



Impact of 2008's Financial Crisis on Islamic Banks of Pakistan

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ABSTRACT

The comparison of financial performance of conventional and Islamic banks is a widely discussed topic after the development of the latter. The existing literature review suggests that Islamic banks usually outperform conventional banks even during crises (Azzam & Rettab, 2020), and this may imply that the global financial crisis of 2008 had little or no impact on the Islamic banks. This empirical study aims to test this narrative and compares ratios and stock prices of all full-fledged Islamic banks of Pakistan with an objective of analyzing the impact of crisis upon profitability, efficiency, risk management, asset quality, liquidity management and stock returns of IBs through trend analysis from 2005-2020. The data collected from bank's annual financial statements provided by official websites is used to test the hypothesis that these ratios and stock prices remain unchanged during the crisis. Through the application of One Way ANOVA methodology, the study concludes that profitability, efficiency and returns remain unaffected by the crisis whereas banks suffer because of liquidity, asset quality, and risk management. The application of t-test on different sub-periods indicates that capital adequacy and write-off ratios of Islamic banks need improvement. The impact of COVID on the performance of Islamic banks is limited. The research work implies that the bank managers and policy makers should focus on capital adequacy and write-off ratios in making future decisions.

Keywords: Financial crisis 2008, Islamic banks, Pakistan, Performance, Accounting ratios

1 INTRODUCTION

The financial institutions, especially banks, are an important part of economic activity of any country. Their stability and performance indicate the economy's well-being. A liquidity crunch initiated by banks may result in an economic crisis country wide or even at times worldwide. The banking industry has survived many financial crises, as banking history dates back to 1600s. The first financial crisis is believed to happen in 1720. The banking history is full of bank runs, which ultimately caused a ripple effect or systematic risk and resulted in the collision of economies and

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countries. Bank runs and financial crises are a paradox. Bank runs cause financial crises and the financial crises cause bank runs. The cause of global financial crisis of 2008 is assumed to be sub-prime mortgages (Shafique, Faheem & Abdullah, 2012). The investments and large speculative positions by big banks in mortgages and the sharp fall of house prices in the USA market attributed to the crisis. Many big names such as Lehman Brothers and Bear Stearns faced liquidity crises and ultimately went bankrupt. The conventional financial system has faced such crisis repeatedly.

1.1 Distinguishing Features of Islamic Banks

In contrast to the conventional financial system, Muslim economists developed an Islamic financial system which is based on the Sharia'ah principles that pay immense importance to justice, ethics and moral values in society. The development of the Islamic banking system may be regarded as an important milestone in finance history because it divides the banking consumers into two channels which differ in their basis as Islamic banking is conceptually and operationally very different from conventional banking. The conventional system is based on borrowers and creditors with interest as the basic unit. Whereas Islamic banking is contract based and promotes real asset financing and trade. The basis of a conventional system which is interest, *Riba*, is strictly prohibited in the Islamic Sharia'ah. The instruments such as derivatives which caused the crisis of 2008 are not an investment option for Islamic banks as they are based on speculation and uncertainty. The speculation, *Maysir*, and uncertainty, *Gharar*, are also prohibited by Islam. The detailed differences between conventional and Islamic banking are out of scope of this research study, but due to these basic differences, Muslim economists claim that Islamic financial solutions are crisis-proof. Khan (1986) claims that the Islamic financial system is beneficial for both Muslim and Non-Muslim participants as it is based on ethics. The distinguishing features of Islamic finance are:

- **No Riba:** Riba, interest is usually defined as excess on lent money which is charged without consideration of any risk. It is strictly prohibited in the Shari'ah as Allah SWT mentioned in the Holy Quran (Chapter 2, Verse 275 – 276):

“Those who consume interest will stand on Judgment Day like those driven to madness by Satan’s touch. That is because they say, “Trade is no different than interest.” But Allah has permitted trading and forbidden interest. Whoever refrains—after having received warning from their Lord—may keep their previous gains, and their case is left to Allah. As for those who persist, it is they who will be the residents of the Fire. They will be there forever. Allah has made interest fruitless and charity fruitful. And Allah does not like any ungrateful evildoer.”

Instead of interest, Islam believes in profit and loss sharing. Charging interest leads to the artificial creation of money and creates imbalance in the living standard of people as poor get poorer as they receive only a small amount of interest on their deposits, whereas the rich get richer as they employ funds to generate more income but instead of sharing profits, they pay only a small amount of interest. In contrast, Islam believes in just practices and encourages sharing profits as well as losses. This profit sharing helps banks in maintaining their net worth and shuns weakening of their balance sheet during uncertain financial situations (Cihak & Hesse, 2010).

- **No Gharar:** Islamic banking is contract based. Any uncertainty in the elements of a contract is referred to as '*Gharar*'. The subject matter and price should be mentioned, and both parties should be certain about the conditions of the contract. The prohibition of Gharar means Islamic banks cannot invest in hedging instruments, the derivatives market and speculative activities as they fall under the prohibited category. Zehri, Abdelbaki & Bouabdellah (2012) claim that prohibition of dealing in derivatives and speculative activities upon Islamic banks protected them from falling during the crisis.
- **Risk Sharing:** Instead of risk transfer, Islamic system believes in risk sharing. Islam announces return prohibited without bearing risk for that return. This promotes real economic activity and trade and discourages buying and selling of conventional insurance.
- **Contract Based Financing:** All Islamic financial products are contract based and they promote profit, loss, and risk sharing. The contracts are on real assets, and the banks and customers share the relationship of equity partners or joint owners instead of debtor-creditor. This asset-backed financing promotes real economic growth, overall prosperity, and a better living standard for all the participants.

The crisis of 2008 has an impact on financial institutions all over the world. The conventional financial industry lost more than \$ 1 trillion from bad debts in the crisis (Reuters, 2009). In contrast, the growth rate of Islamic banks during the crisis is positive (Islamic Financial Services Industry Report, 2013). Preliminary literature research shows that Islamic banks are crisis-proof (Mirzaei et al., 2022) and the global financial crisis of 2008 has no significant impact on Islamic financial institutions (Grassa et al., 2022). This study tests whether the financial and stock performance of Islamic banks in Pakistan remain unchanged during the said crisis.

Most of the previous literature focuses on comparison between conventional and Islamic banks. The focus of this study is Islamic banks only. It compares the banks through different years. This trend analysis overtime will help in capturing the performance of the Islamic banks while comparing them with themselves instead of comparing them with already grown conventional banking industry. A lot of

researchers attribute the better performance of Islamic banks during crisis to the growth phase of Islamic banks in their business cycle. They criticize that history of Islamic banks is too short to conclude their superior performance over financial counterparts. As a result this study adds to the financial literature the data for wider time period to analyze the overall trend of financial and stock performance of Islamic banks in Pakistan. The trend analysis with ANOVA testing to understand crisis's impact is a unique methodology to Pakistan's Islamic banking industry as it divides the total time period to pre-crisis, crisis and post-crisis periods and further divides the post crisis time into periods of 3 years each and compares impact of crisis individually with each sub period including the COVID period.

This study, through trend analysis and ANOVA application on pre-crisis (2005 – 2006), crisis (2007 – 2009) and post crisis (2010 – 2020), shows varied results related to crisis impact. The profitability ratios (ROA, ROE, PM), the efficiency ratios (OER, ATO) and stock returns along with EPS remain significantly same during all sub-periods. The impact of crisis is present in risk indicators (NPL, CAR, TLE) and liquidity ratios (CTA, CTD) as the ratios are statistically different in three sub periods. This can be attributed to the fact that most of the Islamic banks in Pakistan started operating just before the crisis and they were not stable. The asset quality shows mixed results as WRL remains same whereas the LTD ratio differs significantly in all periods.

2 LITERATURE REVIEW

The purpose of this paper is to determine the effect of financial crisis on stability of Islamic banks. The first step of the research study is to assess the performance of Islamic banks. The Performance Evaluation Theory explains that performance of any organization depends on some key performance indicators, KPIs. In case of financial performance, the KPIs are accounting ratios. A very wide application of these accounting ratios can be seen in the CAMELS rating system¹. This system is used to measure the performance of banks and their ability to survive in the longer run. Many researchers (Ross, 1991; Samad, 1998; Toumi et al., 2008; Beck et al., 2010; Mobeen et al., 2011; Almanaseer, 2014; Hussain et al., 2019 & Qian Long Kweh et al., 2024) use ratio analysis for performance measurement of banks. In addition to long-run stability, the goal of any organization is to increase its shareholder's wealth. In order to gain more equity and deposits from their shareholders and customers, banks need to perform well. This performance may be determined through return on stock.

¹ CAMELS is an acronym for Capital adequacy, Assets, Management capability, Earnings, Liquidity and Sensitivity. This research study does not apply the CAMELS ratio but for the reference of application of ratios in performance evaluation, the concept is mentioned here.

Rasiah (2010) states that from an investor's viewpoint, profitability is an important measure of the bank performance. The profitability may be measured through ROA, return on assets (Tabash et al., 2023). The higher ratio indicates higher profitability. Also, the ratios are inflation invariant and are better indicators of performance. Hassan (1999), Samad (1998) & Rushdi (2003) also emphasize on use of ROA and ROE as performance measures. The ratio analysis is a better tool for performance measurement as it ignores other variables which may affect the result such as a bank's size etc.

Zehri, Abdelbaki & Bouabdellah (2012) study the effect of the crisis on Islamic and conventional banks using ratio analysis. In their study they prove that accounting ratios are good indicators of performance and hence a discriminator between performance of Islamic and conventional banks. Their comparison study shows that Islamic banks outperform conventional ones during crisis. They attributed the success of Islamic system to the underlying theory of no interest and profit-loss sharing.

Many research studies compare Islamic bank's performance with conventional banks before the crisis (Zineldon, 1990; Kazarian, 1993; Samad, 1999, 2004 & Iqbal, 2001). These researchers in their respective studies conclude that Islamic banking has advantages over conventional banks with Islamic banks performing better than their financial counterparts. On the other hand, during the crisis of 2008, many conventional financial institutions collapsed. Many researchers and economists examine causes of the crisis and performance of conventional banks. Dewi & Ferdian (2009) state that speculative activities and careless lending transactions resulted in global financial crisis. Shafique, Faheem & Abdullah (2012) review the existing literature on Islamic bank's performance during crisis. In their descriptive study, they mention different causes of 2008's financial crisis while calling sub-prime mortgages the primary cause behind the crisis. They conclude that as Islamic banks are based on the Sharia'ah principles, they are better in terms of their product portfolio and have the ability to survive a crisis as they are more liquid with less debt inclusion in their framework.

To determine more profitable and sustainable banking options, researchers compare the performance of Islamic banks with conventional banks. Tlemsani & Suwaidi (2016) compares both banking channels of United Arab Emirates in 2007 - 2008. With a comparative performance analysis between one Islamic and one conventional bank, the researchers find that the conventional bank has larger negative impact of the crisis in terms of profitability, ROA. Furthermore, for the same time period, the researchers perform a cross-sectional analysis between 8 Islamic and 43 conventional banks. Comparing the capital adequacy, profitability, liquidity and leverage of both banking systems, they conclude that although crisis effects both banking systems, Islamic banks perform well financially as compared to

their counterparts. Beck et al. (2010) concludes the same result while comparing both banking systems of several countries. Their study highlights that higher liquidity, lower overhead costs, higher fixed asset ratio with higher ROA and better capitalization of Islamic banks help them in surviving the financial crisis better than conventional banks.

The GCC (Gulf Cooperation Council) is considered to be a better market for comparison as both banking sectors are operating there with comparable market capitalization. Parashar & Venkatesh (2010) measure five performance indicators for selected 6 conventional and 6 Islamic banks. The time period extends from 2006 - 2009. They conclude that Islamic banks outperform conventional banks in terms of return on average assets and liquidity whereas conventional banks perform better in terms of capital ratio, leverage and return on average equity. The overall four year performance of Islamic banks is found to be better than conventional banks. Almanaseer (2014) use data from 24 Islamic banks of GCC countries over the period 2005 - 2012. The study concludes that crisis does not have a significant impact on profitability of the Islamic banks and the size of bank along with equity capital are important factors impacting the profitability of any bank type. Islamic banks are largely equity sponsored and have comparatively more liquid assets which are key helpers in crisis survival. Hassan & Dridi (IMF study, 2010) also conclude superior performance of Islamic banks in terms of profitability and asset growth compared to conventional banks.

Although most of studies performed on GCC region conclude superiority of Islamic system but Abdalla Salih (2018) concludes that conventional banks outperform Islamic banks in terms of efficiency & ROA. He performs ratio comparison between 33 Islamic and 48 conventional banks of GCC from 2006 - 2012. A recent literature on GCC provided by Hussain et al. (2019) also concludes that performance of Islamic banks is significantly influenced during the crisis period. While comparing 30 banks from 2005 – 2011, the study finds that capital adequacy, financial risk and operational efficiency have a positive relationship with profitability whereas credit risk has negative relationship. Tabash et al. (2023) also report negative impact of crisis upon ROA and ROE of Islamic banks.

The Kingdom of Saudi Arabia is an important participant of the GCC. Tabash & Dhankar (2014) study impact of 2008's crisis on the stability of Islamic banks in the KSA. The researchers using ratio analysis performed on full-fledged Islamic banks from 2005 - 2010 divide the total time period into before-crisis, crisis and after crisis sub-periods. The study finds that there is no statistically significant difference in ratios of all three sub time-periods indicating the crisis has no impact on the stability of Islamic banks and they perform well in crisis too.

Kaouther et al. (2011) perform ratio analysis upon 50 Islamic and 59 conventional banks from 18 countries in the period 2004 - 2009. The study concludes that Islamic banks have more shareholder capital whereas conventional banks use more debt for their functioning. Thus, Islamic banks have low debt to equity ratio. In addition, Islamic banks have comparatively higher ROA and lower debt to asset ratio. The lower leverage of Islamic banks helps them surviving the crisis. Mobeen et al. (2011) also conclude that leverage ratio increases for both systems but the increase in case of Islamic banks is small, indicating less debt presence in their capital structure. The study concludes that net profit increases for Islamic banks whereas it decreases for conventional system during the crisis. The findings of Rashwan (2010) also support the hypothesis that Islamic banks perform well compared to conventional banks before crisis. The study compares both banking systems from 2007 - 2009 and concludes that during the crisis there is no difference among both bank type's performance, the returns of both types decline but after the crisis conventional systems outperform the Islamic banks.

Omar (2017) states that Malaysia is the hub of Islamic banking. Abdulle & Kassim (2012) compares 6 Islamic and 9 conventional banks from Malaysia. By comparing before, during and after crisis ratios, the authors conclude that Islamic banks hold more liquid assets and are less likely to suffer from liquidity risk. Also, during a crisis both banking systems are impacted in a similar manner in terms of profitability and credit risk but the Islamic system performs slightly better than conventional system. The results are supported by an empirical study of Aktas et al. (2013) performed on the Turkish market using trend analysis for conventional and Islamic banks from 2006 - 2011. The study concludes that Islamic banks are more stable in terms of profitability, capital adequacy and liquidity.

In Pakistan's context, Sehrish et al. (2012) compare financial performance of conventional and Islamic banks from 2007 - 2011 and concludes that Islamic banks are more safe in terms of liquidity but less efficient in terms of expense management. The findings are supported by research studies of Siddiqui (2008) and Khan et al. (2016). In contrast, Abbas, Azid & Besar (2016) find the performance of Islamic banks to be low comparatively.

Most of the studies show that Islamic banks outperform conventional banks in usual market conditions as well as during a crisis. Different researchers attribute different reasons behind this result. While some researchers acknowledge the fact that Islamic banking products are more just and promote real business activities and trade, other researchers attribute the growth of Islamic banks to the phase of their business cycle as Islamic banking industry is in its growth phase. This study uses Tabash & Dhankar (2014)'s model on the Islamic banks of the Pakistan to determine the impact of global financial crisis. The study focuses on Islamic banks only, unlike other studies, and compares them through trend analysis, which helps in capturing

the true performance of IBs. The study adds to the financial literature the results from a wider time period using trend analysis with ANOVA testing to understand the crisis's impact, and it is a unique methodology to Pakistan's Islamic banking industry. The total time period is divided into pre-crisis, crisis and post-crisis time periods. Also, the post crisis time is divided into further periods of 3 years each and comparing impact of crisis individually with each sub period adds to the existing financial literature.

The null hypothesis in ANOVA testing is that there is no significant difference between the means of all groups under consideration. Referring to our study, the null hypothesizes state that ratios of three sub-periods, pre-crisis, crisis and post-crisis are not statistically different. The alternate hypothesis here is that the ratios declined during crisis compared to pre & post crisis ratios. The null hypothesis are:

H 1: The Return on Asset ratio of Islamic banks is significantly same in all sub-periods

H 2: The Return on Equity ratio of Islamic banks is significantly same in all sub-periods

H 3: The Profit Margin of Islamic banks is significantly same in all sub-periods

H 4: The Operating Expense ratio of Islamic banks is significantly same in all sub-periods

H 5: The Asset Turnover ratio of Islamic banks is significantly same in all sub-periods

H 6: The Non-performing Loans ratio of Islamic banks is significantly same in all sub-periods

H 7: The Capital Adequacy ratio of Islamic banks is significantly same in all sub-periods

H 8: The Leverage ratio of Islamic banks is significantly same in all sub-periods

H 9: The Current Assets ratio of Islamic banks is significantly same in all sub-periods

H 10: The Cash to Deposits ratio of Islamic banks is significantly same in all sub-periods

H 11: The Loans to Deposits ratio of Islamic banks is significantly same in all sub-periods

H 12: The Write-off ratio of Islamic banks is significantly same in all sub-periods

H 13: The Stock Returns of Islamic banks are significantly same in all sub-periods

H 14: The Earnings per Share of Islamic banks is significantly same in all sub-periods

3 CONCEPTUAL FRAMEWORK

KPIs Before Crisis		KPIs During Crisis		KPIs After Crisis
Profitability Ratios Return on asset Return on equity Profit margin		Profitability Ratios Return on asset Return on equity Profit margin		Profitability Ratios Return on asset Return on equity Profit margin
Efficiency Ratios Operating expense ratio Asset turnover		Efficiency Ratios Operating expense ratio Asset turnover		Efficiency Ratios Operating expense ratio Asset turnover
Risk Indicators Non-performing ratio Capital adequacy Leverage	= =	Risk Indicators Non-performing ratio Capital adequacy Leverage	= =	Risk Indicators Non-performing ratio Capital adequacy Leverage
Liquidity Ratios Current assets ratio Cash to deposit ratio		Liquidity Ratios Current assets ratio Cash to deposit ratio		Liquidity Ratios Current assets ratio Cash to deposit ratio

Asset Quality Ratio Loans to deposit Write-off ratio	Asset Quality Ratio Loans to deposit Write-off ratio	Asset Quality Ratio Loans to deposit Write-off ratio
Return Analysis Price return Earnings per share	Return Analysis Price return Earnings per share	Return Analysis Price return Earnings per share

4 RESEARCH METHODOLOGY

This empirical research studies the impact of financial crisis of 2008 on Islamic banks of Pakistan.

4.1 Population, Sample & Time Period

The selected sample consists of all full-fledged Islamic banks of Pakistan from target population of all Islamic banks of the country. The window model based banks and Islamic subsidiaries of conventional banks are omitted from the analysis to capture the impact of crisis on banks operating on purely Islamic Sharia'ah principles. The data source is annual financial reports from websites of the respective banks. The time period extends from 2005 – 2020. This is further divided into three sub-periods i.e. pre crisis 2005 – 2006, crisis 2007 – 2009 and post crisis 2010 – 2020. The post crisis time period is further divided into four periods named as post crisis 2010 – 2012, 3-years post crisis 2013 – 2015, 6-years post crisis 2016 – 18 and COVID period 2019 – 2020.

4.2 Concept, Construct & Variables

The concept here is to measure performance of banks, which is constructed into ratio and return analysis. The variables from ratio and return analysis are described in TABLE 1.

4.3 Data & Model

Tabash & Dhankar (2014) applied ANOVA on ratios of three different time periods consisting of pre-crisis, crisis and post-crisis while calculating impact on the Islamic banks of KSA. Replicating the same model on the Islamic banks of Pakistan will help in determining the crisis's impact. The websites of banks are helpful as all financial data is available in standard format in the form of financial statements. As

a first step, the ratios are calculated for sampled banks using MS-EXCEL. Secondly, SPSS software is used for hypothesis testing. The test applied here is One Way Analysis of Variance, ANOVA. This statistical method helps in comparing means of more than two groups. In simple words, this test will identify whether the three sub-periods (pre-crisis, crisis, post-crisis) vary according to their mean values. Thirdly, the different post-crisis periods are compared to the crisis period using SPSS independent samples t-test. This will help in comparing the crisis ratios to the different non-crisis period ratios. The ratios calculated include profitability, efficiency, risk management, asset quality and liquidity ratios. The return analysis includes stock price returns and earnings per share. The variables are discussed in TABLE 1 along with their formulas.

TABLE 1: *Variables and their characteristics*

Ratio Group	Proxy	Abbreviation Used	Operational Definition	Reference Model
Profitability Ratios	Return on assets	ROA	$\frac{\text{net profit}}{\text{total assets}}$	Tlemsani & Suwaidi, 2016
	Return on equity	ROE	$\frac{\text{net profit}}{\text{total equity}}$	Tlemsani & Suwaidi, 2016
	Profit Margin	PM	$\frac{\text{net income}}{\text{revenue}}$	Zehri et al, 2012
Efficiency Ratios	Operating expense ratio	OER	$\frac{\text{total operating expense}}{\text{total revenue}}$	Parashar & Venkatesh, 2010
	Asset turnover	ATO	$\frac{\text{net sales}}{\text{total assets}}$	Zehri et al, 2012
Risk Indicators	Non-performing loans	NPL	$\frac{\text{non – performing loans}}{\text{total loans}}$	Abdulle & Kassim, 2012
	Capital adequacy	CAR	$\frac{\text{capital tier 1} + \text{capital tier 2}}{\text{risk weighted assets}}$	Parashar &

				Venkatesh , 2010
Liquidity Ratios	Leverage	TLE	$\frac{\text{total liability}}{\text{total equity}}$	Zehri et al, 2012
	Current assets ratio	CTA	$\frac{\text{current assets}}{\text{current liabilities}}$	Abdulle & Kassim, 2012
	Cash to deposits	CTD	$\frac{\text{cash}}{\text{total customer deposits}}$	Tabash & Dhankar, 2014
Asset Quality Ratios	Loans to deposits	LTD	$\frac{\text{loans and advances}}{\text{customer deposits}}$	Tlemsani & Suwaidi, 2016
	Write-off ratio	WRT	$\frac{\text{write – offs during year}}{\text{total loans}}$	Abdulle & Kassim, 2012
Return Analysis	Price return	Ret	$\frac{\text{ending price – begining } 1}{\text{begining price}}$	Jawadi et al, 2014
	Earnings per share	EPS	$\frac{\text{net income}}{\text{no. of outstanding shares}}$	Tlemsani & Suwaidi, 2016

5 ANALYSIS AND DISCUSSION OF ANOVA RESULTS

The ANOVA is applied on three periods i.e. pre-crisis 2005 – 06, crisis 2007 – 09 and post crisis 2010 – 20. The results are discussed below:

5.1 Profitability Ratios

Profitability is usually considered the first measure of performance for any institution. It indicates how efficiently the bank is using its assets to generate income. The analysis shows that Islamic banks maintained their profitability during crisis. The profitability ratios are significantly same in all sub-periods. The finding is consistent with Toumi et al. (2008) and Parashar & Venkatesh (2010).

5.1.1 *Return on Assets:*

This ratio is an important profitability measure as it compares returns generated from bank's assets. The higher the ROA, the better is the asset utilization and greater bank's profitability. The ANOVA test returns a significance value of 0.145 which implies that null hypothesis of equality of means in all sub-periods is supported. The crisis of 2008 has no impact on Islamic banks in terms of ROA.

5.1.2 *Return on Equity:*

This ratio compares returns generated using bank's equity. The higher the ROE, the higher is the shareholder value and bank's efficiency. The ANOVA application shows a significance value of 0.228 and the null hypothesis of equality of means is supported. The crisis fails to impact ROE of Islamic banks.

5.1.3 *Profit Margin:*

The banks strive hard to earn profits. The higher the PM, the more profitable the bank is. The ANOVA test's significance value is 0.136, resulting in support of null hypothesis, implying that the crisis has no impact on profit margins of IBs.

5.2 **Efficiency Ratios**

As the name implies, these ratios measure how efficient the banks are in managing their operations. The analysis shows that efficiency ratios are significantly same in all sub-periods. The crisis has no impact on the efficiency of Islamic banks. Samad (2021) also concludes that IB's loan and deposit efficiencies are not impacted by the crisis in case of Malaysia.

5.2.1 *Operating Expense Ratio:*

It is a benchmark ratio of a bank's efficiency as it compares cost to the generated income. The higher OER indicates less efficient banking operations. The ANOVA application shows a significance value of 0.090 and the null hypothesis is accepted at 5% alpha, implying that OER is the same in all sub-periods.

5.2.2 *Asset Turnover:*

The ratio indicates how efficiently bank uses its assets to generate sales, which are loans and advances in a bank's case. The higher ATO indicates efficient asset use. The ANOVA application returns a significance value of 0.788, supporting null hypothesis and negating any impact of crisis on IBs in terms of ATO.

5.3 Risk Indicators

The failure of institutions in managing risk is considered to be the main cause of the 2008's crisis (Khan et al., 2016). The analysis of risk ratios show that Islamic banks became more risky in crisis as the ratios are not significantly same in all sub-periods. Parashar & Venkatash (2010) also conclude that Islamic bank's capital ratio and leverage is impacted negatively during a crisis.

5.3.1 Non-Performing Loans:

A higher non-performing ratio indicates greater liquidity risk (Hanif, 2012). The ANOVA test shows a significance value of 0.007 and the null hypothesis is not supported. The crisis of 2008 impacted the non-performing loans of IBs. The higher NPL in crisis shows borrowers defaulted on their loan contracts.

5.3.2 Capital Adequacy Ratio:

It is an important ratio in banking industry as it represents safety and soundness of a bank in crisis (Estrella, Park & Presitiani, 2000). This ratio compares the total capital required to be held against risk weighted assets of the bank. This ratio implies that banks should have sufficient capital to cover its risky assets as banks hold a lot of liabilities. The ANOVA test returns a significance value of 0.00 which shows no support to null hypothesis and concludes that crisis impacted the CAR of Islamic banks. The CAR declines in crisis period making banks risky.

5.3.3 Leverage:

This ratio represents the capital structure of the banks and compares debt and equity. Acharya, Mehran & Thakor (2010) claims that banks with higher levels of capital can withstand a crisis. The ANOVA application shows a significance value of 0.00 which means the leverage of banks is impacted during the crisis.

5.4 Liquidity Ratios

Liquidity plays an important role in determining the sustainability of banks. It refers to how quickly a bank can convert its assets into cash to meet the withdrawal demands of its depositors. The banks holding more liquid assets are better able to survive. Islamic banks are considered to be highly liquid as they cannot invest in interest bearing short term investments, they hold more cash at hand to meet their short term obligations. The analysis shows that crisis has an impact on liquidity as ratios in all sub periods are significantly different.

5.4.1 *Current Assets Ratio:*

This ratio compares the amount of liquid assets a bank owns against its short-term liabilities. The ANOVA shows significance value of 0.00 which implies crisis impact on Islamic banks in terms of CTA. The ratio declines during crisis representing an increase in current liabilities and a decrease in current assets.

5.4.2 *Cash to Deposits Ratio:*

This is a deposit run-off ratio and indicates what percentage of customer fund withdrawal requests be met in case of a liquidity crunch. The ANOVA application shows a significance value of 0.00 which shows that null hypothesis of equality of means of all sub-periods is not supported. The crisis has an impact on CTD of Islamic banks.

5.5 **Asset Quality Ratios**

The assets of banks are usually loans advanced to its borrowers. The ability to get interest and principal back refers to asset quality. The analysis shows asset quality of Islamic banks declined in terms of loans to deposit ratio, whereas the write-off ratio shows no impact of the crisis.

5.5.1 *Loans to Deposits Ratio:*

The banks operate on loans and deposits. The ratio comparing both is important and ANOVA application returns a significance value of 0.036 and the null hypothesis is not supported, showing the crisis has an impact on the LTD ratio. The ratio declines during the crisis because the deposits increase rapidly with a relatively lower increase in loans.

5.5.2 *Write-Off Ratio:*

The write-off ratio represents bad debts which the banks write-off from their books. The ANOVA test shows a significance value of 0.163, supporting the null hypothesis of equality of means of all sub-periods. The crisis has no impact on the write-off ratio of banks.

5.6 **Return Analysis**

Returns are particularly important for investors while making an investment decision. The analysis shows that stock returns and earnings per share of Islamic banks during crisis are consistent with pre and post crisis values. The market performance of banks is significantly same in all sub-periods. This claim of statistically unchanged stock price returns during crisis is supported by the study by Muhammad Daniyal et al. (2022).

5.6.1 Price Return:

The price return shows yearly return on the stock price of the banks. The ANOVA results show significance value of 0.550 and the null hypothesis is supported. The crisis of 2008 has no impact on returns of banks and the market performance of Islamic banks is significantly same in all sub periods.

5.6.2 Earnings Per Share:

It is another important ratio which investors look for while making investment decisions. The ANOVA test returns a significance value of 0.067. The null hypothesis of equality of means of all sub-groups is supported, which shows that the crisis failed to impact the EPS of IBs.

TABLE 2: ANOVA Test Results

Ratio	F – Value	Significance Value	Null Hypothesis	Impact of crisis
ROA	1.989	0.145	Supported	Absent
ROE	1.514	0.228	Supported	Absent
PM	2.060	0.136	Supported	Absent
OER	2.498	0.090	Supported	Absent
ATO	0.239	0.788	Supported	Absent
NPL	5.287	0.007	Not Supported	Present
CAR	12.607	0.000	Not Supported	Present
TLE	17.201	0.000	Not Supported	Present
CTA	40.168	0.000	Not Supported	Present

CTD	44.143	0.000	Not Supported	Present
LTD	3.517	0.036	Not Supported	Present
WRL	1.868	0.163	Supported	Absent
Ret	0.606	0.550	Supported	Absent
EPS	2.8250	0.067	Supported	Absent

6 ANALYSIS AND DISCUSSION OF T-TEST RESULTS

Different t-tests are executed between sub groups to analyze the performance of banks. The results are:

6.1 Pre-Crisis and Crisis

The pre-crisis is 2005 – 06 and crisis is 2007 – 09. All the ratios between both periods are statistically same except CTA. The current assets ratio declined during crisis because of increase in current liabilities. The impact of crisis is very limited.

6.2 Crisis and Post-Crisis

The crisis is 2007 – 09 whereas post crisis here means 2010 – 12. All ratios are significantly same except CAR and WRL. The capital adequacy ratio declines in post crisis period (except for Meezan Bank) because risk weighted assets increase with a decrease in capital due to crisis. Similarly, the write-off ratio increases post crisis as an after effect of the crisis. This shows banks were safe during crisis but vulnerable after that.

6.3 Crisis and 3 Years Post Crisis

The crisis is 2007 – 09 and the other period is from 2013 – 15. All ratios are significantly same except CAR and Ret. The capital adequacy ratio is lower in the period 2013 – 15 as compared to the crisis period. This shows that banks were prudent during crisis and maintained higher CAR to combat crisis. The return increases in 2013 – 15 compared to crisis showing growth of banks in terms of share price.

6.4 Crisis and 6 Years Post Crisis

The crisis is 2007 – 09 whereas the other period is 2016 – 18. All ratios are significantly same except ROA, PM, CTA, CAR and Ret. The return on assets, profit margin and returns increase in 2016 – 18 showing positive growth for banks, whereas the capital adequacy ratio and current assets ratio declines in 2016 – 18. The rapid increase in current liabilities causes the decline in CTA.

6.5 Crisis and Covid

The crisis period is 2007 – 09 whereas the COVID period is 2019 – 20. All ratios are same except ROA, PM, OER, CAR, WRL and Ret. The return on assets, profit margin and returns increase in 2019 - 20 whereas OER declines, showing efficient operations of banks. The CAR declines and WRL increases, showing higher risk of Islamic banks with higher growth in the COVID period.

6.6 3- and 6-Years Post Crisis

The periods being compared are 2013 – 15 and 2016 – 18. All ratios in these periods are same indicating consistent performance of Islamic banks over years.

6.7 6 Years Post Crisis and Covid

The periods under comparison are 2016 – 18 and 2019 – 20. The ratios are statistically same except PM, WRL and EPS. This shows that higher write-offs during COVID is impacting profit margin negatively. Same results are obtained when 2016 – 18 period is compared with 2020 only. This shows the impact of COVID on Islamic banks is limited.

TABLE 3: T – Test Results

Ratio	2005-06	2007-09	2007-09	2007-09	2007-09	2013-15	2016-18 COVID	2016-18 2020
	2007-09	2010-12	2013-15	2016-18	2019-20	2016-18		
ROA	0.353	0.557	0.112	0.007*	0.035*	0.267	0.748	0.501
ROE	0.469	0.493	0.713	0.705	0.556	0.929	0.713	0.698
PM	0.063	0.817	0.088	0.038*	0.013*	0.881	0.045*	0.030*

OER	0.351	0.161	0.082	0.068	0.003*	0.810	0.156	0.333
ATO	0.956	0.938	0.370	0.156	0.532	0.598	0.053	0.081
CTA	0.039*	0.153	0.096	0.031*	0.112	0.484	0.717	0.454
CTD	0.577	0.306	0.208	0.082	0.257	0.533	0.601	0.503
CAR	0.284	0.010*	0.000*	0.000*	0.000*	0.499	0.647	0.760
TLE	0.622	0.692	0.824	0.907	0.713	0.729	0.618	0.772
NPL	0.102	0.144	0.593	0.085	0.316	0.236	0.320	0.311
LTD	0.812	0.297	0.872	0.211	0.722	0.092	0.206	0.178
WRL	0.121	0.032*	0.875	0.817	0.000*	0.960	0.000*	0.000*
Ret	0.283	0.487	0.003*	0.001*	0.000*	0.085	0.201	0.280
EPS	0.856	0.428	0.626	0.705	0.066	0.147	0.039*	0.030*

* shows null hypothesis of equality is not supported

The better performance of Islamic banks may also be attributed to their foundation. As their no-interest linkage is not related to the global financial sector (Ali, 2008).

7 CONCLUSION

Islamic financial institutions are very essential for Muslim banking users as they provide them with *Halal* (permissible) investment opportunities. The *Riba* (interest) is strictly prohibited by Allah SWT. Islamic banks operate on profit and loss sharing instead of interest. The financial crisis of 2008 has a devastating impact on many conventional institutions. The impact of the event on Islamic institutions is an area under extensive research as Islamic banking faced its first major crisis and most of the researchers conclude that Islamic banking performs better than conventional banking in terms of profitability, efficiency, liquidity and risk management. The researchers also conclude that introducing the Islamic financial system as an alternative to the conventional system will help in overcoming chances of facing a financial crisis again (Megha, 2008; Shapra, 2008; Shahid 2009; Tlemsani & Suwaidi, 2016; Farooq & Zaheer, 2015).

This study adds to the literature the impact of crisis on Islamic banks of Pakistan. The trend analysis and ANOVA application on ratios of three sub-periods including pre-crisis (2005 – 2006), crisis (2007 – 2009) and post crisis (2010 – 2020) shows mixed results related to crisis impact on banks. The profitability (ROA, ROE, PM),

efficiency (OER, ATO) and returns along with EPS remain significantly same during crisis and pre post crisis. The impact of crisis is found on risk indicators (NPL, CAR, TLE) and liquidity (CTA, CTD) as the ratios are significantly different in all sub periods. This can be attributed to the fact that most of the Islamic banks in Pakistan started operating just before the crisis and they were not very stable. The asset quality shows mixed result as WRL remains same whereas the LTD ratio differs significantly in all periods.

The t-tests are executed on different sub periods from 2005 – 2020 to analyze performance of banks and this indicates that CAR was declining gradually, but now it shows upward trend in the COVID period which implies that banks are prudent and increased their CAR to combat pandemic crisis. Profitability measures, such as ROA and ROE, are improving, whereas the profit margins are diminishing due to higher write-offs during pandemic.

The findings of this research paper will help bank authorities and policymakers in making future decisions as they should focus more on CAR and WRL. It is to be added here that the sample size of this study is small, although it covers all the Islamic banks of Pakistan.

For future research, the sample size may be extended to add more countries in the analysis. This will be particularly helpful as it will highlight the country-wise impact pattern of crisis on Islamic banks.

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