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Original Research Article

Analysis of Islamic Banks Resilience in Pakistan and Factors affecting it

Mohammad Ghaffary Fard [*] **Bibi Asma**[†]

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The economic resilience of the Islamic financial system and the factors affecting it are important topics in the economic literature. Regarding the Islamic banking system in Pakistan, determining its resilience and examining the factors affecting it is one of the goals of this article. In this study, we make an effort to look at the Resilience of Islamic banks across Pakistan along with how particular banking variables influence their resilience. The data set used for this study is made up of Pakistani Islamic banks from 2015 to 2021. Based on the VOLARE index, the resilience of Islamic banks in Pakistan was calculated, then the factors affecting the resilience of Islamic banks in Pakistan were analyzed based on the econometric method using R software Employing the VOLARE equation, the five full-fledged Islamic banks of Pakistan have been selected, which are Meezan Islamic bank, MCB Islamic limited, Dubai Islamic Pakistan limited, Bank Islami Pakistan limited and Al Baraka Pakistan limited. it is apparent that Meezan Bank has higher resilience compared to other Islamic banks. Regression approaches were additionally used to assess the association between banking-specific variables and bank resilience. Given that the bulk of Islamic banks have witnessed gains in recent years, the bank size showed a positive and substantial relationship in the estimation. Additionally, as prudential laws have been strengthened by the state bank of Pakistan, the capital adequacy ratio and leverage ratio were also found significant and beneficial connections in the model's results. Nevertheless, leverage ratio, non-performing loan ratio, and inflation have a negative impact on the resilience of Islamic banks in Pakistan. Therefore, in order to increase the resilience of the Islamic banking system, the policy makers of Pakistan's banking system should include the necessary facilities to increase the size of Islamic banks, monetary and financial discipline to control inflation and increase capital adequacy.

[*] Department of Economic Sciences, Faculty of economics and management, Ahlul Bayt International University, Tehran, Iran; mghaffaryfard@abu.ac.ir(Corresponding Author) (Corresponding Author)
[†] Department of Economic Sciences, Faculty of economics and management, Ahlul Bayt International University, Tehran, Iran; asmabb115@gmail.com

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1 Introduction

The banking system is always exposed to a variety of internal as well as external disturbances that may have an impact on the stability and health of the banking industry and therefore the economy as a whole, as it is the source of many economic crises in the financial and banking sectors of countries. The financial crisis, which erupted in mid-2007, showed that existing regulatory and prudential rules were not sufficient to insure banks against risks and crises. As a result, there was a widespread call for lawmakers and academic elites to change these laws in order to strengthen banks' resilience. As a result, in addition to leading and major international organizations like the World Bank and the World Economic Forum, countries and regional organizations are also carrying out research in this area to better understand the significance of resilience (Abdolshah and Ghiasvand, 2015). For example, the Basel Committee in Basel 3 addresses the issue of resilience, strategies and measures to increase it. A review of economic texts and global experiences shows that resilience can be defined as measures taken to maintain the performance of a system in the face of risks, stress and crisis. Our country has not been free from fluctuations in the banking sector. It should be noted that due to the inefficiency of the capital market and the lack of various tools in accordance with Islamic standards in the debt market, most of the resources required by companies are supplied by the banking industry and the money market. Therefore, the banking sector and its stability deserve more attention to maintain the country's economic stability and control of financial crises, because any shock and consequently crisis in the banking system can spread to other sectors very quickly and the stability and health of the whole economy. Endanger. Meanwhile, the term "resistance economy", which has entered the country's economic literature in recent years and has been seriously considered, has many semantic meanings with the concept of resilience. Also, one of the axes of the resilience economy is the study is the vulnerability or resistance of the economy on the scale of enterprises, including banks.

Economic resilience in the banking system refers to the ability of banks to maintain stability and continue operations in the face of economic and financial shocks. When economic crises, recessions, or severe market fluctuations occur, banks play a pivotal role in preventing the spread of the crisis to other sectors of the economy. Resilient banks can withstand these

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shocks, safeguard their assets, and continue providing essential financial services to clients even under adverse economic conditions.

Resilience in the banking system is strengthened through various factors. Capital adequacy is one of the key elements; banks with higher levels of capital have a greater capacity to absorb unexpected losses and withstand financial risks. High liquidity ratios are also crucial for maintaining cash flow and fulfilling financial obligations. Moreover, effective risk management and diversified loan portfolios enable banks to reduce their vulnerability to economic fluctuations.

The resilience of banks is critical not only for the stability of the banks themselves but also for the entire economy. When banks are resilient to shocks, they help reduce the likelihood of systemic crises and enhance public confidence in the financial system. This contributes to overall financial stability and sustainable economic growth. Therefore, strengthening resilience in the banking system is a primary objective for economic policymakers globally.

The Islamic banking system is essential in supplying the entire financial system and the national economy with critical economic operations and services. The fundamental building block for ensuring sustained economic growth is the banking sector's resiliency and robustness. The consistency and wellness of the banking system's internal and external shocks can have an impact on the economy's overall health and stability. Additionally, as multiple prior banking crises have shown, risks or shocks that affect one bank may transfer across different banks. The worldwide economic downturn, which occurred in 2007–2008, had an impact on the capital markets across the world. As a consequence of the liquidity crunch that followed, numerous significant financial institutions (FI), like Bear Stearns and Lehman Brothers, were forced into bankruptcy. Many endured substantial damages either within or outside of the United States of America (USA). The financial institutions' estimated losses reached $4.05 trillion by 2009. After the Great Depression of the year 1930, it was the worst financial catastrophe historically. It shows that the existing regulatory rules were not sufficient to ensure banks against crisis and risks. Therefore, there was a public demand among politicians and elites to amend laws and regulations that could increase the resilience of banks. Thus, the concept and importance of resilience increased. Many works of the literature show that resilience is to maintain the performance of a system in the face of risk, stress, and crisis. Retaining the banking sectors' resilience would thereby reduce the likelihood of an economic downturn arising hence automatically ensuring the stability

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of the financial system. Resilience is the term used to describe the banking sector's capacity to adapt to both current and upcoming disruptions.

Shari'ah, which forbids interest, gambling, and investing in commodities that are prohibited, like alcohol, governs Islamic banking in general. (Siddiqi, 2004). Islamic banks and Islamic financial institutions are expanding more quickly than conventional banks, particularly in Islamic nations, as a result of the high demand for Shari'ah-compliant goods and services. At the moment, over 70 distinct nations are served by 200 banks that offer banking services consistent with Shari'ah. Both Islamic and non-Islamic nations are included in this. All banking services and products in Pakistan, Iran, and certain other Islamic nations now comply with Shari'ah.

Resilience in the Islamic banking system holds particular significance due to its foundation on Shariah-compliant and partnership-based principles, distinguishing it from conventional banking with unique features like the prohibition of interest (riba) and the principle of profit and loss sharing. These structural differences can lead to varied impacts on the resilience of Islamic banks when facing economic and financial shocks.

Resilience in Islamic banking is essential for the stability of the system and for maintaining the trust of customers and investors. Through effective risk management, high capital adequacy, and the use of asset-backed and participatory financial methods, Islamic banks can enhance their capacity to absorb economic shocks. Since Islamic banks rely on participatory and real economy-linked methods rather than interest-based financing, this approach can help reduce systemic risks and enhance resilience during economic crises.

Moreover, resilience in Islamic banking contributes to the stability of economies that rely on this system. Islamic banks play a critical role in financing and fostering the development of infrastructure and productive projects in Islamic economies. Their resilience means continued access to financial resources for economic projects, preventing economic downturns. Therefore, strengthening the resilience of Islamic banks is essential as part of national strategies for sustainable development and financial stability in these economies.

In Pakistan, Islamic banking began in 1977–1978 and did away with interest. The state bank of Pakistan (SBP) granted Meezan Bank Limited the first Islamic banking license across Pakistan in 2002. In line with best practises around the world, to supervise and grow the Islamic banking industry, the SBP established the Islamic Banking Department in 2003 (IIFM). The growth of customers at Meezan Bank, Dubai Islamic Bank,

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Bank AL Baraka, Faysal Bank, UBL Islamic Bank, and Bank Islamic shows that Islamic banking is on the right track. In addition to this, plenty of commercial banks with numerous branches are actively advertising Islamic Bank and its goods and services. Similar to other banking systems, the State Bank of Pakistan and the Government of Pakistan has helped to consolidate the Islamic Bank's base in the nation and provide facilities. According to the study, in spite of the financial crisis and the country's dire economic circumstances, the Islamic Bank has grown significantly in terms of assets, turnover of business, deposits, and reserves. (Ramzan and Khan Ghauri, 2012).

The Islamic financial system is not risk-free and can be vulnerable to financial crises for a variety of reasons, despite the strong foundational Shari'ah underpinnings. First, because Islamic finance and the real sector are closely related, unforeseen negative developments in the real sector could have a negative impact on the operations and performance of Islamic banks if they don't have strong and efficient risk management procedures. Second, especially during economic upswings, Islamic banks may be persuaded to embrace riskier, more aggressive speculative investment methods without also adhering to fundamentally solid risk management criteria. Aggressive lending combined with poor risk management, which caused a breakdown in counterparty confidence, was a significant contributor to the current crisis.

In developing nations, Islamic banking is one of the financial sector's fastest-growing subsectors. Predictions regarding this segment's relative resilience to financial crises in comparison to conventional banking are made along with this segment's rapid expansion. It is clear that no nation is immune to the political, economic, and environmental occurrences that have the potential to harm our nation's financial and economic sectors.

The State Bank of Pakistan (SBP) is crucial to Pakistan's efforts to advance Islamic banking in accordance with Shari'ah law and regulatory requirements. It is feasible to establish three distinct kinds of Islamic Banking Institutions (IBIs) that offer Islamic banking services in Pakistan: full-fledged Islamic banks, Islamic bank subsidiaries of conventional banks, and standalone Islamic banking branches of a conventional bank.

Islamic banking is one of the parts of the financial sector in developing countries that is growing. The sector's rapid growth is accompanied by claims about its relative resilience to the financial crisis compared to conventional banking. It is obvious that no country is safe from political, economic and natural events that can negatively affect the economic and banking sectors of their country, but identifying their level of resilience

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against monetary and financial shocks and the factors affecting their resilience can raise the questions that:

What factors influence the studied Islamic banks' resilience? Which variables are influencing the resilience of Islamic banks in pakistan?

Calculating each of the analyzed Islamic banks' resilience is another goal of the study. Additionally, numerous internal and external elements that may have an impact on the resilience of Islamic banks are being looked into. A review of various studies shows that the method of calculating the Volare index to express the resilience of Pakistan's Islamic banks and the factors affecting the resilience of the country's Islamic banks network is one of the innovations of this research which has not been done in any research and hast been discussed in the research literature.

The rest of the article is divided into the following sections. The literature on banking resilience is outlined in Section 2. Section 3 follows with an explanation of the research methodology and data. In section 5, we summarize the key findings from the research investigation and give the research findings. The study is concluded in the last section, which also offers suggestions for additional research.

2 Literature Review

The environment for studying Islamic banking resilience is more appealing. Islamic banking resilience has been the focus of substantial studies worldwide. The pool of literature on Islamic banking resilience is constantly growing in new directions.

Moin (2008) compared and evaluated the 2003–2007 performance of Meezan Bank Limited, Pakistan's first Islamic bank, against that of five other conventional Pakistani banks. He used the Return on Asset (ROA), Return on Equity (ROE), Loan to Deposit Ratio (LDR), Loan to Assets Ratio (LAR), Debt to Equity Ratio (DER), Asset Utilization (AU), and Income to Expense Ratio (IER) financial indicators to get at his conclusion. He investigated the relationship using the F and T-tests. In the end, he came to the conclusion that Meezan Bank Limited is less productive, less efficient, and less risky than the average of the remaining five traditional banks. He came to the conclusion that there is no distinction between the two types of banks' liquidity.

Ismal (2014), in his study "The Resilience and Prospects of Islamic Banking In Indonesia," showed that due to the financial crisis, the economic system of Indonesia is dealing with rupiah devaluation, a rise in inflation, and a deficit in the balance of payments. Further, it showed the challenges

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facing Islamic banking in Indonesia. Finally, it suggested that these challenges are temporary because the downturn of the current economy is short-lived, and the Islamic banking sector has so far demonstrated good performance.

Ouerghi (2014), investigated that which one banking system is more resilient in global financial crisis, Islamic or conventional bank? He looked at profitability, liquidity, efficiency, capital adequacy, and leverage ratios over two time periods—one during the financial crisis (2007–2008) and the other following the financial crisis (2009–2010)—in order to achieve this goal. The z-score has also been used by him as a stability indicator. His results demonstrated that Islamic banks underperformed conventional banks in terms of profitability, credit risk, and efficiency in the immediate wake of the financial crisis. The second study indicates that small banks outperform big ones, while enormous Islamic banks dominate conventional banks in terms of efficiency. It has been established that conventional banks are more financially stable than Islamic banks.

Farooq and Zaheer (2015), in their article "Are Islamic Banks More Resilient During the Financial Crisis", they compared the behavior of Islamic and conventional banks during financial panic, by using Pakistan's banking data for the time period of 11 July 2008 to 2 January 2009. They discovered that Islamic bank branches were less likely to experience deposit withdrawals during financial panics by applying regression analysis models. In order to attract deposits during the panic, they also discovered that various Islamic branches participated in both Islamic and conventional activities. They also found that during financial crises, Islamic branches extended more loans. Additionally, they demonstrated how Islamic banks' lending decisions were less susceptible to variations in deposits.

Khan and Muhammad (2016) proposed a paper to elucidate the financial resilience perspectives in banks, with an aim to distinguish empirically the short term and the long-term financial resilience between Islamic and conventional banks. Employing Thompson's Bank scope data, they took into account an overall 100 non-listed Islamic banks and 57 listed Islamic banks in 22 nations, together with their commercial banking equivalents, during the years 2000 to 2012. Ratios and diagnostics are computed using panel data analysis. They came to the conclusion that whereas traditional commercial banks are much more resilient than Islamic banks over the long term, the latter are significantly less resilient over short periods of time.

Amiry et al., (2018) measured the resilience of banking in Iran using two indices: volar and distance to failure, and banks are ranked accordingly.

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They used data for banks from 2005 to 2014. After evaluating the resilience of banks, they examined the most crucial internal and macroeconomic factors that affect the resilience of the banks. Their results showed that when resilience is measured using the VOLARE index, the ratio of facilities to assets, equity to assets, and gross income ratio are directly related to resilience. The ratio of facilities to deposits is indirectly related to banks' resilience. The size of the banks did not affect the degree of resilience. The distance to failure index is used as a dependent variable; among the bank's internal variables, the ratios of equity to assets, capital to debt, and return on assets directly correlate with banks' resilience. On the other hand, the two variables of loan-to-assets and deposit-to-debt ratios have also been indirectly related to banks' resilience.

Jahangard et al., (2018) have studied the resilience of Iran's banking system by using the panel autoregression method of the effect of various shocks. The results show that production has a positive effect on banking resilience, but the inflation rate has a negative effect on the resilience of Iran's banking network.

Wiranatakusuma (2018) analyzed the level of resilience of Islamic banking in Indonesia by building the Islamic banking resilience index (IBRI) through the composite index. The composite index is created employing twelve variables and monthly data from January 2010 to December 2016. Additionally, he demonstrated how crucial the development of IBRI is as a tool for monitoring and as a foundation for additional responses and application of policy. The IBRI composite index can be used to gauge how resilient Indonesian Islamic banking remains. Ultimately, researcher argued that strong capital and liquidity management are necessary for Islamic banking to be resilient in order to create a stronger capacity for absorbing shocks and promoting financial services.

Bahemia (2019) analyzed the effectiveness and resilience of the Middle East and North African (MENA) Islamic banks in the wake of different financial shocks. They used the data for banks from 2007 to 2018 and used the OLS regression model. Their research shows that the Islamic banks are more buoyant in the wake of the crisis and suffer a lower decrease in profits, less risky, and quickly recover from the crisis compared to the conventional banks.

Sadeghisharif et al., (2019) have investigated the economic resilience threshold of banking in Iran by using survival analysis model and regression method. The results show that the uncertainty of the interest rate of

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cooperative contracts and the inflation rate had the greatest effect on the economic resistance of the Iranian banking network.

Ahmad and Arafat (2020) investigated the impact of Islamic governance practices on Pakistani Islamic banks' performance before and during the 2007–2008 global financial crisis. The performance of the Sharia Supervisory Board (SSB), Board of Directors (BOD), and Ownership Concentration (OC) was specifically examined in their study. They employed data gathered from Pakistan's Islamic banks from 2003 to 2016. Their findings indicated that the effectiveness of Islamic banks was positively impacted by the size of the Shari'ah supervisory board. At the same time, the GFC had a negligible impact on these banks' return on assets.

Abrishami et al., (2021) focusing on consumer behavior, have calculated the resilience of 10 selected Iranian banks based on the complete indicators and have examined the effects of supply-side shocks, demand shocks, and external shocks on the country's banking resilience. The results show that the country's banking system is not resistant to various shocks.

Danisman et al., (2021) examined the influence of differences in the banking market structures on the local stock market resilience to the COVID-19 across countries. They selected 66 nations as a sample for this study, which was conducted from January 2020 to July 2020. They demonstrated that nations with an additional integrated banking system—one that has a greater number of international lenders and Islamic banks—are highly resilient to pandemics. Furthermore, they noted that equities markets in nations that have greater regulations on capital and liquidity are more resilient to the COVID-19, given on the disparities in banking regulatory standards between nations. According to their final analysis, countries with more stable banking systems are more resilient to the pandemic in terms of stock reactions, whereas those with higher credit-to-deposit ratios, operational costs, excessive provisions, and nonperforming loans are less resilient.

Shahkarami et al., (2022) have identified the factors affecting the resilience of the country's banking network using the foundation data method. Expansion of communication, transparency of laws, planning and expansion of quality, support of the government, empowerment of employees will improve the organizational resilience of the banking network of Iran.

Hasan et al., (2022) explored the resilience of Islamic financial markets to the COVID-19 pandemic first and second waves in comparison with the conventional markets. They employed two bond indices and their

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conventional counterparts, along with five Dow Jones Islamic stock indices, as substitutes for the Islamic and Western financial markets. Their empirical estimations from Jan 1, 2019, to Feb 26, 2021 indicated that both Islamic and conventional stock indices are roughly equally affected by the extreme market fluctuation caused by COVID-19 adopting wavelet, wavelet-based Granger causality, hedge ratio, optimal weights, and hedging efficacy approaches. Islamic stock markets therefore do not benefit from diversification. They also uncovered any discernible differences in reliance between the first and second COVID-19 waves. Islamic bonds, on the other hand, show little dependence on their conventional equivalents, demonstrating the value of diversity. They also showed that a portfolio mix of Islamic and conventional bond pairs could be beneficial because those portfolios exhibit the lowest hedging costs and greatest hedging efficacy, particularly during COVID-19. Overall, their findings imply that compared to other instruments taken into consideration in their study, global Sukuk offers more resilience in periods of significant market volatility.

Mosajed et al.,(2023) calculated the basic components of the resilience of Iranian banks by using the CAMELS indices and the method of 1385 to 1398, and using the GMM method, they concluded that the ratio of facilities to total assets along with economic growth increases banking resilience has become and inflation and the ratio of deposits to total assets reduce resilience in the banking system of Iran.

Salehikia, et al., (2023) have tested the resilience of banks to macroeconomic shocks in Iran's banking system. The results of their research show that the exchange rate has a positive effect on bank credit risk, although other variables such as inflation rate, economic growth and liquidity rate have a negative effect. It will have less credit risk.

Afshari. et al., (2023) have calculated the Volare index for the level of Iranian banks' solvency, and by using the panel data method, the factors affecting the banks' resilience have been identified. The results show that cheap banking resources and banking efficiency strengthen the resilience of the Iranian banking system.

This research is approximately near to the work of Amiry et al., (2018). However, they measured the resilience of banking in Iran for the years 2005-2014. Moreover, our research case study is Pakistan Islamic banking from 2015- 2021 with different variables.

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3 Research Methodology

The method of analysis in this research is descriptive-analytical. In this way, Islamic banks' resilience is evaluated using the Volare index, after calculating this index for each bank, the effect of this index on the banks' internal and external factors is investigated using a simple regression equation. Due to the fact that the Volare index is calculated for a seven-year period, the factors affecting it are also included in the model as a seven-year average. After that, using the econometric methods of panel data, the factors affecting the resilience of banks and the amount and type of their relationship are measured.

Data have been gathered for this purpose from the annual reports of banks, the financial analysis of the state bank of Pakistan, and the reports from KPMG Pakistan for the years 2015 to 2021. Moreover, the five fully-fledged Islamic banks of Pakistan, namely Meezan Islamic Bank, MCB Islamic Limited, Dubai Islamic Pakistan Limited, Bank Islami Pakistan Limited, and Al Baraka Pakistan Limited, have also been chosen.

Many researchers employ VOLARE, an innovative resilience measurement, to determine the bank's resilience. VOLARE (Volatility and ROE) applies an investing strategy that takes into account combined a long-term ROE (a measure of profitability) and the fluctuation of ROE (as a measure of risk). The long-term ROE is defined as the average ROE over several years.

$$ROE_{LT} = \frac{Net\ Income_t}{Equity_t} \quad (1)$$

$$Volatility_{ROE} = \sqrt{1/n \sum_{i=1}^{n} (x_i - \bar{x})} \quad (2)$$

Where x stands for the sample's arithmetic mean and n represents the sample size. The Markowitz (1959) model served as an inspiration for VOLARE, which calculates superior sustained performance (SSP) throughout a ten-year time frame by taking into account both ROE and ROE volatility.

3.1 Calculating VOLARE

VOLARE, we initially chose an industrial area (e.g., in this case Islamic banks) that is homogenous and permits accurate financial outcomes assessment. Following that, we computed the average ROE (2015–2021) for every bank and the adjusted standard deviation of ROE during the exact same time. Next, we established risk zones based on the top performance for each risk period.

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The subsequent steps should be made in order to create the VOLARE index:

1) To determine the average return on equity for the years 2015 to 2021, we aggregated the ROE data from the selected annual bank reports. Then we gave this the AV ROE label.
2) With the exception of 2015, we calculated the difference between year ROEs in order to account for performance variations. The total of all positive changes was denoted by the letters (P), and the total of all negative changes by the letters (N). After calculating the return on equity for each bank, its difference with the previous years is calculated, and the sum of these differences is included with the P sign for years that are positive, and with the sign of N for years that are negative.
3) As an indicator of risk, we computed the adjusted standard deviation of ROE from 2015 to 2021.

$$ASD\ ROE = \frac{(N+1).SD}{(P+1).(-1)} \quad (3)$$

In the above relationship, the sum of the annual difference of ROE for consecutive years is called N when it is negative and P when it is positive. The high level of the adjusted standard deviation indicates the high level of bank risk, since risk is considered a negative phenomenon for banks, the adjusted standard deviation in the equation mentioned in (-1) has been multiplied.

4) Employing the risk performance metric ASD ROE and the corresponding risk-adjusted standard deviation, we ranked each bank from highest to lowest.
5) For each interval of adjusted standard deviation (Adj. St. Dev.), we carefully selected the "best in class."

3.2 Variable Measurement

The key ratios used to gauge financial performance are return on assets (ROA) and return on equity (ROE) (Naceur & Goaied, 2001; Williams, 2003; Siddiqui, 2008; and Sufian & Habibullah, 2009). The yearly financial reports of Islamic banking institutions were examined using the profitability from two dimensions (Return on Assets and Return on Equity). Here, we measured the RoE for each bank and added it to the adjusted RoE to obtain resilience and explanatory variables such as Bank Size, Liquidity Ratio, CAR, Leverage ratio, and NPL Ratio determines over a seven-year period. Similar to this, the bank's external variables like GDP and inflation are also

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considered to have explanatory significance. Table 1 displays the specifics of these variables together with their symbols, definitions, and anticipated indications.

Table 1
Explanatory Variables

Bank Specific Variable					
s. no.	**Variables**	**Symbol**	**Operational Definition**	**Expected relation**	**Sources**
1	Size	SIZE	The natural Log of total Assets	Positive/ Negative	SBP
2	Liquidity ratio	LIQ	Loan to deposit	Positive/ Negative	SBP
3	Capital Adequacy ratio	CAR	Capital to risk weighted assets	Positive/ Negative	SBP
4	Leverage ratio	LR	Total deposit to Equity	Positive/ Negative	SBP
5	Non-performing loans to total loan ratio	NPL	NPLs to total loan	Positive/ Negative	SBP
Macroeconomic variables					
1	Gross Domestic Product	GDP	Value of GDP growth (annual %)	Positive/ Negative	WDI
2	Inflation	INF	Value of inflation (annual %)	Positive/ Negative	WDI

Source: Research Findings

The desired model is estimated in this study using the panel data approach. Typically, data including time series observations of several individuals are referred to as panel data or longitudinal data. In light of this, panel data is an amalgamation of cross-sectional and time series data. In other words, panel data are statistics gathered from a group of people who have been monitored repeatedly over time. In the case of T time periods (t = 1, 2, ..., T) and N people (i = 1, 2, ..., N), the total observational units for panel data will be N x T.

4 Results

As previously noted, the average return on equity (ROE), which is essentially a long-term average of the bank's performance and profitability, is determined for each bank across several years to determine the VOLARE index. The amount of variation in the return on equity across these years is then determined using the adjusted standard deviation (ASD ROE). The

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average and adjusted standard deviation of equities are added together to get the volatility index. The banks that were evaluated and their average long-term return on equity are shown in the Table 2.

Table 2
Calculated Average ROE and Adjusted ROE

BANKS	AVERAGE ROE	SD ROE	N	P	ASD ROE
MEEZAN BANK	0.25807	0.07257	0.18820	-0.03350	0.61203
BANK ISLAMI	0.11040	0.05060	0.22950	-0.10930	0.12203
DUBAI ISLAMIC	0.06901	0.03963	0.10410	-0.04520	0.11978
AL BARAKA	0.00774	0.03963	0.09890	-0.00540	-0.93828
MCBIB	-0.01689	0.04485	0.13330	-0.12880	0.05410

Source: Research Findings

Banks with higher average ROE are expected to have higher ASD and conversely. Banks with lower ROE are expected to have lower ASD. Therefore, banks that have been able to maintain high average returns have less volatility, and have been more resilient, while banks that had a lower average return on equity are high volatile, and are less resilient.

Table 3
Calculation of Volare Index

BANKS	AV ROE	SD ROE	VOLARE
MEEZAN BANK	0.25807	0.07257	0.33064
DUBAI ISLAMIC	0.06901	0.03963	0.14735
BANK ISLAMI	0.11040	0.05060	0.11961
AL BARAKAH	0.00774	0.03963	0.04738
MCBIB	-0.01689	0.04485	0.02796

Source: Research Findings

In Table 3, banks are ranked based on the VOLARE index. Islamic Banks for which the value of the VOLARE index is high are placed at the top of the table and the banks for which the value of this index is less are placed at the bottom of the table. Therefore, Meezan Bank and Dubai Islamic Bank are more resilient than other banks (Bank Islami, AL Baraka, and MCBIB). On the other hand, the Volare index value for the Al Barakah Pakistan limited and MCBIB is lower. Therefore, they are less resilient and are placed at the bottom of the ranking table.

After measuring the resilience of Islamic banks in Pakistan by using Volare index, now the factors that affecting resilience have been measuring.

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The resilience of the banking sector is affecting by many variables, some of which have been discussed in this study. Based on these variables the following regression equations have been established.

$$VOLARE = \beta_0 + \beta_1 SIZE_b + +\beta_2 LIQ_b + \beta_3 CAR_b + \beta_4 LEV_b + \beta_5 NPL_b + \beta_6 GDP_b + \beta_7 INF_b \quad (4)$$

In which β_0 is intercept, $\beta_{1,2,3,4,5,6,7}$ are model coefficients; SIZE is bank size, LIQ is liquidity ratio, CAR is capital adequacy ratio of banks, LEV is leverage ratio, and NPL is non-performing loans. These are the bank's internal factors that will determine the resilience of banks in this model. Similarly some external variables like GDP (gross domestic product) and INF (inflation) has been used to detect the impact on bank's resilience.

```
R 4.2.2 · ~/
> library(plm)
> data=read.csv(file.choose())
> pdata=pdata.frame(data, index=c("BANKS","YEAR"))
> pool=plm(RESILIENCE~SIZE+LR+CAR+LEVR+NPL+GDP+INF,data=pdata,model="pooling")
> summary(pool)
Pooling Model

Call:
plm(formula = RESILIENCE ~ SIZE + LR + CAR + LEVR + NPL + GDP +
    INF, data = pdata, model = "pooling")

Balanced Panel: n = 5, T = 7, N = 35

Residuals:
    Min.  1st Qu.   Median  3rd Qu.     Max.
-87.6550 -12.9100   3.9327  16.5138  50.1226

Coefficients:
             Estimate Std. Error t-value  Pr(>|t|)
(Intercept) -618.96851  120.57406 -5.1335 2.128e-05 ***
SIZE          65.14948   13.85646  4.7017 6.789e-05 ***
LR            -0.56442    1.06055 -0.5322   0.59894
CAR            8.82652    1.55777  5.6661 5.122e-06 ***
LEVR           0.26327    0.51806  0.4986   0.62213
NPL           -1.72554    1.27143 -1.3572   0.18597
GDP            0.61471    2.49096  0.2468   0.80695
INF           -4.95923    2.23796 -2.2160   0.03531 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    90086
Residual Sum of Squares: 24983
R-Squared:      0.72268
Adj. R-Squared: 0.65078
F-statistic: 10.0513 on 7 and 27 DF, p-value: 3.9094e-06
>
```

Figure 1. Findings Using R Studio
Source: Research findings using R Studio

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SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.850103
R Square	0.722675
Adjusted R Square	0.650776
Standard Error	30.41874
Observations	35

ANOVA

	df	*SS*	*MS*	*F*	*gnificance F*
Regression	7	65102.96	9300.422	10.05125	3.91E-06
Residual	27	24983.09	925.2996		
Total	34	90086.05			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-618.969	120.5741	-5.13351	2.13E-05	-866.366	-371.571	-866.366	-371.571
SIZE	65.14948	13.85646	4.701739	6.79E-05	36.71836	93.5806	36.71836	93.5806
LIQ	-0.56442	1.060549	-0.53219	0.598944	-2.74048	1.611648	-2.74048	1.611648
CAR	8.826523	1.557771	5.666125	5.12E-06	5.630242	12.0228	5.630242	12.0228
LEVR	0.263266	0.528059	0.498555	0.62213	-0.82022	1.346754	-0.82022	1.346754
NPL	-1.72554	1.271431	-1.35717	0.185966	-4.3343	0.883216	-4.3343	0.883216
GDP	0.614711	2.490962	0.246777	0.806948	-4.49632	5.725744	-4.49632	5.725744
INF	-4.95923	2.23796	-2.21596	0.035312	-9.55114	-0.36731	-9.55114	-0.36731

Figure 2. Findings Using MS Excel
Source: Research findings using MS Excel

A model is deemed to be a good model when the explanatory power, which is measured by the coefficient of determination R2, is high. The main goal of a regression analysis is to examine the influencing factors on the dependent variable through the explanatory variables included in the model. The findings from the numbers in the aforementioned table demonstrate that all models have sufficient R2, or the coefficient of determination, which contributes to the high explanatory power of the models by the explanatory variables employed. The probability level is more than 95% and the F-statistic is equal to 0.7347 or near to 1, which is showing the goodness to fit of a model.

The result of estimating these equations has been shown in table below table results using R software and the MS Excel. The results demonstrated a positive relationship between size and bank resilience. It showed that greater size of bank increased bank resilience and vice versa. The outcome was

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consistent with earlier study done by Akhtar et al. (2011), Ahmed (2011); Amiry et al., (2018).

The ratio of current asset to current liabilities, which measures the degree of liquidity (LIQ), is found to have negative and significant relation with the bank resilience. The estimated coefficient which is related to this specific variable provides that liquidity and resilience have an inverse relationships, i.e. an increase in liquidity will results in a decrease in profitability and result decrease in resilience. The results were in line with the findings by Abate & Yuvaraj (2013); Suheyli (2015); and Berhe & Kaur (2017).

The findings of CAR revealed a substantial favorable relationship with bank resilience. It seems that strengthening the capital buffer for Islamic banks would make them more resilient. The result was parallel with earlier study done by Ramlall (2014); Akhtar et al. (2011); Ghenimi & Omri (2015); and Amiry et al. (2018).

Leverage ratio, which is determined by the debt-to-equity ratio, has a favourable and significant impact on the bank's resilience. This demonstrates that banks are more profitable and therefore more resilient when their leverage ratio is higher. While the findings by Ahmed et al. (2011), and Isayas (2022) are consistent with the prior expectation, Alomari and Azzam (2017), Hailegebreal (2016), and Kazeem (2015) revealed negative connection, which is contrary to those findings.

Interestingly, NPLs ratio established the negative relationship with adjusted return on equity (ASD ROE) or resilience, any economy is in grave peril when non-performing debts are high and growing. The outcome was consistent with other studies by Akinlo and Emmanuel (2014) and Khairi et al. (2021).

With respect to macroeconomic variables, the GDP showed positive relation with the banks' resilience a result of the simple reason that during cyclical upswings lending demand rises. Increased bank loans and deposits can be beneficial for banks' resilience. And the inflation (INF) showed negative relation with the banks' resilience. By having a negative coefficient, Islamic banks were more exposed to short-term liquidity risks because they held fewer liquid assets to cover growing costs during recessions or periods of high inflation. High inflation rates during an inflationary period might elevate the risk of financing default, which would lower bank profitability and cash reserves and weaken banks' ability to withstand shocks. The results corroborated those of studies by Ghenimi and Omri (2015) and Amiry et al., (2018).

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5 Conclusion

Throughout this research, we make an effort to investigate how the resilience of Islamic banks in Pakistan is affected by bank-specific variables. The sample for this study was drawn up from Pakistani Islamic banks from 2015 to 2021. Employing the VOLARE equation, it is clear that Meezan Bank has greater resilience than other banks. Regression models have also been used to observe the association between bank-specific characteristics and bank resilience. Given that the majority of Islamic banks have experienced gains in recent years, the size of the bank showed a positive and substantial relationship in the model. Additionally, as prudential rules, the capital adequacy ratio and leverage ratio both identified positive and significant relationships in the model. The model is a good fit and explains 72% variation. The results are to some extent consistent with the research study conducted by (Amiry et al., 2018. Afshari et al., 2023). The variable of the capital adequacy ratio has a direct relationship with the resilience of banks. So, it is necessary for banks to increase this ratio and the amount of capital compared to assets This study contributes to the knowledge in many ways. Firstly, this study is conducted on Islamic banks. The research on resilience practices in Islamic banks is still an under researched area, as the Islamic banking industry is flourishing over time not only in Islamic countries, but also in Western and African countries. Secondly, the resilience practices of banks are evolving rapidly, especially after the recent Covid-19 crisis, as the recent crisis has confirmed that many companies and financial institutions were having inadequate policies and processes to deal with major risks. Companies from all sectors were affected by the unexpected events, such as a decline in the demand of their products, commodity prices, extreme changes in the currency exchange rate and a wide liquidity crunch. Thirdly, the current research study was conducted in the context of the Pakistani banking industry. The fact of the matter is that there exist several differences in practicing resilience among different economies due to cultural and regulatory differences. The current study has introduced a resilience model which can be used to investigate resilience practices of the banks.

The resilience of Islamic banks in Pakistan, given their reliance on participatory financial structures and commitment to Shariah principles, faces unique challenges and opportunities. Studies show that while these banks have experienced significant growth and an increasing share in Pakistan's financial system, they remain vulnerable to certain economic shocks. Factors such as capital adequacy, bank size, and liquidity ratios play crucial roles in enhancing resilience. However, issues like inflation, high

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leverage ratios, and elevated levels of non-performing loans can negatively impact their resilience.

In Pakistan's economically volatile and high-inflation environment, Islamic banks need to strengthen their risk management strategies to withstand such conditions. Focusing on improving capital adequacy and reducing non-performing loans could contribute to better resilience. By relying on asset-based financing and profit-and-loss sharing methods, Islamic banks in Pakistan can potentially demonstrate greater resistance to economic fluctuations. However, due to certain regulatory and structural limitations, achieving full resilience remains a challenge.

Overall, while Pakistan's Islamic banks are on the path to enhancing resilience, achieving a sustainable level of resilience and effectively addressing economic challenges requires regulatory support, increased capital capacity, and improved risk management practices.

6 Practical Implications

The current study contributes in the practices of Islamic banks in Pakistan in many ways. Firstly, the study has identified the weaknesses in the resilience of some Islamic banks operating in Pakistan, which need to be considered for improving their practices. Also, it identified the factors that are affecting the resilience.

The current study has contributed in terms of methodology by employing the secondary sources of data from the annual reports of bank and the financial statements of state bank. The use of this data is contributing in the methodology by use of VOLARE index and panel regression analysis.

Based on what has been stated in this study, a number of policy implications can be suggested for the development of resilience in the Islamic financial institutions.

This research study is of the interest and value for the risk managers, practitioners, conventional banks, Islamic banks and policy makers as well as for academic point of view. The findings of the study will be helpful for improving the resilience practices of banks operating in Pakistan. It facilitates the academician, scholars and bankers to have a depiction about banking developments in resilience practices of banks.

As they can use these research findings of this research to improve their resilience practices. By doing so, they would be able to build confidence of the stakeholders and market participants, which will enhance their reputation, strengthen their ratings and improve their profitability.

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This study has implications for Islamic banks by pointing out the weaknesses in the resilience practices of banks. This may help them to improve their current practices, processes and procedures related to resilience measuring, mitigation, monitoring, reporting and risk disclosure practices.

7 Future Research Recommendations

Since, the present research focused on the resilience of Islamic banks operating in Pakistan. The same research strategy can be used to conduct this kind of investigation independently in several nations. Considering the cultural and regulatory diversity, it is anticipated that different economies will result in varying findings. This will be fascinating to know because these practices are influenced by a variety of circumstances. Additionally, panel studies can be carried out employing various models across various nations. Comparing and contrasting the resilience of other nations will be interesting. Comparing the level of resilience of conventional and Islamic banks with each other can also be significant in order to be able to calculate and compare their level of resilience in the conditions of various monetary and financial shocks.

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