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Resiliency and Performance during COVID-19: Evidence of Islamic Banking in Bangladesh

- Tofayel Ahmed*

Abstract

Every component of the global banking system has suffered serious harm due to COVID-19, and Bangladesh is no exception. As a result, its financial stability and profitability have suffered. In this study, we investigate the resiliency and profitability of Islamic banks as compared to conventional banks in Bangladesh due to the adverse impact of COVID-19. The study uses balanced panel data of 26 listed banks in Bangladesh, of which 20 conventional banks and 6 Islamic banks for 2012-2021. The study employs the Z-score to measure bank stability and Return on Asset (ROA) as a profitability measure. The study employs a random effect model for the estimation of the models. Also, it uses panel-corrected standard errors to verify the robustness of the estimation obtained from the initial random-effect model. According to the empirical results of this study, first, it cannot be said that COVID has a greater impact on the resilience of Islamic banks than conventional banks. Moreover, it cannot be concluded that Islamic banks are more profitable than traditional banks during COVID-19 Finally, the results also show that higher Capital Adequacy Ratios (CAR) and Return on Assets (ROA) had a favorable impact on resiliency. In contrast, a greater Cost to Income Ratio (CIR) indicates worse profitability due to COVID-19. Information from this study is useful to investors, regulators, and bank executives, particularly during times of crises and pandemics.

Keywords: Resiliency, Profitability, COVID Period, Islamic Banks, Random Effect Model, Panel Corrected Standard Errors
JEL Classification: G21

1. Introduction

Unprecedented destruction brought on by the COVID-19 epidemic has sparked concerns about the viability of the world's financial system. To contain the COVID-19 virus, numerous countries enacted social isolation, travel restrictions, and lockdowns. COVID-19 disrupted the input-output of goods and services globally (Alon et al., 2020). Banks were forced to close their physical branches shortly after the virus first appeared. For instance, JP Morgan cut almost 1,000 locations in the US, whereas Citigroup shuttered only 100 branches (Subbanna, 2020).

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According to the most recent WHO weekly epidemiological bulletin, published on December 25, 2021, COVID-19 has invaded 222 countries and territories, resulting in roughly 279 million illnesses and more than 5.4 million fatalities globally (WHO, 2021). The financial sector has been harmed by this shock. Due to the severity of the crisis, the relevant authorities and regulators were thinking of measures to keep the economy afloat at the beginning of the epidemic rather than accelerating their wheel of advanced economic growth. Due to its involvement in and execution of the majority of the economic activities of human civilization, whether directly or indirectly, the financial sector is more susceptible to the present pandemic (Wojcik & Ioannou, 2020 and Banna et al., 2020).

Furthermore, the stability of the banking industry affects the economic stability of a nation. Therefore, preserving the stability of the banking sectors (both conventional and sharia-based) is essential to guaranteeing the sustainability of global finance (Salami et al., 2020). However, according to Kao et al. (2019), different banks have different characteristics regarding capital and the ability of financial institutions to handle any crisis (2019). Around 1,400 Islamic financial institutions are active in more than 80 countries, and the global market for Islamic banking is now worth USD 2.4 trillion. The asset size is projected to reach over $4 trillion by 2030 (Meo et al., 2021).

Following the financial crisis of 2007–2008, numerous studies concluded that Islamic banking was more resilient than conventional banking because Islamic banking rules prevent excessive speculation and gambling (Beck et al., 2013). For instance, the top 500 Islamic banks' assets went up by 28.6 percent. At the same time, many multinational financial institutions experienced a decreasing trend in assets during the financial crisis of 2007-2008 (Ayub 2012). However, Flögel and Gärtner (2020) suggested that COVID-19 is distinct from the previous global financial crisis as it has already affected both sectors of the economies around the globe, the financial and real sectors.

Following the discovery of the first pandemic on March 8, 2020, and the first occurrence of pandemic-related death on March 18, 2020, the government of Bangladesh launched several actions to lower the infection rates. For instance,

the government issued a "General Holiday" (i.e., a general lockdown) on March 26, 2020, which was in effect until May 30, 2020. But on April 5, 2021, the Bangladeshi government imposed a second lockdown, which was extended until June 16, 2021, in response to an increase in confirmed cases and fatalities. As of May 29, 2022, Bangladesh had 1.95 million confirmed illnesses and 29,131 fatalities (WHO, 2022).

COVID-19 exerted macroeconomic and microeconomic shocks on the economy and population of Bangladesh. Compared to the anticipated GDP growth rate at the start of 2020, Bangladesh's GDP declined by 2.91% by the end of the year. Bangladesh's financial industry has not been significantly impacted by the COVID-19 outbreak (Karim et al. 2021). Bangladesh has a high percentage of Non-performing Loans (NPL) compared to other emerging nations, and it increased by more than 7% from the fourth quarter of 2020 to the first quarter of 2021. (Paul, 2021). More information about this topic is explored in the literature review section.

Recently, sustainability has received a lot of attention in academic publications (Subbaredy & Reddy, 2017). Sustainability challenges and the financial performance of banks are closely related. Banks have a significant impact on the sustainability of their performance, claim Moufty et al. (2021). For instance, non-performing loans make it difficult for banks to maintain a stable financial position. According to Weber et al. (2010), using sustainable criteria while making loan decisions might reduce banks' risk exposure.

The majority of study has concentrated on the factors affecting the financial performance of private commercial banks as a result of COVID-19, even though few studies have been undertaken to assess the impact of COVID-19 on the banking sector in Bangladesh. According to a thorough examination of the literature, no study has been done to compare Islamic banks' resilience (financial stability) and financial performance to those of conventional during COVID-19.

However, the study offers three key contributions to the existing literature. First, it adds to the emerging literature in the financial sector that simultaneously examines the impact of COVID-19 on financial stability and profitability.

Second, the study addresses the key factors that affect the ranking stability and profitability of banks during COVID-19. Last but not least, it supports and expands the literature on Islamic banking and finance throughout the crisis. With these practical implications, the specific objectives of the study are to compare the resiliency and profitability of Islamic banks as compared to conventional banks due to COVID-19.

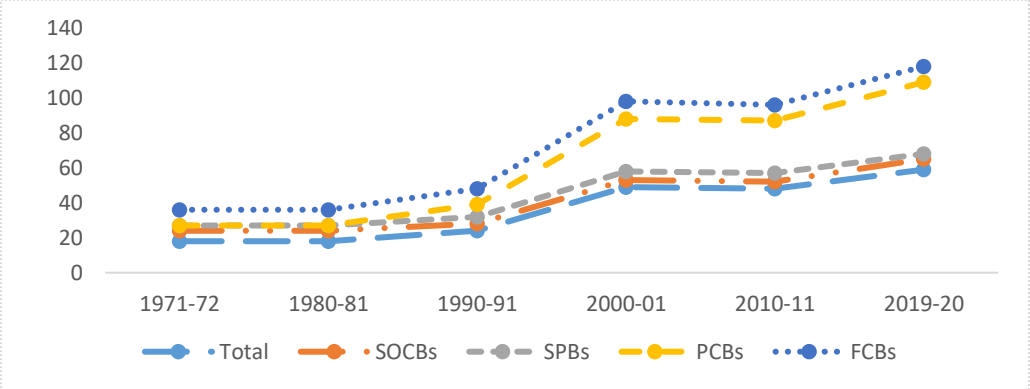
Following on from the introduction in chapter one, the second chapter provides a brief overview of Bangladesh's banking sector and previous studies on financial stability and performance during COVID. Section three deals with the data and the methodology. Descriptive statistics and empirical findings are discussed in section four. Section five's policy recommendations serve as the conclusion.

2. Financial System of Bangladesh

There are three types of financial systems in Bangladesh: formal, semi-formal, and informal. Banks, non-bank Financial Institutions (FIs), insurance firms, and capital market intermediaries including brokerage firms, merchant banks, and microfinance institutions are all considered to be part of the formal sector (MFIs). Semi-formal institutions are those that are subject to some type of regulation but are not under the control of the Central Bank, the Insurance Authority, the Securities and Exchange Commission, or any other statutory financial regulator. Finally, the unregulated private intermediaries are included in the unofficial sector.

State-owned and foreign commercial banks were the country's first financial institutions after it gained independence in 1971. There were 9 (nine) state-owned and 9 (nine) foreign commercial banks after independence. Early in the 1980s, local private commercial banks began to conduct banking operations. Moreover, significantly increased banking operations after that. All of the nation's financial institutions, both banking and non-banking, are governed and supervised by Bangladesh Bank. 61 banks having licenses from Bangladesh Bank, are currently operating (BB, 2022). Figure-1 shows how the number of banks has changed in terms of size and structure from 1971–1972 to 2019–20.

Figure 1: Changing Structure and Size in Terms of Number of Banks from 1971-72 to 2019-20



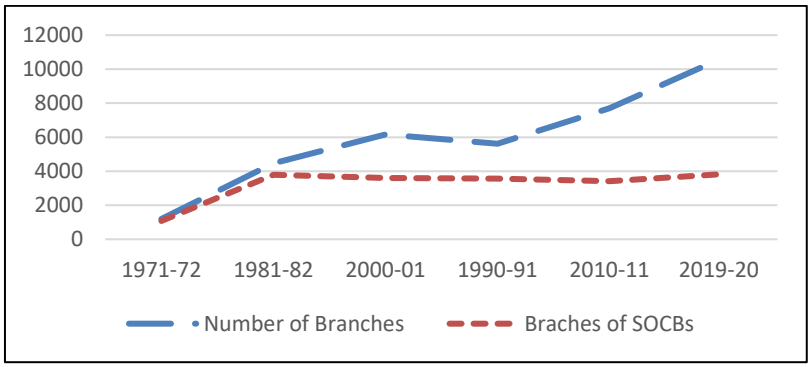
Source: Bangladesh Bank, 2022

Notes: Total indicates total number of banks, SOCBs indicate State-Owned Commercial Banks, SPBs indicate Specialized Banks, PCBs indicate Private Commercial Banks, and FCBs indicate Foreign Commercial Banks

Since the government was eager to increase banking services in rural Bangladesh, government-owned banks rapidly developed in the first decade of the 20th century, primarily in rural areas. In 1972, there were only 1116 bank branches nationwide, with 38% of them situated in rural areas. By the end of 1980, there were 3,748 bank branches, with 63% of them being found in rural areas (Chowdhury et al., 2014). By the end of 2019–20, there was roughly 48 percent of rural bank branches. With the establishment of PCBs, government-owned banks (SOCBs and SPBs) lost their market dominance (Figure-2).

The majority of branches are held by state-owned commercial banks, with Private Commercial Banks (PCBs) coming in second (49 percent). For 2020–2021, only 1% of the country's branches are operated by Foreign Commercial Banks (FCBs), while PCBs control two-thirds of all banking assets (MoF, 2022). As of the end of 2020–2021, SOCBs, Private Commercial Banks (PCBs), Specialized Banks (SPBs), and Foreign Commercial Banks (FCBs) held market shares of 36%, 49%, 14%, and 1%, respectively, in terms of branch count. PCBs also held two-thirds of all banking assets (MoF, 2022).

Figure 2: Expansion of Bank Branch for the Periods 1971 to 2020

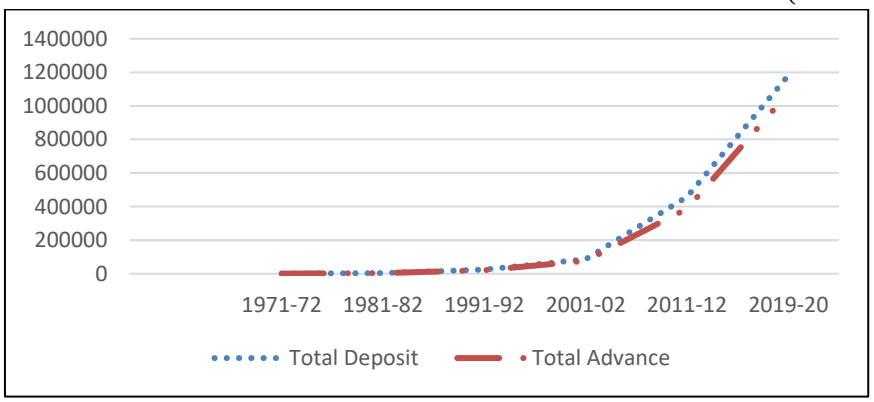


Source: Bangladesh Bank, 2022

Advance growth picked up steam in the first decade of Bangladesh's independence due to policy measures. Total advances climbed from BDT 388 crores in 1972-73 to BDT 3091 crores in 1980-81. Deposit growth grew subsequently (primarily after 1980-81) as the economy began to recover from the war's devastation and reap the benefits of the country's first five-year plan's economic reconstruction programs. Since the mid-1990s, the PCBs' deposits and advances have expanded with their market share gains in the group. As of 2019-20, the PCBs were responsible for over two-thirds of all bank deposits and advances (Figures-3 and 4).

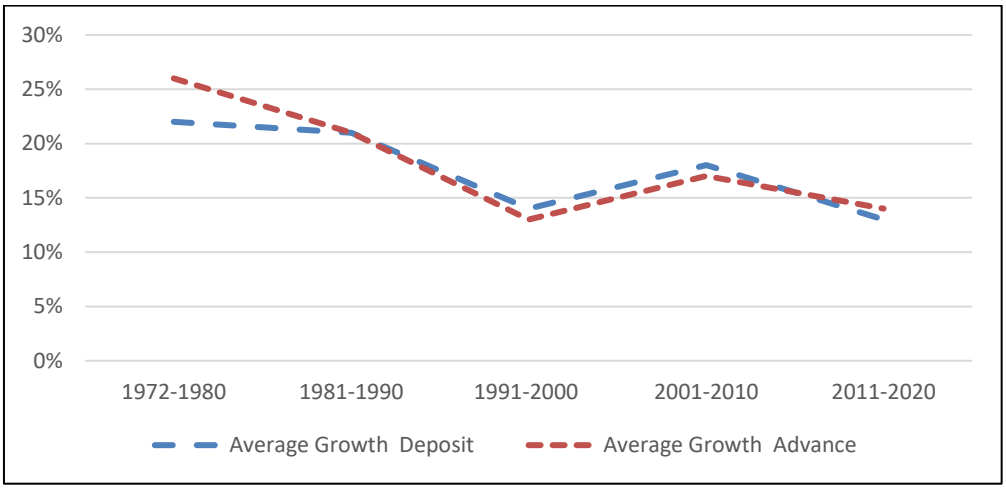
Figure 3: Total Deposit and Advance Growth for the Periods of 1971 to 2020

(in BDT Crore)



Source: Bangladesh Bank, 2022

Figure 4: Total Deposit and Advance Growth for the Periods of 1971 to 2020 (in Percentage)



Source: Bangladesh Bank, 2022

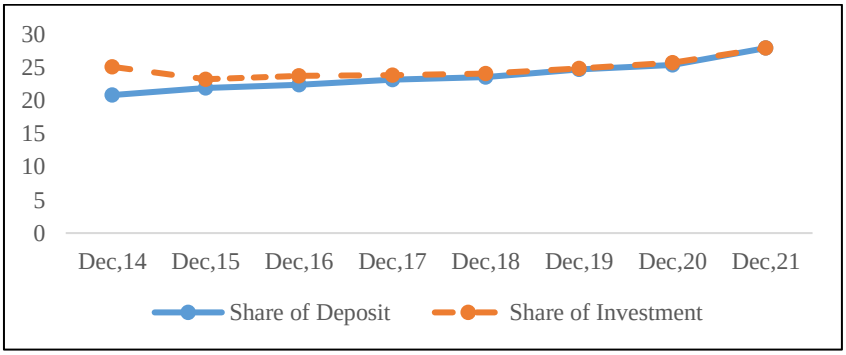
2.1 Market Share of Islamic Banking in Bangladesh

The financial activities in Islamic banks are governed by the bans on "Riba" (interest), "Ghararar" (excessive risk), and a few other activities like betting and drinking. It is commonly acknowledged in the literature that Islamic banking methods are the primary source of income for Islamic banks (Bukhari & Qudous, 2012). The funding strategies used by Islamic banks are divided into two major categories. The first includes the "Murabaha" and "Musharakah" types of investment contracts, which are founded on the principles of equity and profit-and-loss sharing. The second group mainly consists of various contract kinds like "Ijarah" and "Salam," which are based on the cost-plus/profit-margin principle derived from the debt-based premise.

Islamic and conventional banking are combined in Bangladesh's financial system. Islamic banks are currently essential for Bangladesh's deposit mobilization and financing of important economic sectors including manufacturing and services. Bangladesh Bank (BB), regulates all banking activity. Ten full-fledged Islamic banks are currently in operation, with 1619 branches spread throughout 10803 locations. Additionally, Bangladesh Bank permits Islamic banking operations upon request from conventional banks. 13

(thirteen) conventional banks are operating Islamic banking activities, through separate Islamic banking branches, as a result of this legislation. (BB, 2022). Islamic banks in Bangladesh account for a sizeable portion of all deposits and investments (Figure-5).

Figure 5: Market Share of Deposit and Investment of Islamic Banks in Bangladesh



Source: Bangladesh Bank, 2022

The Islamic banking sector's market share has progressively increased over time, as seen in Figure-5. As a result, any catastrophe, such as COVID-19, is likely to impact the financial industry severely. In this view, it is crucial to assess the performance and soundness of Islamic banking compared to conventional banking during COVID-19 in Bangladesh.

2.2 Resiliency and Profitability of Banks: A Literature Review

Numerous empirical studies reveal that capital formation positively affects banks' resiliency. For example, Laeven and Levine (2009) used a Z-score model to investigate bank resilience. The analysis examined capital adequacy measures such as capital adequacy ratio, bank size, and country-level macroeconomic variables. They showed that capital adequacy measures improve the stability of banks. Using the Z-score methodology, Abdel-Baki (2012) evaluated the effect of Basel Capital Framework III on the emerging economies of 47 countries. According to Vazquez and Federico (2015), the amount of capital in a bank boosts its resilience dramatically.

Using panel data from 2007 to 2014, Hossain et al. (2018) examined the impact of additional capital ratios of Basel Capital Framework III on the stability of BRICS economies' banks. The results suggested a positive and significant impact on the stability of banks due to Capital Adequacy Ratio (CAR) and Leverage Ratio (LEV). According to the findings, the CAR appears robust in terms of increasing bank resilience.

Ghosh and Saima (2021) investigated the resilience of Bangladesh's commercial banks due to COVID-19. Their findings give evidence of more vulnerability in banks with lower capital, lower liquidity, and higher Non-Performing Loans (NPLs). Moudud-Ul-Huq et al. (2021) also studied the relationship between financial stability and capital adequacy measures during COVID-19 in Bangladesh. Petria et al. (2015) looked at the key drivers of bank profitability in the EU27 from 2004 to 2011 by banks' profitability measures, ROA and ROE. Their findings reveal that NPL, Advance Deposit Ratio (ADR), and Cost Income Ratio affect banks' profitability. Findings also suggest that an increase in NPLs reduces ROA and ROE. Table-1 shows the factors affecting banks' profitability and their expected impact on bank performance.

Table 1: List of the Variables: Dependent Variable: Return on Asset (ROA)

Variables	Priori Expectation	Sources
Total Asset(TA)	+/-	Kosmidou, 2008
Capital Adequacy Ratio(CAR)	+/-	Akbas, 2012
Non-Performing Loan(NPL)	-	Mansur et al., 1993
Cost Income Efficiency Measures	-	Akbas, 2012
Inflation(INF)	+/-	Abdel-Baki, 2012
Macroeconomic Variable	+	Chalermchatvichien et al., 2014

Source: Authors' Compilation from Various Journal Articles

2.3 Islamic Versus Conventional Banks' Financial Resiliency and Performance: Literature Review

Numerous types of research provided empirical support for the negative impact of COVID-19 on stock markets and investor confidence (Kinateder et al. 2021; Hassan et al., 2021). The COVID-19 problem is anticipated to affect banks in the form of riskier borrowers withdrawing liquid assets, increasing credit risk,

and increasing the amount of non-performing loans (Acharya and Steffen, 2020; Goodell, 2020; Perotti, 2020).

In COVID-19, Ashraf et al. (2022) compared the resilience of Islamic banks to conventional banks for the member states of the Gulf Cooperation Council (GCC). They found that after COVID-19, stock market investors did not believe that Islamic banks were superior to those that were conventional. According to their research, there is no proof that during the COVID-19 shock, investors valued Islamic banks' equities differently than conventional banks' stocks.

But in 2022, Akkas and Al Samman (2021) looked into how the COVID-19 epidemic affected Islamic and Conventional financial institutions as well as Islamic windows in the GCC nations. According to their findings, Islamic banks are less resistant to the COVID-19 epidemic than they were during the 2008 financial crisis.

Danisman et al. (2021) used a sample of 66 nations from January 2020 to July 2020 to investigate whether regional variations in banking market systems affect local stock market resilience to the COVID-19 pandemic. According to the report, nations with concentrated banking systems and a bigger proportion of Islamic banks are more able to withstand the pandemic.

The financial stability of Islamic banking and conventional banking in Indonesia during the COVID-19 epidemic from 2019Q1 to 2021Q2 for 80 banks is compared by Wijana & Wayan (2022). Both before and after the COVID-19 outbreak, Islamic banking showed greater resilience than conventional banking.

The Gulf Cooperation Council's Islamic banking industry was affected by both the COVID-19 epidemic and the Global Financial Crisis, according to Grasa et al. (2022). 32 Islamic banks between the years 2006 and 2020. The study found that compared to the global financial crisis, the COVID-19 pandemic has negatively impacted Islamic banks' profitability and resilience.

In their study published in 2022, Mirzaei et al. (2022) assessed the stock performance of 426 banks from 48 nations during the first stage of the COVID-19 crisis in comparison to their conventional equivalents. According to their

research, Islamic banks' stock returns were 10–13% greater than those of regular banks. El-Chaarani et al. (2022) examined the important variables that might have an impact on the performance of conventional and Islamic banks in the Gulf Cooperative Council from 2017 to 2020, particularly before and mostly during the COVID-19 pandemic period. This study demonstrates that during the COVID-19 pandemic, conventional banks outperformed their Islamic counterparts in terms of financial performance and liquidity.

In Bangladesh, Miah et al. (2021) evaluated COVID-19's effects on the Islamic banking sector in Bangladesh and investigated if Islamic banks are more at risk as a result of their function as a source of "commercial capital." Their findings showed that Islamic banks' investment patterns are oriented toward commerce and merchant lending. Additionally, they demonstrated how severely susceptible Islamic banks are to the economic shock brought on by COVID-19.

Barua and Barua (2021) looked at how COVID-19 would affect Bangladesh's banking industry. The results of this study indicated that both at the sectoral and individual bank levels, risk-weighted asset values, capital adequacy ratios, and interest income are anticipated to decrease for all banks.

During COVID-19, Rizwan et al. (2022) investigated any variations in the systemic risk profiles of conventional and Islamic banks. Their analyses showed that Islamic banks shared similar systemic vulnerabilities to systematic and idiosyncratic causes. However, compared to conventional banks, Islamic banks have substantially less of an impact on other parties despite generating extraordinary returns.

For 32 commercial banks in Bangladesh, Moudud-Ul-Huq et al. (2021) studied the link between capital regulation and financial stability about the effects of COVID-19 over the years 2000–2020. The study's conclusions demonstrate a negative and reciprocal relationship between capital regulation and financial stability. More significantly, COVID-19 weakens banks and necessitates higher capital requirements for risk absorption. When the authors take ownership structure into account, the COVID-19 effect is uneven.

Gazi et al. (2022) looked into how COVID-19 affected the financial success and profitability of Bangladesh's listed private commercial banks. The banks that had superior pre-pandemic COVID-19 performance also had better pre-pandemic COVID-19 performance.

The effect of COVID-19 on Bangladesh's banking industry from 2019 to 2020 was studied by Kashem (2022). All different kinds of banks in Bangladesh have suffered devasting and uniform effects as a result of the pandemic. Efficiency and profitability were largely unaffected by the pandemic.

2.4 Theoretical Model

Based on a few macroeconomic indicators and a few bank-specific variables, the conventional model of the financial stability and profitability of banks uses these variables. The Capital Adequacy Ratio (CAR), Return on Asset (ROE), and a few macroeconomic indicators like inflation and GDP are examples of bank-specific variables, also referred to as internal factors by academics Chalermchatvichien et al. (2014). The mathematical functions for financial stability and bank profitability can be written as follows because this study primarily compares Islamic banks to conventional banks in terms of their financial stability and bank performance during COVID-19:

$\text{Ln(Z)}=f(\text{Islamic}_i, \text{COVID}_t, \text{Islamic}_i * \text{COVID}_t, \text{ROA}_{it}, \text{CAR}_{it}, \text{LnTA}_{it}, \text{LnNPL}_{it}, \text{Growth rate of GDP}_t, \text{INF}_t)$

$\text{ROA}=f(\text{Islamic}_i, \text{COVID}_t, \text{Islamic}_i * \text{COVID}, \text{CIR}_{it}, \text{CAR}_{it}, \text{LnTA}_{it}, \text{LnNPL}_{it}, \text{Growth rate of GDP}_t, \text{INF}_t)$

Where

Ln(Z)= log of Z score

ROA= Return on Asset

Islamic_i = 1 for Islamic Banks, 0 for Conventional Bank

$Covid_t$, = 1 for the COVID period (sample period from 2020 to 2021, otherwise, pre-COVID period (sample period from 2012 to 2019)

$\text{Islamic}_i * \text{COVID}_t$ = 1 for Islamic Banks for COVID Period, otherwise pre-COVID period

ROA_{it} = Return on Asset for ith observation at time t

CAR_{it} = Capital Adequacy Ratio for ith observation at time t

$LnTA_{it}$ = Log of Total Asset for ith observation at time t

$LnNPL_{it}$ = Non-Performing Loan Ration for for ith observation at time t

GDP_t = Growth rate of Gross Domestic Product at time t

INF_t = Yearly Inflation at time t

2.5 Hypothesis

With the objectives in chapter one and the literature review in chapter two, the study aims to compare the resiliency of the Islamic and conventional banks during the COVID-period. It also intends to compare the profitability of the Islamic and conventional banks during the COVID-period. Hence, the hypothesis can be set as follows:

H1: Islamic banks are more resilient than conventional banks during COVID

H2: Islamic banks are more profitable than conventional banks during COVID

3. Data and Methodology

3.1 Data

The study relies on secondary data at the bank level. Bank-level data are collected from the banks' websites. The bank-level data are collected for the periods of 2012 through 2021. Data on the external factors, inflation, and GDP growth rate are collected from the World Bank database. Data for macroeconomic factors such as inflation and GDP growth rate are collected from the World Bank's database. 6 (six) Islamic Banks and 20 (twenty) conventional banks are included in the study in the study. The sampled banks have been listed on the Dhaka Stock Exchange (DSE) (Appendix-1) for more than ten years. The sample period is then separated into two groups of banks, Islamic and Conventional, using the dummy variable approach to attain the objectives. Furthermore, the sample period is

divided into a pre-COVID period (2012 to 2019) and a during-COVID period (2020 to 2021). Before the estimation, all series are turned into a natural logarithm except growth rate of GDP and rate of inflation. Table-2 lists the variables used in the model specification in the next section. The study derives the Z-score in the following manner following

$$\text{Z} - \text{score} = \frac{ROA + CAR}{\sigma(\text{ROA})}$$

σ(ROA) measures the standard deviation of ROA. In theory, banks show more resiliency with a higher Z-score. The study uses a natural logarithm of the Z-score.

Table 2: List of Variables

Variables	Description	Unit of Measurement	Sources
Ln(Z)	Z-score	Log of Z-score	Laeven and Levine (2009)
ROA	Net Income/Total Asset	Percent	Audited Annual Reports
CAR	Regulatory capital/total risk-weighted assets.	Percent	Audited Annual Reports
CIR	Total Operating Expense/ Operating Income	Percent	Audited Annual Reports
NPL	Non-Performing Loan	Percent	Audited Annual Reports
GDP	GDP Annual Growth Rate	Percent	World Bank
INF	Annual Inflation	Percent	World Bank
Islamic	Islamic Bank=1, and Conventional Banks=0	Dummy	Audited Annual Reports
COVID	During COVID-Period = 1, and Pre-COVID Period =0	Dummy	

Correlation analysis has been used to determine whether the major explanatory variables are substantially correlated before model estimation. Before estimating models, the correlation pattern among the independent variables was confirmed. The correlation matrix in Table-3 shows that LTA and LNPL have a correlation of 0.52 and that LTA and inflation have a correlation of -0.50.

Table 3: Correlation Matrix

	CAR	CIR	LTA	LNPL	GDP	INF
CAR	1					
CIR	-0.21	1				
LTA	0.23	0.13	1			
LNPL	0.11	-0.07	0.52	1		
GDP	-0.05	-0.10	0.04	0.09	1	
INF	-0.25	-0.10	-0.50	-0.30	-0.30	1

Notes: Sample period: 2012 to 2021, All series above are transformed into a natural logarithm except GDP growth rate and inflation.

3.2 Model Specifications

The study uses panel data to compare the resiliency of Islamic banks with conventional banks during COVID regimes. Panel data are also used to compare the profitability of the Islamic banks with conventional banks during COVID regimes. An interaction between Islamic and COVID is required to retain the research objectives. The paper utilizes two models, one is for resiliency measurement, and the other is for profitability measurement. Consequently, the model specification is as follows:

To investigate the resiliency of the Islamic banks with conventional banks in the pre-COVID regime and during the COVID regime, the econometric model becomes as follows:

$$Ln(Z_{it}) = \beta_0 + \beta_1\ Islamic_i + \beta_2\ Covid_t + \beta_3\ Islamic_i * Covid_t + \beta_4\ ROA_{it} + \beta_5\ CAR_{it} + \beta_6\ LnTA_{it} + \beta_7\ LnNPL_{it} + \beta_8\ GDP_t + \beta_9\ INF_t + v_i + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

To investigate the profitability the resiliency of the Islamic banks with conventional banks in the pre-COVID regime and during the COVID regime, the econometric model becomes as follows:

$$ROA_{it} = \beta_0 + \beta_1\ Islamic_i + \beta_2\ Covid_t + \beta_3\ Islamic_i * Covid_t + \beta_4\ CIR_{it} + \beta_5\ CAR_{it} + \beta_6\ LnTA_{it} + \beta_7\ LnNPL_{it} + \beta_8\ GDP_{it} + \beta_9\ INF_t + u_i + e_{it} \ldots\ldots\ldots(2)$$

Where

Ln	:	Natural logarithm
Z	:	Z-score, Resiliency Indicator
ROA_i	:	Year-End Return on Average Asset of Bank Balance Sheet, 31 December of each year
Islamic	:	=1 for Islamic Banks, 0 for Conventional Bank
COVID	:	=1 for the COVID period (sample period from 2020 to 2021, otherwise, pre-COVID period (sample period from 2012 to 2019)
CAR	:	Year-End Capital Adequacy Ratio of Bank Balance Sheet, 31 December of each year
CIR	:	Year-End Cost Income Ratio of Bank Balance Sheet, 31 December of each year
TA	:	Year-End, 31 December of each year, Total Asset of Bank Balance sheet in Bangladeshi Taka (BDT)
NPL	:	Year-End Amount of Non-Performing Loan in Bank Balance sheet, 31 December of each year
GDP	:	Annual GDP Growth Rate
INF	:	Annual Inflation

The first model depicts the relationship between Islamic and conventional bank resiliency. It also expresses independent variables by bank group-wise (total asset size, managerial efficiency, credit risk and capital adequacy measures). The model also considers external factors like the yearly GDP growth rate and inflation.

The second model demonstrates the relationship between the profitability of Islamic and conventional banks. It also breaks down independent variables into bank groups (total asset size, managerial efficiency, credit risk and capital adequacy measures). The model also considers external factors such as annual GDP growth and inflation.

4. Results and Discussion

4.1 Descriptive Statistics

The following Table-4 exhibits descriptive statistics of the sample banks for 2012 to 2021. From Table-4, Islamic banks show a higher z-score (4.02) and Lower Cost to Income Ratio (47.87 percent. However, the average performance of ROA, log of Total Asset, log of Non-Performing Loans, and Capital Adequacy Ratio remains the same in the two banking categories.

Table 4: Descriptive Statistics for Islamic and Conventional Banks

Variable	Observation	Mean	Standard Deviation	Min.	Max.
LnZ Score					
Islamic Banks	60	4.02	0.36	3.39	4.81
Conventional Banks	200	3.84	0.69	2.52	5.72
ROA					
Islamic Banks	60	0.01	0.00	0.00	0.01
Conventional Banks	200	0.01	0.00	0.00	0.02
CIR					
Islamic Banks	60	47.87	8.85	33.99	76.20
Conventional Banks	200	52.31	11.09	34.08	89.71
LnTA					
Islamic Banks	60	11.50	0.26	11.06	12.06
Conventional Banks	200	11.37	0.20	10.93	11.90
LnNPL					
Islamic Banks	60	9.94	0.41	8.68	10.55
Conventional Banks	200	9.71	0.47	8.31	10.66
CAR					
Islamic Banks	60	12.62	1.60	10.13	16.65
Conventional Banks	200	12.54	1.87	7.00	17.28
GDP	60	6.65	1.26	3.50	8.20
INF	60	6.04	0.67	5.50	7.50

Note: Sample period: 2012 to 2021. Ln indicates the transformation of a series into a natural logarithm. Where LnZ= Log of Z score, ROA=Return on Average Asset, CIR=Cost Income Ratio, LnTA= Natural log of Total Asset, LnNPL=log of Non-Performing Loans, CAR= Capital Adequacy Ratio, GDP= Annual Gross Domestic Product Growth Rate, INF= Annual Inflation

4.2 Variance Inflation Test

The Variance Inflation Factor (VIF) test is used to establish if multicollinearity is a problem or not. As per Hair et al. (2014), the maximum mean VIF should be 10, i.e., the tolerance value (1/VIF) should not be greater than 0.1. There is no issue of multicollinearity in the regressors, as shown in table 5 of the VIF test because the mean VIF of both z-score and ROA is less than 10.

Table 5: Variance Inflation Factor (VIF) Test

Dependent Variable: Ln(z)			Dependent Variable: ROA		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
ROA	2.24	0.44	Z score	1.33	0.75
LTA	2.05	0.48	LTA	2.17	0.46
INF	1.63	0.61	INF	1.63	0.61
LNPL	1.48	0.67	LNPL	1.47	0.67

Dependent Variable: Ln(z)			Dependent Variable: ROA		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
EA	1.37	0.73	EA	1.3	0.76
CAR	1.34	0.74	CAR	1.42	0.70
TRA	1.3	0.76	TRA	1..35	0.74
CIR	1.29	0.77	CIR	1.24	0.80
GDP	1.19	0.84	GDP	1.18	0.84
Mean VIF	1.59			1.46	

4.3 Empirical Results

The Hausman test is used to determine if fixed effects or random effects are the best estimating approach. Outputs of Pooled OLS and Fixed Effect are given in Appendix-2 and 3, respectively. The Hausman test suggests random effect as an appropriate method to estimate both panel regression models. Table 6 compares the resiliency and profitability of Islamic and conventional banks in the pre-COVID and COVID periods using panel regression outputs of two dependent variables, Ln (Z), z-score, and ROA, profitability measure. The interaction of Islamic and COVID is included in the model to investigate the influence during the COVID period on the resiliency of Islamic banks.

Table 6: Panel Regression Outputs: Dependent Variable Ln (Z)

	Dependent variables	
Independent variables	**Ln(Z)**	**ROA**
Islamic	0.1917	-0.0017
	(0.49)	(0.14)
COVID	0.0025	-.0011
	(0.79)	(0.35)
Islamic_COVID	-0.0114	-0.0003
	(0.19)	(0.75)
ROA	7.9191***	-
	(0.00)	
CIR	-	-0.0001***
		(0.00)
CAR	0.07520***	0.0002*
	(0.00)	(0.10)
LTA	0.0169	-0.0036**
	(0.35)	(0.06)
LNPL	-0.0061	-0.0005
	(0.36)	(0.50)
GDP	0.0007	-.00001
	(0.69)	(0.50)
INF	0.0064*	0.0001

	Dependent variables	
Independent variables	**Ln(Z)**	**ROA**
	(0.05)	(0.80)
Constant	2.6480***	0.0581***
	(0.00)	(0.0)
Observations	260	260
F-statistics	4320***	64.2100***
	(0.00)	(0.00)
Wald Test	$X^{2 = 0.53}$ (0.76)	$X^{2 = 3.32}$ (0.19)

Note: p-values are shown in parentheses. ***, **, and * are significant are 1 percent, 5 percent, and 10 cent levels of significance.

According to Table-6, the interaction of Islamic and COVID is insignificant, implying that COVID does not affect the resiliency of Islamic banks. Azim et al. 2017 found the reverse when they investigated the resiliency of Islamic and conventional banks in Bangladesh throughout the global financial crisis and pre-crisis of 2007-2008. Furthermore, the results suggest that Islamic banks are no more resilient than regular banks in the absence of interaction. Similarly, the COVID period does not give more robustness to the banks.

Table-6 also represents panel regression outputs of ROA as a profitability measure to compare the profitability of the Islamic banks in pre-COVID and during COVID-period. In investigating the impact of during COVID period on the profitability of Islamic banks, the interaction of Islamic and COVID is also added to the model. From table 6 the interaction of Islamic and COVID is insignificant, meaning that COVID does not impact the profitability of Islamic banks. However, some findings were not observed by Azim et al. 2017 while examining the profitability between Islamic banks and conventional banks in Bangladesh during the global financial crisis and pre-crisis of 2007-2008.

Moreover, without interaction of Islamic and COVID, the result shows that Islamic banks do not show more profitability than conventional banks. In the same way, the COVID period also does not exhibit more profitability for the banks as a whole.

The key objective is to show the resiliency and profitability of Islamic and conventional banks in the pre-COVID and during the COVID period. Table-6 shows significant positive relationship between ROA and CAR, meaning that a greater value of CAR significantly increase banks' resilience, which is consistent

with the findings of Abdel-Baki (2012). Table-6 shows a significant negative relationship between CIR and ROA and provides a significant negative relationship between Bank size and ROA. The findings are consistent with the study of Gazi et al. (2022).

Moreover, CAR and ROA provide a significant negative association, which means banks with more capital show more profitability. The results are also consistent with the findings of Petria et al. (2015). NPL and GDP do not show any significant impact on the resiliency and profitability of banks.

4.4 Robustness Check

Table-7 presents the robustness of the estimation; the study uses panel-corrected standard errors to estimate both models. Both models, the resiliency model, and profitability model show overall significance, the same as the original models. The coefficients of panel corrected standard errors also provide almost the same significance with the same sign. From Table-7, it cannot be concluded that COVID impacts the resiliency and profitability of Islamic banks. It can be said that COVID impacts the resiliency of both categories of banks, as COVID have a significant positive relationship with resiliency in the banks.

Table 7: Robustness Check Output: When Dependent Variable: Ln(Z) and ROA

Independent Variables	Dependent Variable	
	Ln(Z)	**ROA**
Islamic	0.3000***	-0.0010***
	(0.00)	(0.01)
COVID	0.2520***	-.002
	(0.00)	(0.17)
Islamic_COVID	-0.0030	-0.0003
	(0.96)	(0.84)
ROA	-25.57**	-
	(0.03)	
CAR	0.102***	0.00057***
	(0.00)	(0.00)
CIR	-	-0.0001***
		(0.00)
LTA	-1.455***	-.0030**
	(0.00)	(0.02)
LNPL	0.0798	-.0002
	(0.30)	(0.75)

Independent Variables	Dependent Variable	
	Ln(Z)	**ROA**
GDP	0.04	-.0001
	(0.12)	(0.52)
INF	-0.0903*	.0004
	(0.07)	(0.53)
Constant	18.76***	0.04140***
	(0.00)	(0.00)
Observations	260	260
F-statistics	216.36***	112.37
	(0.00)	(0.00)
R-squared	0.194	0.26

Note: p-values are shown in parentheses. ***, **, and * are significant at 1 percent, 5 percent, and 10 percent significance levels.

5. Conclusion and Recommendations

The study's main goal is to see if Islamic banks' resiliency and profitability are higher than conventional banks' due to the pandemic. The study employs the Z-score model as the dependent variable to measure resiliency and ROA as a profitability measure to achieve the research objectives.

The empirical results of this study do not support hypothesis H1 since it is not possible to conclude that COVID has a greater impact on the resilience of Islamic banks than conventional banks. Moreover, it cannot be concluded that Islamic banks are more profitable than traditional banks during COVID-19. However, the findings provide that a greater Capital Adequacy Ratio (CAR) and greater Return of Asset (ROA) positively affect the resiliency of the banking sector for the sampled banks. In contrast, a higher Cost to Income Ratio (CIR) poses lower profitability for the banking sector as a whole of the banking sector as a whole for the sampled banks.

The results of this study offer useful information for the future to policymakers, regulators, and lenders even if the real effects of COVID won't be known until the pandemic is finished. Policymakers should focus more on the Capital Adequacy Ratio and Return on Asset to make banks more robust. The cost-to-income ratio and quality assets of the banks should receive more attention from bankers in terms of performance indicators. The research examines the resilience and profitability of Islamic banks in Bangladesh in comparison to

conventional banks during COVID using empirical methodologies. The pandemic persists despite the study finding no effect of COVID on the stability and performance of Islamic banks during-COVID periods. To generate a more thorough and clear answer, an additional study with more data for the variables and different sample banks is required.

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Appendices

Appendix Table 1: List of the Sampled Banks for the Study

Serial Number	Name of the Bank	Type of the Bank
1.	Alarafah Islami Bank Ltd	Islamic
2.	Export and Import Bank of Bangladesh	Islamic
3.	First Security Islami Bank Limited	Islamic
4.	Islami Bank Bangladesh Limited	Islamic
5.	Shahajalal Islami Bank Limited	Islamic
6.	Social Islami Bank Limited	Islamic
7.	AB Bank Limited	Conventional
8.	Bank Asia Limited	Conventional
9.	BRAC Bank Limited	Conventional
10.	Dhaka Bank Limited	Conventional
11.	Dutch Bangla Bank Limited	Conventional
12.	IFIC Bank Limited	Conventional
13.	Mutual Trust Bank Limited	Conventional
14.	National Bank Limited	Conventional
15.	Premier Bank Limited	Conventional
16.	Prime Bank Limited	Conventional
17.	Pubali Bank Limited	Conventional
18.	Rupali Bank Limited	Conventional
19.	Uttara Bank Limited	Conventional
20.	Mercantile Bank Limited	Conventional
21.	The City Bank Limited	Conventional
22.	Jamuna Bank Limited	Conventional
23.	NCC Bank Limited	Conventional
24.	ONE Bank Limited	Conventional
25.	Trust Bank Limited	Conventional
26.	United Commercial Bank Limited	Conventional

Appendix Table 2

	Pooled OLS	**Fixed Effect**
Independent Variables	Dependent Variable Ln(Z)	Dependent Variable Ln(Z)
Islamic	.1938419	-
COVID	-0.0059	-0.0060
ROA	7.9194***	7.9281***
CAR	.0751***	0.5791***
LTA	0.0155	0.0162
LNPL	-0.0047	-.0047
GDP	0.0007	.0007
INF	0.0065**	0.0066**
Constant	2.6486***	2.6859
Observations	260	260
p-value of F-statistics	0.000	0.000

Note: *** and ** indicate 1 percent and 5 percent levels of significance