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The Worldwide Financial Crisis: An Analysis of Financial Performance from the Banking Sector of Pakistan

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Abstract: The global financial crisis (GFC) of 2007-2008, which started in the USA and quickly spread worldwide, caused major disruptions in many countries' economies. This study evaluates the financial performance of Pakistan's banking sector before and after the crisis, spanning 2004 to 2013. Both Islamic banks (IBs) and conventional banks (CBs) were analyzed, focusing on variables such as return on assets, investments, solvency, liquidity, deposits, asset quality, advances, and total asset size. A stepwise panel regression model was used for the analysis. The results show that asset quality and advances had a positive effect on return on assets, while solvency, liquidity, investments, deposits, and total asset size had a negative impact. Comparisons between the pre-crisis (2004-2008) and post-crisis (2009-2013) periods suggest that the global financial crisis had a negligible effect on Pakistan's banking sector's financial operations.

Keywords: Global financial crisis, banking sector performance, return on assets, Islamic banks vs. conventional banks, Pakistan

1. Introduction:

The global financial crisis (GFC) began in the U.S. in late 2007, negatively impacting the financial and operational performance of banks worldwide. However, public interest in Islamic banks grew during this period because these institutions were less affected by the crisis. Over the past forty years, Islamic banks have expanded globally, including in both Muslim and non-Muslim countries. Bahrain played a key role in the growth of Islamic banking, launching its industry in 1979 (Abdulle et al.). The GFC, originating in the United States, had long-term effects on the global banking sector, reducing credit availability and increasing uncertainty about future economic gains (Cernohorska & L). Australia, in contrast, performed better than many other countries during the 2007-2009 crisis, implementing policies to support the economy and minimize the crisis's impact (Claessens et al.). The global financial crisis also impacted Pakistan's financial institutions, particularly commercial banks, affecting their operational programs, financial structures, and market strategies. Similarly, Pakistan's overall economy was affected by the crisis. While the efficiency and effectiveness of conventional banks were significantly influenced, Islamic banks in Pakistan were less affected. This study aims to analyze the impact of the financial crisis on banking performance in Pakistan from 2004 to 2013, with the period 2004-2008 as the pre-crisis period and 2009-2013 as the post-crisis period (Grove et al.).

The global financial crisis (GFC), which began in the USA and spread worldwide, hurt the economies of many countries. Economists consider the 2007-2008 GFC one of the worst financial crises in history, severely affecting the economies of Europe and the West, as well as those in Asia and the Arab world. Throughout history, several financial crises have similarly shaken global economies. The stock market crash on 24 October 1929, known as Black Tuesday, devastated Western economies. Other significant crises include the 1994 Mexican peso crisis, the 1997 Asian financial crisis that started in Thailand, the 1998 Russian financial crisis (Russia Flu), the 2001 Turkish economic crisis, and the 2007-2008 GFC, all of which severely impacted the economies of numerous countries. The global financial crisis occurred because banks created too much money too quickly and used it to speculate on assets, driving up housing prices. Banks generated money by issuing loans, and between 2000 and 2007, they doubled the amount of money and debt in the economy. A large portion of this money was directed outside the productive financial sector: 31% went into housing, around 20% into commercial real estate, 32% into the business sector, 8% into areas outside the business sector, and another 8% into personal loans and credit cards. Banks borrowed vast amounts to inflate housing prices through personal loans. As debt grew faster

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than incomes, many people became unable to repay their loans, pushing banks toward bankruptcy. This triggered the global financial crisis. In response, banks reduced borrowing, causing the economy to shrink.

The global financial crisis significantly impacted the economies of many countries and affected the performance of the banking sector. This study examines the financial performance of Pakistan's banking sector before and after the crisis, using variables such as return on assets (ROA), investment, liquidity, deposits, advances, size, and solvency. ROA, the dependent variable, is typically defined as total profit after tax divided by total assets, indicating a company's profitability relative to its assets. The independent variables (investment, liquidity, deposits, advances, size, and solvency) are used to assess banking performance. According to a study by (Maredza et al.), the capital ratio, cash and cash equivalents to total assets, advances to total assets, total assets, and investments to total assets positively affect ROA, while the deposit to total assets ratio and provisions against non-performing loans (NPL) negatively affect it. The results showed that poor asset quality and deposits negatively affect financial performance, whereas investment, liquidity, size, solvency, and advances positively affect financial performance. Additionally, the comparison of pre- and post-crisis periods suggests that the global financial crisis had a significant impact on the financial performance of Pakistan's banking sector (Popovici & M).

2. Literature Review

The financial performance of commercial and Islamic banks during the global financial crisis has been extensively studied. Evidence indicates that poor asset quality negatively affected bank performance, whereas solvency, size, liquidity, and investment positively influenced performance (Abdulle et al.). Similarly, the performance of Islamic banks during the crisis was found to be resilient, although studies were often limited to specific countries and excluded conventional banks (Almanaseer & M). Analyses of bank performance during the 2007–2010 financial crisis also revealed that efficient banks performed better, while market concentration negatively affected profitability and stability, and market efficiency positively affected both (Anichshenko & V).

In comparative studies, banks in India and Jordan were differentially impacted by the crisis. While Jordanian banks experienced negative effects, including higher deposit-lending ratios, higher interest rates, and declining stock prices, Indian banks observed positive outcomes, such as increased post-crisis share prices (Ashamu et al.). Research on banking globalization further demonstrated that commercial, cooperative, and savings banks experienced significant performance declines during the crisis (Bollen et al.). Similarly, the crisis adversely affected the Nigerian banking sector, reducing credit quality and impacting the broader economy (Dalaien & B). In Indonesia, bank profitability was negatively affected, although pre-crisis performance remained strong (Gerrath et al.). Studies also highlight that branding and entry strategies, as well as restructuring programs, can mitigate the effects of financial crises, strengthening bank resilience and efficiency (Gunay & E. N).

Further research showed that efficiency measures, such as those using Data Envelopment Analysis, indicated improvements in bank performance following crisis-induced reforms (Gunay & E. N). In South Africa, the global financial crisis reduced the efficiency and productivity of the banking system, as evidenced by analyses of total factor productivity and the Tobit model (Maredza et al.). Similarly, the crisis negatively affected Kazakhstan's banking sector and broader economy (Bollen et al.). Conversely, the profitability of Islamic banks in Saudi Arabia, Qatar, Bahrain, and the UAE increased during the crisis due to asset and liquidity growth (Dalaien & B), and comparative analyses confirmed that Islamic banks outperformed conventional banks during the crisis (Hidayat et al.).

Studies comparing banking sectors across countries revealed differences in stability and efficiency. For instance, the Czech banking sector outperformed its British counterpart during the financial crisis (Dalaien & B). In Jordan, banking and tourism sectors were largely unaffected during 2008–2011 (Ahid et al.), whereas Romanian banks performed better before the crisis but experienced efficiency declines during the crisis period (Mirzaei & A). Corporate governance factors were also found to influence post-crisis bank performance, with leverage negatively affecting loan quality and financial performance (Gunay & E. N).

3. Methodology

The data is collected from financial statement analysis provided on bank websites and the Pakistan Stock Exchange. The economic data is collected from the Statistical Bureau of Pakistan and the Pakistan Economic

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Survey for the period of 2003-2013 (Nazir et al.). The population consists of the banking sector, including 34 scheduled banks in Pakistan. The sample consists of 14 scheduled banks. In which 7 are Islamic banks, and 7 are conventional banks. The sample period consists of 2004-2013. Based on the panel regression model to analyze the impact of the global financial crisis on bank performance is analyzed as follows:

$$ROA=\alpha+\beta_1 Dpst+\beta_2 Adv+\beta_3 Liq+\beta_4 Inv+\beta_5 AQ+\beta_6 S+\beta_7 Sol+\epsilon \text{ …….. Equ. 1}$$

In this equation, Return on Assets (ROA) serves as the dependent variable, calculated by dividing total profit after tax by total assets, reflecting how efficiently the bank generates profit from its assets (Almanaseer & M). The independent variables include Dpst, the deposit-to-total-assets ratio, which highlights the bank's reliance on deposits for its asset base, and Adv, the advances or loans portion of the bank's assets. Liquidity (Liq), measured as cash and cash equivalents to total assets, indicates the bank's ability to meet short-term financial obligations (Sufian et al.).

The investment to total assets ratio (Inv) reflects the extent to which a bank's assets are invested, while asset quality (AQ), calculated by the ratio of provisions against non-performing loans (NPLs) to gross advances, measures the quality of the bank's loans (Abdulle et al.). An increase in NPLs suggests inefficiency, leading to a decline in productivity and performance, and thus, the sign of AQ is expected to be negative. Size (S), measured by total assets, indicates how the bank's scale affects its efficiency. A bank can be either too large or too small relative to its optimal size, meaning the sign of the size coefficient could be either positive or negative. Solvency (Sol), calculated by the capital ratio (total equity to total assets), assesses the bank's ability to meet long-term financial obligations. Overall, highly profitable banks are generally more efficient, so the sign of the net profit (NETP) coefficient is expected to be positive (Gerrath et al.).

4. Results

The panel regression model is used to analyze the data and highlights the financial performance of the banking sector in the post- and pre-crisis years over the period 2004-2013.

4.1 Correlation

Correlation shows the strength of the association between two or more variables. Correlation indicates the strength of the relationship between variables: strong, weak, or moderate.

Table 1: Correlation Matrix

Variables	Roa	Size	Sol	Liq	Inv	Dpst	Aq	Adv
Size	0.148	1						
Sol	-0.325	-0.332	1					
Liq	-0.298	-0.326	-0.021	1				
Inv	-0.227	-0.054	0.016	0.301	1			
Dpst	-0.583	-0.192	0.090	0.667	0.728	1		
Aq	-0.466	-0.193	0.088	0.086	0.078	0.251	1	
Adv	-0.637	-0.218	0.130	0.632	0.510	0.937	0.318	1
Mean	0.114	10.227	0.887	1.624	4.062	11.363	0.006	6.959
Median	0.167	10.000	0.893	1.377	3.696	10.138	0.007	6.137
Maximum	0.580	11.000	1.351	4.728	15.375	56.748	0.143	35.193
Minimum	-2.687	9.000	0.477	0.552	0.246	0.888	-0.118	0.479
Std. Dev.	0.317	0.526	0.115	0.850	2.554	6.802	0.027	4.449

The correlation matrix shows there is no issue of multicollinearity between the dependent variable, return on assets, and the independent variables, investment, liquidity, solvency, size, deposit, and advances, as shown in Table 1.

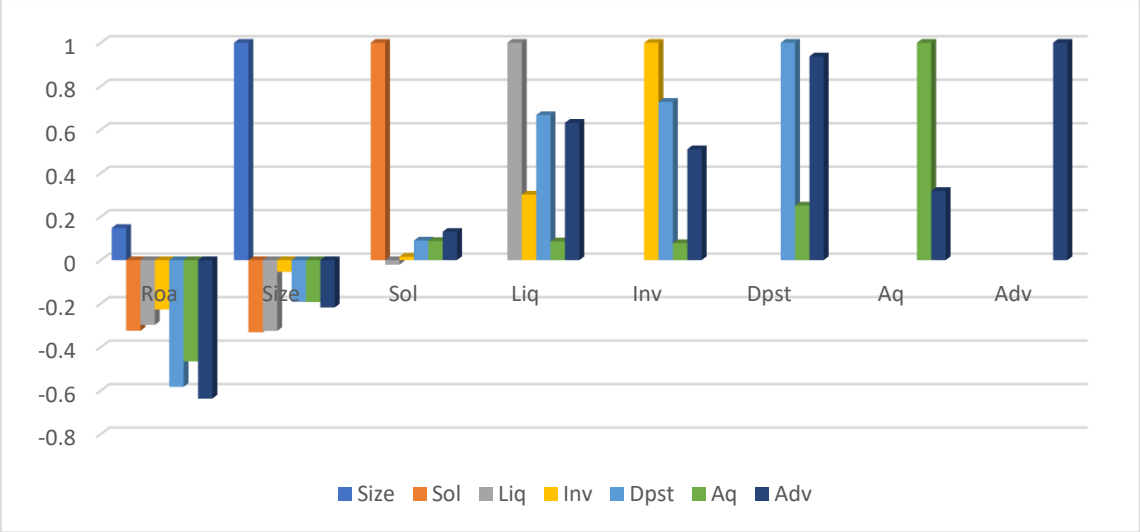

Figure 1: Correlation between the variables.

4.2 Descriptive Statistics

Statistics is defined as the collection, organization, and interpretation of data. There are two types of statistics. The first one is descriptive statistics. The second one is inferential statistics. Descriptive statistics are values that describe the characteristics of a sample or population. Inferential statistics describes methods for inferring results from a sample to the population from which the sample is drawn.

Table 2: Descriptive Statistics

	ROA	SIZE	SOL	LIQ	INV	DPST	AQ	ADV
Mean	0.11	10.23	0.89	1.62	4.06	11.36	0.01	6.96
Median	0.17	10.00	0.89	1.38	3.70	10.14	0.01	6.14
Maximum	0.58	11.00	1.35	4.73	15.38	56.75	0.14	35.19
Minimum	-2.69	9.00	0.48	0.55	0.25	0.89	-0.12	0.48
Std. Dev.	0.32	0.53	0.12	0.85	2.55	6.80	0.03	4.45

Table 2 presents the summary statistics of the variables used in the panel regression analysis. The descriptive statistic includes mean, median, maximum, minimum, and standard deviation. In return over assets mean value is .114, median value .167, maximum value .579 and standard deviation value .316. In size, the mean value is 10.22, the median value is 10.00, the maximum value is 11.000, and the standard deviation value is .526. In solvency, the mean value is .886, the median value is .893, the maximum value is 1.350, and the standard deviation value is .115.

In liquidity mean value is 1.624, median value 1.37, maximum value 4.72 and standard deviation value 0.849. In investment, the mean value is 4.06, the median value is 3.69, the maximum value is 15.3, and the standard deviation value is 2.55. In deposit mean value is 11.3, median value 10.1, maximum value 56.7 and standard deviation value 6.80. In advance mean value is 6.95, median value 6.13, maximum value 35.1 and standard deviation value 4.44.

4.3 Base Line Model

The stepwise panel regression model is used to determine the influence of independent variables on the dependent variables to analyze the performance of the banking sector before and after the global financial crisis over the period 2004-2013.

The stepwise technique of the panel regression model used in this study yielded three panel regression models with varying numbers of independent variables. The following tables show the result of pre- and post-crisis periods using three panel regression methods, such as the common effect method, the fixed effects method, and the random effect model.

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4.4 Result of Pre-Crisis Period

Table 3: Results of Pre-Crisis Period

Regressors	CEM		FEM		REM	
	Coefficients	P Value	Coefficients	P Value	Coefficients	P Value
Coefficients	0.739	0.266	1.372	0.047	0.830	0.148
Size	-0.022	0.683	-0.051	0.426	-0.012	0.815
Solvency	-0.300	0.165	-0.331	0.210	-0.411	0.037
Liquidity	0.054	0.276	0.024	0.697	0.038	0.418
Investment	0.133	0.000	0.031	0.479	0.106	0.003
Deposit	-0.043	0.114	-0.007	0.807	-0.036	0.128
Asset quality	-7.290	0.000	-4.672	0.002	-6.172	0.000
Advances	-0.008	0.760	-0.059	0.038	-0.022	0.348
Model Sig					0.000	
Adjusted R^2					0.1748	
Hausman Test	0.01624					
Wald Stat			0.0005			
m2					0.6421	
Sargan Test					0.2142	

*p < 0.05; **p < 0.01; ***p < 0.001

Table 3 and Figure 2 present results from three models: the Common Effects Model (CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). For each model, coefficients and p-values are provided for the following independent variables: Size, Solvency, Liquidity, Investment, Deposit, Asset Quality, and Advances.

In CEM, the coefficient for Asset Quality is highly significant (-7.290, p = 0.000), indicating a strong negative relationship with the dependent variable. The Investment variable also shows significance (0.133, p = 0.000), indicating a positive impact on the outcome. However, other variables, such as size and Solvency, are not statistically significant in CEM.

In FEM, Asset Quality remains significantly negative (-4.672, p = 0.002), while Advances also show a statistically significant negative effect (-0.059, p = 0.038). Investment, while positive (0.031), is not significant in this model (p = 0.479). REM results are similar to CEM, with Asset Quality (-6.172, p = 0.000) and Investment (0.106, p = 0.003) remaining significant. Solvency also becomes significant in REM (-0.411, p = 0.037), showing a negative impact.

The Hausman Test result (p = 0.01624) suggests that the Fixed Effects Model (FEM) is more appropriate than the Random Effects Model (REM) for this data.

The overall model is highly significant (p = 0.000), and the Adjusted R^2 of 0.1748 indicates that around 17% of the variation in the dependent variable is explained by the independent variables. Other diagnostics, such as the Wald Stat (p = 0.0005) and the Sargan Test (p = 0.2142), provide further insights into model validity and the absence of overidentifying restrictions, respectively.

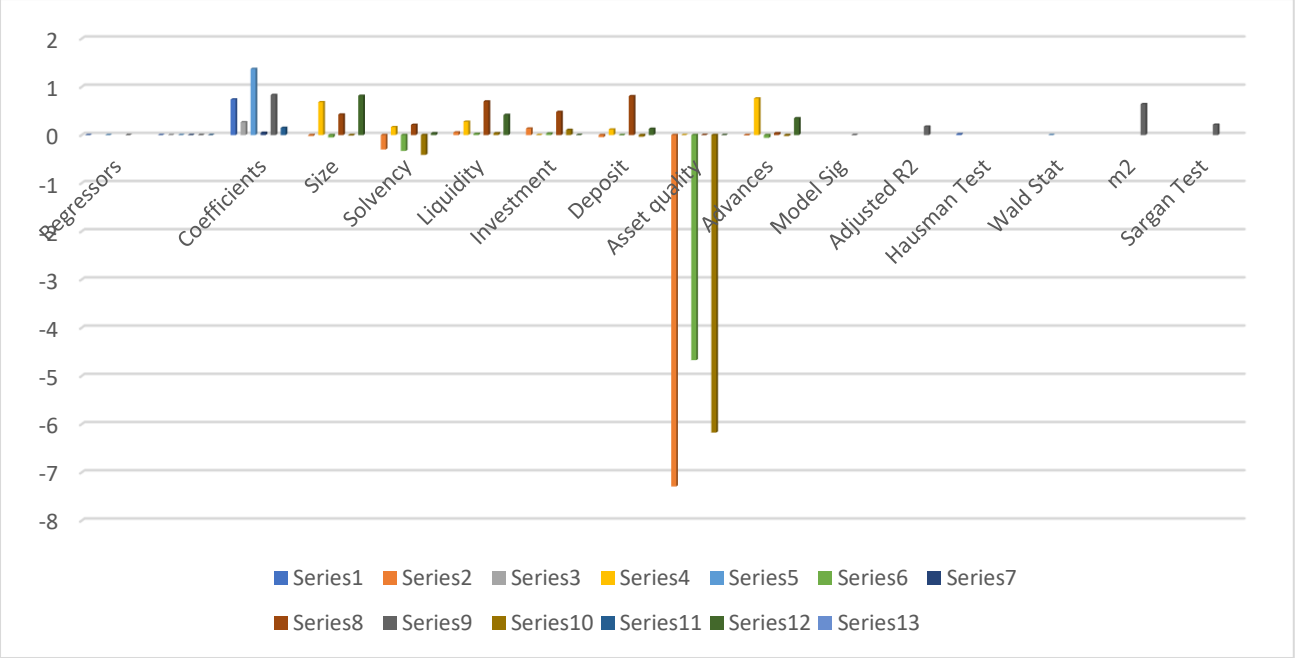

Figure 2: Pre-Crisis Period

Table 4: Results of Post-Crisis Period

Regressors	CEM		FEM		REM	
	Coefficients	P Value	Coefficients	P Value	Coefficients	P Value
Coefficients	1.783	0.137	1.507	0.198	2.319	0.022
Size	-0.061	0.426	-0.039	0.696	-0.111	0.102
Solvency	-0.920	0.055	-0.666	0.242	-0.873	0.042
Liquidity	0.038	0.038	-0.009	0.698	0.022	0.193
Investment	0.023	0.630	-0.003	0.953	0.020	0.664
Deposit	-0.011	0.644	-0.009	0.718	-0.009	0.661
Asset quality	-1.733	0.031	-9.270	0.000	-4.041	0.000
Advances	-0.052	0.086	-0.036	0.267	-0.049	0.067
Model Sig					0	
Adjusted R2					0.5142	
Hausman Test	0.01571					
Wald Stat			0.0001			
m2					0.6482	
Sargan Test					0.2417	

*p < 0.05; **p < 0.01; ***p < 0.001

5. Discussion

The global financial crisis, which originated in the USA and spread worldwide, negatively affected the economies of many countries. Western and European developed economies were severely affected during this period. The crisis also hit the economies of developing regions, including Asia and Arab countries. This study analyzes the financial performance of Pakistan's banking sector, covering both Islamic and conventional banks over the period from 2004 to 2013, using panel data regression analysis.

The stepwise panel regression analysis revealed that provisions against non-performing loans to total assets and advances to total assets had a positive effect on return on assets (ROA), whereas capital ratio, investment

to total assets, cash and cash equivalents to total assets, deposits to total assets, and size to total assets negatively impacted ROA. This indicates that while non-performing loans and deposits positively influenced financial performance, size, solvency, investment, liquidity, and advances negatively impacted financial performance. A comparative regression analysis of the independent variables across the pre-crisis (2004-2008) and post-crisis (2009-2013) periods shows that the global financial crisis had an insignificant impact on the financial performance of Pakistan's banking sector.

The results indicate that non-performing loans had a more significant impact on improving financial performance during the post-crisis period than during the pre-crisis period. In contrast, the size of total assets had an insignificant effect on financial performance. Additionally, deposits to total assets enhanced financial performance in the pre-crisis years but had a declining effect in the post-crisis period, contributing negatively in the latter years. Investment had a positive contribution to financial performance before the crisis, but had a negative impact afterward. Similarly, liquidity was a positive contributor prior to the crisis but turned negative afterward.

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Data availability
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent
Not applicable. This study uses publicly available, de-identified secondary data and does not involve human participants or personal information.

Competing interests
The authors declare no competing interests.

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