before Loan Loss Provision (R16):** This ratio is calculated as the ratio of Net Charge-off and Net Income before reduction of Loan Loss Provision. The figures are obtained from profit and loss statement of the bank. If the ratio shows reduced figure that will show improvement in asset quality.
- **Impaired Loans to Bank Equity (R17):** Firm's equity is compared with impaired loans in order to reveal bank asset quality.
- **Unreserved Impaired Loans/Equity (R18):** The impaired loans are compared with equity for which reserve is yet to be maintained.

Dependent Variable

Liquidity Risk Management of Banks:

The liquidity risk management variable is measured with the following ratios:

- **Inter Bank Ratio (R19):** The interbank ratio depicts the relation among money lent and borrowed by a bank to other banks in money market transactions. The high ratio of more than a hundred (100) shows better results and increased liquidity. The bank should rather well be a lender/placer than being a borrower which will show better liquidity position.
- **Net Loans to Total Assets (R20):** This ratio shows that how much of amount of bank's asset has been deployed in loans. The higher ratio shows aggressive loaning policy of the bank and that can sometimes create liquidity crunch for the bank and increased net loans means the default risk is also expected which can damage the liquidity more.
- **Net Loans to Deposit & Short-Term Funding (R21):** Ratio depicts that how much of the deposit and short-term funding has been deployed to loans. If the ratio results higher, bank's vulnerability to liquidity risk is higher too.
- **Net Loans to Total Deposits & Borrowings (R22):** This ratio shows that bank's deposits and borrowings are being used to make loans. The higher ratio shows that massive deposit funds and borrowings have been deployed in loans which can cause liquidity risk if any adverse change hit the economy or banking industry.
- **Liquid Assets to Deposit & Short-Term Funding (R23):** The availability of enough deposit and short funding budget is available for meeting any unexpected withdrawals. The higher ratio shows better results.
- **Liquid Assets to Deposit & Short-Term Funding (R24):** This comparison elaborates that bank have sufficient liquid assets to meet the needs of depositors and borrowers. The lower value shows vulnerability to liquidity risk.

Analysis & Discussion

It has been already discussed that descriptive, correlation, and regression analysis will be used to test the research hypothesis. Ratios related to dependent variable "Liquidity Risk Management" and the independent variables "Loan Quality, funding Management, Asset Quality" have been compared among Conventional and Islamic Banks. The ratios have been calculated on the basis of yearly figures for both type of banks and then the mean value is deducted followed by obtaining averages of those ratio mean values. Detailed analysis is as under:

Co-Relation Analysis

The correlation matrix is given in table 1 and 2 for CnBs and IsBs presenting all explanatory variables. We can deduce from the results given below that in case of CnBs (Table 1), all the independent variables of our model Bank's LQAL, FMAN, and AQAL are showing positive co-relation with the dependent variable the LRM. Further, it is also found out that in case of IsBs (Table 2), the independent variable LQAL is negatively co-related to LRM whereas the other two variables FMAN and AQAL are positively co-related to the dependent variable LRM. It is also pertinent to note that LQAL is also negatively co-related to FMAN.

TABLE 1
CnBs' Pearson Correlations

	LQ	FM	AQ	LRM
LQAL	1	.333**	.353**	.312*
FMAN		1	0.207	.534**
AQAL			1	0.134
LRM				1

Note: ***, **, and * signify the 1 %, 5%, and 10% levels, respectively.

Descriptive Analysis

The descriptive analysis helps us to find out regarding the performance of IsBs in comparison to CnBs for a period of fifteen years starting from 2004 to 2018. The ratios of LQAL, FMAN, AQAL and LRM have been compared among IsBs and CnBs. The ratios have been calculated on the basis of yearly figures for both types of banks and then the mean value is deducted which is presented in the table. The average of all ratios pertaining to a specific variable is calculated and then an average of all the variable averages is also obtained for comparison of performance among both systems. Paired sample T-test depicts variations in results.

TABLE 2
IsBs' Pearson Correlations

	LQ	FM	AQ	LRM
LQAL	1	-0.121	0.005	-0.287
FMAN		1	0.294	.841**
AQAL			1	0.243
LRM				1

Note: ***, **, and * signify the 1 %, 5%, and 10% levels, respectively.

TABLE 3
Descriptive Analysis of CnBs and IsBs- LQAL

Variables	Conventional		Islamic		MD	p-value
	Mean	S.D	Mean	S.D		
R1	0.147	0.111	0.568	1.712	0.419	0.004
R2	0.109	0.142	0.337	0.271	0.228	.000
R3	0.086	0.036	0.057	0.051	0.03	.000
R4	0.062	0.031	0.036	0.031	0.026	.000
R5	0.76	0.273	0.753	0.463	0.007	.000
R6	0.182	0.297	0.116	0.151	0.066	.000
R7	0.011	0.012	0.007	0.011	0.004	.000
R8	0.002	0.009	-0.013	0.09	0.015	0.664
Averages	0.17		0.23		0.06	*

* IsBs shows superior performance with respect to LQAL

The table 3 exhibits variable LQAL descriptive analysis showing the comparison among CnBs and IsBs with respect to independent variable. Table 3 reveals that the average means of LQAL for IsBs is (0.23) which much better than the CnBs' LQAL average mean value of (0.17). Different reasons can be observed for better performance of IsBs the like selection of appropriate borrowers and the industry or the asset-backed and interest free banking products. The Mean Difference (MD) was also calculated against every ratio from R1 to R24.

The table 4 shows that the mean average value of ratios regarding FMAN for IsBs are higher (4.76) than that of CnBs (1.53). This concludes that IsBs are managing their funds much more properly i.e., the sources of funds like customer deposits and inter-bank short-term borrowings have been efficiently utilized keeping in view the checks and balances and FMAN policy of IsBs is better than CnBs in Pakistan.

TABLE 4
Descriptive Analysis of CnBs and IsBs- FMAN

Variables	Conventional		Islamic		MD	p-value
	Mean	S.D	Mean	S.D		
R9	0.621	0.133	0.729	0.179	0.108	.000
R10	2.446	2.064	8.801	10.492	6.355	.000
Averages	1.53		4.76	3.23		**

** IsBs shows superior performance with respect to FMAN

Table 5 signifies the average mean of ratios measuring AQAL and it is apparent from the results that IsBs average value of means (0.28) are showing better AQAL ratio results than CnBs values (0.24). Gross loans constitute a large portion of bank's assets liquidity management plays a pivotal role in enhancing Asset Quality. The interbank assets or placements are also a vital part of bank's assets.

TABLE 5
Descriptive Analysis of CnBs and IsBs- AQAL

Variables	Conventional		Islamic		MD	p-value
R11	0.062	0.031	0.036	0.031	0.027	0
R12	0.172	0.337	0.124	0.295	0.049	0
R13	0.76	0.273	0.753	0.463	0.007	0
R14	0.086	0.036	0.057	0.051	0.029	0
R15	0.002	0.009	-0.013	0.09	0.015	0.437
R16	0.08	0.184	0.833	20.039	0.753	0.757
R17	0.588	0.348	0.37	0.344	0.219	0
R18	0.189	0.284	0.115	0.152	0.074	0
Averages	0.24		0.28		0.04	***

*** IsBs shows superior performance with respect to AQAL

Table 6 presents the average mean values of ratios regarding "Liquidity Risk Management"

and it is inferred from the results that Islamic Banks have better liquidity Risk Management performance (1.04) than the Conventional Banks (0.59). It reveals that IsBs have a comparatively better policy for liquidity management than CnBs. The conventional banks must improve the inter-bank assets portion of their portfolio and reduce the inter-bank liabilities to enhance the inter-bank ratio.

Descriptive Analysis (Pre & Post Financial Crises 2008)

We now introduce Financial Crises 2008 as a Dummy variable for checking robustness in the following table to see how the performance of both Islamic and conventional banks show variations at different points in time before and after financial crises. Both pre and post financial periods consists of years (2004-2008) & (2009-2018) respectively.

The average values comparison of LQAL ratios before and after financial crises show that Islamic banks are performing better than conventional banks in both pre and post financial crises period which also support our results regarding over all descriptive analysis of better Islamic banks performance.

Similarly, the FMAN ratio descriptive statistics results are same as LQAL.

AQAL ratio results which shows that before crises AQAL of Islamic banks is much better than Conventional banks but after crises period has been better for conventional banks.

Likewise, LRM results of Islamic banks are better than conventional banks in both pre and post Financial Crises-2008 periods.

The comprehensive average of all ratio averages of four variables (LQAL, AQAL, FMAN and LRM) exhibit that IsBs are comparatively giving better performance better than the CnBs in Pakistan banking industry and the results almost remains the same even after the inclusion of dummy variable "Financial Crises-2008 which speaks volumes about validity of our results It also means that Islamic Banks' Liquidity Risk Management is better than Conventional Banks and LRM policies adopted by management of Islamic banks are more appropriate to curb liquidity risk.. The IsBs are not only better in LQAL and FMAN but also superior in AQAL and LRM as per our results obtained from the financial data.

Regression Analysis

Table 6 and table 7 respectively represent the results of multiple regression Models 1 (Conventional banking) and Model 2 (Islamic Banking). Conventional banking results in model 1 reveal that positive relation exists between independent variables FMAN, LQAL and the dependent variable LRM.

The AQAL shows negative relation with LRM for conventional banks. The Durbin-Watson test has value (1.206) is aligned with [Field \(2013\)](#) for CnBs regression model which reveals that no auto co-relation exist between variables. The r-squared value is 30.3% for CnBs which indicate the change in CnBs' LRM due to variations in LQAL, FMAN and AQAL. It is pertinent to note that FMAN has a significant positive impact on LRM for CnBs. The independent variable of AQAL clearly has negative impact on LRM so the CnBs must enhance their asset portfolio quality.

Similarly, the table 7 shows the results of regression model (2), the Islamic Banking, where

the independent variables of AQAL and FMAN have positive relation with LRM whereas the independent variable AQAL negatively impacts LRM. The FMAN has a positive and significant impact on LRM in Islamic Banking which shows the importance of FMAN in banking operations and liquidity management. The LQAL shows the negative relationship with LRM. The r-squared value is 74.1% which shows that independent variables LQAL, FMAN and AQAL variations are causing changes in dependent variable LRM. The value of 1.617 (Durbin Watson) for IsBs regression model reveals that auto co-relation is non-existent among variables.

TABLE 6
Regression Results

	CnBs			IsBs		
	β	t-value	Sig.	β	t-value	Sig.
Constant		4.698	0.000		5.939	0.000
LQAL	0.156	1.297	0.200	-0.192	-2.271	0.029
FMAN	0.484	4.214	0.000	0.815	9.232	0.000
AQAL	-0.016	-0.136	0.892	0.005	0.06	0.952
Over-all Model Sig.	0.000			0.000		
R-Squared	0.303			0.741		
Adj. R-Squared	0.269			0.720		
Durbin Watson	1.206			1.617		
F- Stat	8.710			35.302		

Regression Analysis (Pre and Post-Financial Crises 2008)

Since the Financial Crises 2008 has been used as Dummy variable for checking robustness in the following tables to see how the performance of both Islamic and conventional banks show variations at different points in time before and after financial crises while carrying out the regression analysis. Both pre and post-financial periods consists of years (2004-2008) & (2009-2018) respectively both tables 8 and 9 show regression model results of both Islamic and conventional banks before financial crises. We can observe a Durbin Watson value of 1.535 and 2.668 and R-squared values of 42% and 93% respectively for model I (Conventional banking) and model II (Islamic Banking) before financial crises-2008 which shows validity of our model. The LQAL shows significant positive relationship with LRM before crises for conventional banks and FMAN and AQAL are negatively related to LRM whereas all the three independent variables are positively related to LRM in Islamic banking regression model which includes significant relation of LQAL. The conventional banks needed to give more importance to LQAL in that scenario while managing LRM whereas Islamic banks should have considered all the three independent variables equally but more importance should have been given to AQAL being significantly related to LRM.

Table 10 and 11 show regression model results for both Islamic and conventional banks after the financial crises-2008. We can see that Durbin Watson value of 1.232 & 1.541 and R-squared values of 30% and 80% respectively for model I (Conventional banking) and model

II (Islamic Banking) after the financial crises-2008 which shows strength and validity of our regression model. The AQAL shows significant positive relationship with LRM before crises for conventional banks and FMAN and LQAL are negatively related to LRM whereas two independent variables FMAN & AQAL are positively related to LRM in Islamic banking regression model and LQAL is negatively related. The conventional banks needed to give more importance to AQAL in that scenario while managing LRM whereas Islamic banks should have considered FMAN being significantly related to LRM in post crises scenario.

TABLE 7
Regression Model I Results of CnBs and IsBs (Before Crisis)

	CnBs			IsBs		
	β	t-value	Sig.	β	t-value	Sig.
Constant		4.97	0.000		0.474	0.650
LQAL	0.578	3.181	0.005	0.221	2.308	0.054
FMAN	-0.204	-1.189	0.249	0.267	2.795	0.027
AQAL	-0.449	-2.459	0.023	0.900	9.659	0.000
Over-all Model Sig.		0.011	Over-all Model Sig.		0.000	
R-Sqr.		0.42	R-Sqr.		0.939	
Adj. R-Sqr.		0.333	Adj. R-Sqr.		0.913	
Durbin Watson		1.535	Durbin Watson		2.668	
F- Stat		4.834	F- Stat		36057.000	

TABLE 8
Regression Results of CnBs and IsBs (After Crisis)

	CnBs			IsBs			
	β	t-value	Sig.	β	t-value	Sig.	
Constant		2.011	0.053	Constant		5.656	0.000
LQAL	-0.105	-0.704	0.487	LQAL	-0.231	-2.606	0.015
FMAN	-0.099	-0.592	0.558	FMAN	0.83	9.378	0.000
AQAL	0.575	3.444	0.002	AQAL	0.084	0.958	0.347
Over-all Model Sig.		0.009	Over-all Model		Sig.	0.000	
R-Sqr		0.309	R-Sqr.		0.800		
Adj. R-Sqr.		0.243	Adj. R-Sqr.		0.777		
Durbin Watson		1.232	Durbin Watson		1.541		
F- Stat		4.63	F- Stat		34.604		

Conclusion

The study examines the Liquidity Risk Management through comparison of liquidity management performance of Conventional Banks and Islamic Banks established in Pakistan. The

results show that LQAL and FMAN has affected LRM positively in scenario of conventional banking whereas AQAL has negative impact on LRM. Moreover, in case of IsBs in Pakistan, the FMAN and AQAL shows positive impact on LRM whereas LQAL has negative impact. It is pertinent to mention that FMAN not only has positive impact on LRM but it is also significant as compared to AQAL and LQAL in case of both IsBs and CnBs in Pakistan. The introduction of dummy variable (Financial Crises-2008) for checking robustness in pre and post financial crises period also depicts superiority of Islamic banks in LRM in scenario of Pakistan.

All the three independent variables should be given importance specially both IsBs and CnBs should carefully prepare their FMAN Policies in order to efficiently utilize funds obtained from investor depositors and develop assets thereof. The Inter-bank liabilities must be very carefully generated if need arises in situations like economic shocks or huge withdrawals. As liquidity risk has been supposed as major concern for financial institutions (Chen et al., 2017).

The results of descriptive analysis reveal that IsBs are performing better than CnBs as they have better grand mean average value of ratios (0.831) than CnBs (0.413) in terms of FMAN, LQAL, AQAL and thereby LRM. The pre and post financial crises-2008 average values of ratios in descriptive analysis continue to reveal better performance of Islamic banks. IsBs are a developing phenomenon in Pakistan yet IsBs have performed better with in given circumstances despite having a smaller customer's base and deposit availability. Following The implications of our research are very important in terms of future policy-making and researches for financial institutions including that i-e;

The emphasis of Government of Pakistan and SBP (State Bank of Pakistan) towards developing Islamic banks and their products will invite the banking industry to benefit from our research regarding performance of Islamic banks from investment point of view that The top management of all banks will benefit from our research for development of long term and short term LRM policies in order to avoid liquidity risk and introducing better policies to curb such risks. The development of skilled human resource in the field of Islamic banking will be a major issue in future and our research exactly points out to the increasing requirement for skilled Islamic banking human resource for future. LRM is sensitive and most relevant in terms of operations of the bank. Minimum level of liquidity for operating needs should be established along with surplus funds to manage huge withdrawals or economic turmoil. Our study is vital for Liquidity Risk Management future policies development in term of running actors of this research like Asset Quality, Loan Quality and Funding Management affecting the Liquidity Risk Management. Our study invites future research studies in terms of relevant variables like equity structure, sources of generating funds, local and foreign market exposures

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