Liquidity Risk of Conventional Banking:
A Case of Pre- and Post-Financial Crisis-2008

Muhammad Kashif Khan[1]*
Muhammad Azizullah Khan[2]
Muhammad Ramzan[2]
Syed Saad Ali[2]

ABSTRACT

The global financial crisis had an enormous impact on financial institutions the world over, and Pakistan was never an exemption. Hence this paper investigates the post-financial crisis liquidity risk of conventional banks in Pakistan in consortium with the pre-financial crisis-2008. Methodologically, 15 of 20 conventional banks were selected as a sample, while paired sample t-test was instrumentalized to measuring the pre- and post-financial crisis liquidity risk amongst the sampled banks. As part of the research objectives, the paper equally looks at the chances of the bankruptcy of these institutions through the Altman's Z-Score tool. The paper shows that liquidity risk in the pre and the immediate year following the financial crisis was marginal and insignificant; however, the liquidity risk bar rises and becomes pronounced in the following year. Though the allied demise in Pakistan financial market felt the ruthlessness of this collapse is not comprehensive enough to demolish the financial stability of Pakistan. In addition, despite the sounding performance of Pakistan banking system in the pre and post-financial crisis, the Altman's Z-Score tool is indicative of bankruptcy creeping up amongst the sampled banks in the near future

JEL Classification: *G2, G21, G33*

Keywords: *Liquidity Risk, financial institutions, Pre- and Post-financial crisis, Pakistan.*

INTRODUCTION

The history has witnessed outburst different financial crises in the matured conventional financial system running more than three centuries in a different part of the world and reported huge losses to the economy of the world. In the study of Awan (2009) reported four main financial crises and damage caused to the societies appeared in just last three decades. Firstly, the financial crisis (Saving and Loan) severely affected the economy of the United States in 1986-1995 causing a fiscal loss of US$225 billion with curtailing Gross Domestic Product (GDP) at five percent. Secondly, "the mother of all crises" appeared in Japan and lasts for a decade of years. The economy of Japan reported US$800 billion losses with forcefully declining GDP at 18%. Thirdly, a financial crisis appeared in East Asian and Latin American countries during 1998-1999 costing a fiscal loss of US$400 billion with 10% declining GDP growth. Fourthly, the historic gigantic financial crisis appeared in America which was titled "Sub-Prime Mortgage Loan Crisis" in 2007-2009. The International Monetary Fund (IMF) organization estimated its fiscal loss to US$1.4 trillion to the economy, with 10% losses to the GDP in 2007. This demise re-estimated in 2009 and reported US$2.2 trillion losses to the economy with a 16% decline in GDP during 2009.

1- School of Business and Management Sciences, Minhaj University Lahore, Pakistan.
2- Faculty of Business Administration, Preston University, Islamabad, Pakistan.
*- Corresponding Author Email: kashifdurrani81@hotmail.com

International financial crisis 2008-09 revealed the historic severe effect on major financial institutions, especially in the developed countries but the least impact realized in developing countries. That financial crisis was considered to be the worst after World War II (Frankel & Saravelos, 2012) even lead to the bankruptcy of the financial institutions (Shafique, Faheem & Abdullah, 2012; Lang & Jagtiani 2012). The International Monetary Fund propagates about $2.8 trillion loss being observed in U.S. and European banks from 2007 to 2010. Among this loss, about 60% pure loss tolerated by the U.S. banks and about 40% losses are realized by the Euro Banks. The first signs of trouble in the United Kingdom appeared when BNP Paribas blocked withdrawals from three hedge funds. This led to a panic selling pressure causing liquidity crunch. The first big financial institution in the U.S. that bore the brunt of the financial crisis was Indy Mac Bank (Southern California base Independent National Mortgage Corporation). Before its failure, Indy Mac Bank was the 7th largest mortgage originator in the U.S.

The liquidity stress was at peak during October-November 2009 in Pakistan and suffered in deep trouble when the wise investors pooled their investments in illiquid mutual funds. This increasing illiquid market and shrinking opportunities to avail funds added more difficulties to stabilize the liquidity situation of the organizations. During this chaos, the State Bank of Pakistan (SBP) consistently monitored the liquidity position of the banks and relaxed its statutory liquidity requirement policies. Additionally, the scope of the money market instruments was widened and added new financial assets in the money market. To restructure the flow of funds, the SBP has floated Rs. 270 billion high liquid certificates in the domestic money market with the intuitions to boost the confidence of the local investors and curtail call rate about 400 basis points on demand liabilities. Additionally, the securities were permitted under the head "Held to Maturity" to streamline the liquidity with SBP 3-day Repo facility as mentioned in the Financial Stability Review, 2008-2009, of State Bank of Pakistan at its website.

The urgency of the funds' requirements got more importance, especially after the gigantic financial crisis-2008 and many of the solvent financial institutions were denied in interbank lending. Though the central bank supported, few went into liquidation due to not fulfilling the cash requirements, particularly in that crisis. So, the liquidity risk is the situation where an institution does not have sufficient funds or liquidity to meet its obligation, and it is the most important risk for the financial market. It becomes worst and threatening if the management is not able to predict the future demand of loans and withdrawals of funds. The liquidity of any bank may determine with the availability of liquid assets that can be sold quickly in the market either at par or close to it. However, the management's important responsibility is to determine the liquidity requirements accurately. Misappropriate allocation of liquidity even leads to hurt the profitability of the banks. By putting more funds in liquidity will diminish profitability and placing limited funds, optimize the risk and also creeping towards bankruptcy. The liquidity stress has a more severe effect on small banks compared with large banks. Therefore, the banks need rigorous and appropriate control over the liquidity so that systematic risk may be mitigated (Matis & Matis, 2015).

Banks are very much concerned to stabilize the liquid investments with the illiquid one. The liquid investment may consider the mutual funds or treasury certificates, but the illiquid scope of investments may comprehend over the hedge funds, private equity or real estate. The liquidity phenomenon may comprehensively be explained that; lack of potential to meet

obligations on time or the low potential to generate cash flows against funds commitments. The banks have the privilege to mitigate this disparity by managing low-cost deposits in realization with bulk deposits (Karahan, 2017).

The primary motive of the banks is to streamline the cashflows, particularly in the uncertain situation and financial markets. The banks' stability and goodwill in comparison with competitors and investors need to be monitored closely. The banks' stability is considered more appropriate if the value of the assets is more compared with liabilities. The imbalances in the current assets and short-term obligations generate liquidity risk (Sarwat, Kashif, Umer, & Godil, 2019). Even the timings of uncertain cash-outflows create the disparities with the cash inflows that instigating the liquidity risk.

Very high default rates of a mortgage from 2006 to 2007 suddenly pave the way to a collapse in the market where much of the investments have made on commercial papers. This chaos led to many of the wrong decisions regarding investments that peeping into burdening financial cost and attenuation of available financial resources. This turmoil hit a gigantic crisis in the world, especially after the great depression. It is investigated that the banks were having fewer loans and deposits, more liquid assets, less return and lower ex-ante uncertainty performed more poorly during the crisis period. Furthermore, it is explored that banks' regulations closely monitored having a high association with banks performance (Mateev & Bachvarov, 2019).

The problem that arose from the financial crisis was the liquidity crunch. The mortgage corporations that were unable to get back the amount loaned out faced liquidity crisis because they were unable to pay their liabilities. Driga and Socol (2009) articulated that the importance of liquidity risk imagining the most important consideration for any bank is to manage interest rate risk and liquidity risk. Ariffin (2012) makes the linkages of liquidity risk with the bankruptcy and highlights the importance of liquidity management that is the ultimate source of making wonderful banking operation and financially sounds. This study comprehends the demise caused by this international financial crisis in Pakistan's financial sector. Meanwhile, it investigates the close association with the international financial environment.

LITERATURE REVIEW

A strong proposition prevails during this crisis period that many of the banks went into bankruptcy due to mismatches in the maturity of assets and liabilities. In this particular situation, banks are unable to recover peeping down cash inflows and flattering the requirements of short-term obligations. However, in the large-spectrum, the assets become illiquid. It is also found that before the crisis, the banks usually kept low reserves and capital that instigated banks' insolvency even though the insolvent banks were unable to recover their funds from the reputed banks and failed to meet the promised payments (Mateev & Bachvarov, 2019).

Liquidity risk arises from situations in which a party interested to sell its financial assets but finds difficulties and less demand in the market. A measure of the extent to which aperson or organization has the cash to meet immediate and short-term obligations or assets that can be quickly converted to do this (Khan, Baloch, Arif, & Alvi, 2020). The pledgeability of the riskier assets and ability to generate cash flows are quite low, but conventionally the banks mitigate their liquidity risk by pledging their riskier assets against liabilities (Kashif, Ilyas,

Rehan, & Chhapra, 2018). Metwally (1997) explained the nature of Islamic banking is equity bindings. This equity nature puts extra impositions over the financing for Islamic banks. This additional restriction burdened extra costs and limited available financing resources but for the conventional banks having vibrant and open financing options as debt or equity. Clementi (2001) emphasized on the liquidity risk management through handing with care and guidelines provided by the Basel Accord on capital requirements.

Lang and Jagtiani (2012) having the opinion that house financing got a severe problem with the financial market. This problem linking to the gigantic historic crisis in august 2007 and mounting high risk in asset-backed commercial papers. This turmoil situation occurred because the solvency of several large financial firms was threatened by considerable losses in complex structured financial securities. This chaos prevails in many of the prominent organizations before 2007 due to the inception of the modern risk mitigation system. Sawada (2010) explored that in the period of crisis, banks were more concerned to increase their liquidity position and either putting their investments in financial market securities or increasing cash balances to pay off their obligations. Buying and selling of financial securities is the common way pursued by the banks in times of liquidity crunch.

Banks and liquidity have a direct relationship with one another. In Pakistan banking sector and the capital market also face the issue of liquidity (Arif, 2015). This is because banks have to meet with the withdrawals demand of their customers daily. Usually, commercial banks meet their liquidity requirements through their reserves, borrowing from the Central Bank or liquidating their highly solvent assets. Gabbi (2004) elaborated severity of the risk may be gauged through market presence.

Further it explains that liquidity risk can be controlled in the course of practices that are severely connected to the scale and scope of financial measures, seeing as large banks are capable both to manage additional market information and to influence monetary policy functions. Dahir, Mahat and Ali (2018) found inverse relation of liquidity risk with overall bank risk-taking behaviour. Moreover, funding liquidity risk comprehensively lowered the banks' risk-taking intuitions and vice versa.

Zheng (2006) found that short-term yield spreads are dominated by liquidity risk. According to Franck and Krausz (2007) securities market matter more in supporting bank for likely liquidity deficiency while studying the function of the stock exchange as a similar function of, and lender of last resort. Driga and Socol (2009) highlighted that liquidity risk might often occur from evident or real flaw, failure or crisis in the management of other risk types. A bank should know and forecast events that could affect the market and the way people think about its reliability. A bank should know and judge the strong relations between liquidity risk and the other types of risk to which it is exposed.

Ojo (2010) described that the magnitude of the risk might assure through the availability of the capital. In light with the Basel Accord principles, the study observed that besides extensive growth, a lot of work is yet to be done, in particular related to liquidity risk. Uddin (2009) investigated that there exists an inverse relationship between liquidity and dividend yield, as stock becomes more illiquid the liquidity risk increases more than the relative rate, he also indicated that return is not affected by the variations in the corresponding stock liquidity.

Arif and Anees (2012) investigated the comprehensive causes and the importance of liquidity in the banking sector of Pakistan from 2004 to 2009. The researchers have the opinion, the liquidity stress damages the earning powers of the banks and subsequently curtail the cashflows. If the uncertainty with the liquidity prevails for a longer time, it might drag into insolvent and then bankruptcy. The management of such banks needs early and quickly act to capture this pandemonium situation at its early state. This chaotic may be settled with; increasing the amounts in reserves, provisions in non-performing loans and settling the anomalous gap of liquidity.

Theoretical Framework

To weigh up the magnitude of liquidity risk face by the conventional financial institutions in Pakistan, the following variables are considered as proxies for liquidity risk assessment. Furthermore, a linkage of the international financial crisis 2008 is realized on the financial environment of Pakistan; either the liquidity ruin is the cause of this particular demise, or it is the traditional performance of banks. Additionally, the chances of the bankruptcy of these financial institutions are magnified through the Altman's Z-score in both pre-financial crises and post-financial crisis 2008.
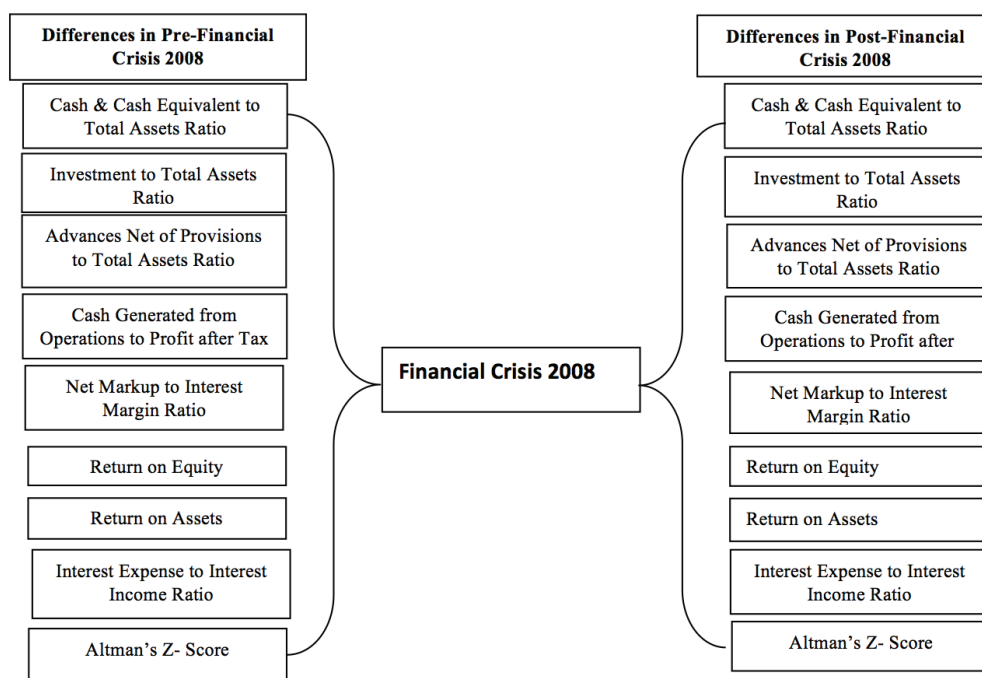
Figure 1: *Schematic Diagram*

METHODOLOGY

This study links to investigate the significant impact of international financial crisis-2008 on the liquidity constraints of commercial banks. To comprehend this severe demise, the post-financial crisis liquidity compared with the pre-financial crisis liquidity. Each variable is calculated for two years (-2,-1) before the crisis compared with two years after the crisis (+1,

+2) in Microsoft excel. The crisis period is omitted in the analysis and considered as zero years. To figure out the significant difference in banking liquidity in pre- and post-financial crisis, the paired sample t-test has applied.

Meanwhile, the chances of bankruptcy due to this sneaking crisis have calculated through Altman's Z-score. Altman's Z-score is one of the best known, statistically derived predictive models used to forecast a firm's impending bankruptcy. The value of Z-Score is based on various accounting ratios and market-driven information to predict financial distress and future bankruptcy. This ratio investigates the liquidity of a firm that led the company into bankruptcy. Ariffin (2012) articulated the liquidity has a close association with bankruptcy. The undermentioned mathematical equation is used to forecast the financial distress in the near future

$$Z = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E$$

Where,
A = working capital / total assets
B = retained earnings / total assets
C = earnings before interest and taxes / total assets
D = market value of equity / book value of debt
E = sales / total assets.

To understand and develop logical thinking on the probability of bankruptcy of the conventional banks of Pakistan; benchmarks of Altman Z-score are considered to postulate the chances of bankruptcy. If the calculated values come at 1.8 or less, the chances of an organization are to go into bankruptcy is quite evident. Whereas, if the value comes greater than 1.8 but less than 3.0 propagates moderate chances of bankruptcy, whereas if the value is greater than 3.0 would be in the safe zone.

Population and Sample

The banking sector of Pakistan has witnessed splendid performance over the period, but it has extraordinary showed contribution towards GDP at 3.4% in 2016. This sector has outstandingly performed and augments its spread ratio from 42.94% to 51.61% from 2012 to 2016 (Pakistan Economic Survey, 2016-2017). The banking sector of Pakistan is the constituent of public banks (5 in total with 2606 branches), specialized banks (4 in total with 668 branches), private banks and four foreign banks with ten branches. A total of 20 conventional private banks having 10835 branches are enlisted with SBP in 31st December 2018. The most abundant constituent of the banking sector is private banks, and the researcher has taken as a population of this study. However, 15 prominent banks with the largest chain of branches are considered as a sample of the study. The purposive sampling techniques are used to select the banks but on the availability of the data. The list of the sampled banks is provided as under;

Table 1:
Sample of the study

Sr. #	Banks	Sr. #	Banks
1	Bank Alfalah Limited	2	Allied Bank Limited
3	Habib Bank Limited	4	Askari Bank Limited
5	Habib Metropolitan Bank Limited	6	Bank Al Habib Limited
7	Muslim Commercial Bank Limited	8	Faisal Bank Limited
9	NIB Limited	10	Samba Bank Limited
11	Silk Bank Limited	12	Standard Chartered Bank Limited
13	Sonari Bank Limited	14	United Bank Limited
15	Sumit Bank Limited		

DISCUSSION AND ANALYSIS

The primary motive of the study is to investigate the strong ability of liquidity and risk associated with maintaining the liquidity, especially after this gigantic financial crisis-2008. The computation of the variables was done on Microsoft Excel Spreadsheet by extracting out the financial information from the financial statements of the sampled banks. The analysis was carefully done with due diligence and the utmost care. The sources of data were verified and found out to be true.

Table 2:
Paired Sample T-test of Different Ratios for the Year 2006 and 2009

Variable	Pre-FC Mean Year 2006	Post-FC Mean Year 2009	Difference	Difference in Percentage	Paired Sample S.D	Significance Level
Cash & Cash Equivalent to total assets	0.09292	0.084113	-0.008807	-0.88%	0.0222673	0.148
Investment to Total Assets	0.252953	0.30068	0.047727	4.77%	0.0631452	0.011
Advances Net off Provisions to Total Assets	0.503033	0.480893	-0.02214	-2.21%	0.0758777	0.277
Cash Generated from Operation to Profit after Tax	2.966667	19.615333	16.648666	1664.87%	7.9681197	0.055
Net Markup to Interest Margin	0.031487	0.034967	0.00348	0.35%	0.0072483	0.084
Return on Equity	-0.032	-0.92556	-0.89356	-89.36%	3.0715929	0.279
Return on Assets	0.004773	-0.000153	-0.004926	-0.49%	0.0216034	0.392
Interest Expense to Interest Income	0.557493	0.618747	0.061254	6.13%	0.105613	0.041

To comprehend the instant effect of international financial crisis-2008 on Pakistani financial market, the combined mean of all sampled banks during post-financial years 2009 is compared with the financial results shown in previous financial crisis in the year 2006. The calculated statistical values of combined mean in Pre-financial crisis year 2006 (year -1) compared with the combined mean of Post-financial crisis year-2009 (year +1) and found insignificant changes, except, investment to total assets and interest expenses to interest income. It indicates the intentions of the conventional banks to make a buffer against adversity and put more funds on the investment side. The other side pre-negotiated interest rate on deposits and borrowings vary, which mounting high disparity in interest expenses and interest income. Therefore, the volume of interest expenses proportionately increased in post-financial crisis.

The combined mean of cash and cash equivalents to total assets shows an insignificant decrease of -0.88% from 0.09292 in pre-financial crisis to 0.084133. Though, the negligible decrease in available funds has realized but implicate the uncertain market situation, curbing the potential to generate ready cash with the banks from the market. However, this severity is not as recognized in the developed economy like the British economy; the Northern Rock, which was the fifth-largest mortgage lender of Britain went into bankrupt. The primary reason

behind this bankruptcy was unable to renew short-term financial instruments and market was impotent to generate cash inflows. Above all, the declaration of the financial crisis-2008 created panic in the market, and depositors withdrew their deposited amounts from the banks (Suresh & Paul, 2010; pp. 396). The adverse effect of this international financial crisis-2008 also realized on the advances net off provision to profit after taxes, return on equity and return on assets. The negative signs indicate the mean values of these variables diminished during the post-financial crisis, but at 95% confidence interval, all these values are insignificant. The diminishing trend in the provision of net advances creeping down the liquidity potential of the Pakistani banks while increased interest rate curtailed the profit. This delineating liquidity position forced SBP to reduce statutory liquidity requirements further, and in this context in October 2008 decreased twice with 100 basis points (Omer, Haan & Scholtens, 2014).

Though the allied demise in Pakistan financial market felt the ruthlessness of this collapse is not comprehensive enough to demolish the financial stability of Pakistan. Comprehensive fertility captured in the investment opportunity and interest maximization. Investment to total assets and interest income to interest expenses have significantly increased during the post-financial-2008. The flickering fear in the minds of international investors and particular Pakistani investors upon highly sophisticated and sturdily interconnected financial system was boosted, and they tilted their investment decisions towards least intermingled world financial system but the comprehensive developed financial system in Pakistan.

Table 3:
Paired Sample T-test of Different Ratios for the Year 2007 and 2010

Variables	Pre-FC Mean Year 2007	Post-FC Mean Year 2010	Difference	Difference in Percentage	Paired Sample S.D	Significance Level
Cash & Cash Equivalent to Total Assets	0.11854	0.085347	-0.033193	-3.32%	0.0286617	0.001
Investment to Total Assets	0.20798	0.31304	0.10506	10.51%	0.0856421	0.00
Advances Net off Provisions to Total Assets	0.533967	0.486473	-0.047494	-4.75%	0.1332923	0.189
Cash Generated from Operation to Profit after Tax	3.236	6.648	3.412	341.20%	20.836595	0.536
Net Markup to Interest Margin	0.029987	0.03482	0.004833	0.48%	0.0119645	0.14
Return on Equity	0.151333	-0.043287	-0.19462	-19.46%	0.3885889	0.073
Return on Assets	0.009647	0.00048	-0.009167	-0.92%	0.0287315	0.237
Interest Expense to Interest Income	0.542373	0.611587	0.069214	6.92%	0.2479454	0.304

The severity of this demise spread all around the world but felt enormous in developed countries (Frankel & Saravelos, 2012; Landsman & Peasnell, 2013). As the instant severity felt in developed countries more as compared with developing countries (Naude, 2011) but the aftershocks felt in developing countries as well like Pakistan. The conventional banks faced more liquidity risk as the overnight rate was more volatile. Even the passive behaviour of the conventional banks on purchasing the government securities and the government uncertainty in borrowing from SBP made uncertain in current deposits with the banks increased the liquidity risk (Omer, Haan & Scholtens, 2014). The intensity of this crisis is growing as the time is passing. The calculated statistical results of the combined mean of post-financial crisis year 2010 show insignificant changes in the 2nd (year +2) as compared with pre-financial crisis year 2007 (year -2) with increasing magnitude. These changes are insignificant with the pre-financial crisis. The diminishing trend has increased in year 2nd (year +2 with -2) as were calculated in the year first (year +1 and year -1). The severity of declining in cash and cash equivalent to total assets from 0.88% to 3.32%, advances net off provisions to total assets from 2.21% to 4.75% and return on assets from 0.49% to .92% has increased but the return on equity strengthens in the post-financial crisis. The results of deteriorating potential to sanction loans and making provisions for advances drastically decreased in post-financial crisis and

gained more attention especially after this gigantic financial crisis-2008 (Iyer, Peydró, Da-Rocha-Lopes, & Schoar, 2014). The magnitude of insignificant increasing trend also improved in investment to total assets, interest expense to interest income and net markup to interest margin. The deteriorating losses of the banks are comprehensively making the banks to absorb the losses, especially after this gigantic crisis.

Table 4:
Altman's Z-Score Results

Banks	Pre-financial crisis- 2008		Post-financial Crisis 2008	
	2006	2007	2009	2010
Bank Alfalah Limited	0.1289	0.0794	0.0852	0.0836
Allied Bank Limited	0.2985	0.2078	0.1483	0.1909
Askari Bank Limited	0.1867	0.1457	0.0534	0.0075
Bank Al Habib Limited	0.1291	0.1104	-0.0697	0.0066
Faisal Bank Limited	0.0165	0.0435	-0.1142	-0.0758
Habib Bank Limited	0.3032	0.2287	0.2035	0.3866
Habib Metropolitan Bank Limited	0.0573	-0.0159	-0.2155	-0.1541
Muslim Commercial Bank Limited	0.5013	0.3931	0.3786	0.4281
NIB Limited	-0.0914	0.0357	-0.0294	-0.7966
Samba Bank Limited	-0.3151	0.3327	-0.1415	-0.2211
Silk Bank Limited	-0.0114	-0.5114	-0.6583	-0.2252
Sonari Bank Limited	0.1362	0.133	-0.0462	-0.0639
Standard Chartered Bank Limited	0.3763	0.4711	0.2683	-0.7966
Sumit Bank Limited	1.2049	0.6243	-0.2277	-0.0569
United Bank Limited	0.3444	0.2043	0.2874	0.2687

The conventional banking of Pakistan amazingly performing well, but the alarming considerations are likely to go in bankrupt in the near future. Almost, all of the conventional banks revealed the same attributes in the post-financial crisis as being shown in pre-international financial crisis-2008. So the consequences of this demise not mainly linked with this global crisis. It is worth noting that Bank Al Habib, Faisal bank, Habib Metropolitan, NIB, Samba bank, Soneri Bank, Standard Chartered and Summit Banks go into the negative after this international crisis. These negative signs indicate the management of these banks needs special considerations to prevent from chances of bankruptcy. The financial environment of Pakistan is little abate and not closely associated with the developed countries' therefore the results of this study strengthen the arguments of previous studies (Frankel & Saravelos, 2012; Landsman & Peasnell, 2013) that the severity of this financial catastrophe felt relentlessly in developed countries and having little effect on developing countries (Naude, 2011).

CONCLUSION

The purpose of this study was to comprehend the cash-generating potential after this international financial crisis 2008-2009 in Pakistan's financial environment. The liquidity potential of the conventional banking of Pakistan insignificantly changed in the post-financial crisis period. A notable decrease found in the cash and cash equivalent, net provision against loans but a comprehensive increase in the long-term investments has reported. This unusual situation has curtailed the liquidity potential of the banks and has increased the difficulties with cash-generating opportunities. However, investment in long-term opportunities and

interest expenses were comprehensively increased in the post-financial crisis period. This increase in the interest expenses in consortium with interest income attracts the readers' intention that banks had borrowed more amounts in the post-financial period for streamlining the cash requirements. The vindictiveness of this crisis felt severely on ROE and ROA, and noticeably this wickedness increased as the time passes from the crisis 2008. The Altman's Z-score paved the way for the management of the conventional banks to pay special considerations to prevent from further demises and chances of bankruptcy. However, to curtail the liquidity stress, the management of the conventional banks should have to take a keen interest in optimizing the cash requirements and give more intentions on pooling more funds on high liquid securities against illiquid opportunities.

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