*Article*

# Bank-Specific and Macroeconomic Determinants of Profitability of Islamic Shariah-Based Banks: Evidence from New Economic Horizon Using Panel Data

**Md. Abu Issa Gazi** [1,2,*] , **Rejaul Karim** [3,*] , **Abdul Rahman bin S Senathirajah** [4], **A. K. M Mahfuj Ullah** [5], **Kaniz Habiba Afrin** [3] **and Md. Nahiduzzaman** [6]

1. INTI International University, Persiaran Perdana BBN Putra Nilai, Nilai 71800, Negeri Sembilan, Malaysia
2. School of Management, Jiujiang University, Jiujiang 332005, China
3. Department of Business Administration, Varendra University, Rajshahi 6204, Bangladesh
4. Faculty of Business and Communications, INTI International University, Persiaran Perdana BBN Putra Nilai, Nilai 71800, Negeri Sembilan, Malaysia
5. Department of Business Administration, Rajshahi Science and Technology University, Natore 6400, Bangladesh; akmmahfuj458@gmail.com
6. Department of Finance and Banking, Bangabandhu Sheikh Mujibur Rahman Science and Technology University, Gopalganj 8100, Bangladesh; info.nahiduzzaman.bd@gmail.com
* Correspondence: dr.issa@jju.edu.cn or maigazi@yahoo.com (M.A.I.G.); rkarimreja@gmail.com (R.K.)

**Abstract:** The purpose of this study is to analyze significant variables that permit us to ascertain the profitability of Bangladeshi Shariah-based banks. In doing so, two profitability measurements, namely, return on asset (ROA) and return on equity (ROE), have been used as dependent variables, while capital adequacy, asset management quality, operational efficiency, credit risk, liquidity, and the size of the bank have been considered as bank-specific independent variables. In addition, the rate of interest, inflation, and GDP growth rate have also been taken as macroeconomic independent variables. This study examined panel data of eight Shariah-based Islamic banks over a thirteen-year period spanning from 2010 to 2022, applying different kinds of linear regression models, including pooled ordinary least squares (OLS), fixed effects, and random effects. Subsequently, the generalized method of moments (GMM) approach is also applied to assess the robustness of the findings. The results revealed that the profitability of Bangladeshi Shariah-based Islamic banks is positively associated with asset management quality, liquidity, and credit risk. In contrast, capital adequacy, operational efficiency, and bank size are negatively correlated with the bank's profitability. Concerning the macroeconomic factors, the findings indicated a notable positive correlation between the profitability of Shariah-based banks in Bangladesh and both the inflation rate and the interest rate spread. However, this study has also found that the profitability of the sample banks of Bangladesh is not significantly influenced by GDP growth. By providing fresh empirical data, the current research aimed to close a significant vacuum in the body of knowledge on banks and provide important insights for policymakers, managers, and other stakeholders by focusing on particular bank-specific and macroeconomic aspects that influence the profitability of Shariah-based Islamic banks in Bangladesh.

**Keywords:** Shariah-based Islamic banks; profitability; financial access; macroeconomic; determinants; economic growth

## 1. Introduction

The bank, the most trustworthy trader of money worldwide, is of paramount significance in setting up a roadmap to channel and accordingly allocate the limited resources for economic growth and development. Since the mid-1970s, the Shariah-based Islamic banking sector and its financing activities have been growing faster due to their increasing appeal in terms of legal progress, Shariah products, and Shariah financial regulatory

frameworks. Specifically, in the dynamic landscape of the global financial system, Islamic banking has emerged as a distinctive and rapidly growing sector, embodying principles aligned with Shariah law. As seen by the emergence of several Islamic financial institutions worldwide over the past four decades, Islamic banking has developed into a respectable substitute form of financial intermediation (Karim et al. 2010). According to the Bangladesh Bank report, the proportion of total remittances deployed by Islamic banks made up 54.53% of all remittances mobilized by the banking industry in Bangladesh, followed by 50% of the market share of corporate social responsibility (CSR), 29.20% of total loans and advances, and 25.81% of total deposits at the close of December 2022.[1,2]

Conventional and Shariah-based banking are both for-profit financial institutions that adhere to their own set of banking principles in their accumulation of the wealth of a society (Ahmad and Hassan 2007). To survive and remain solvent in the competitive business world, the most desirable concern is profitability, which has been turned into a topic of concern for certain people, including researchers, regulatory authorities, practitioners, academicians, and so on. However, the operational principles regarding conventional banks and Shariah-based banks are different. Conventional banks earn the majority of their revenues from "interest-based" banking services, whereas shariah-based banks follow a "profit–loss sharing" business model. Both conventional banks and Islamic banks compete with one another to please clients, meet their expectations, and provide long-term economic advantages. The most common distinction between conventional and Shariah-based banks lies in their objectives: interest (riba) and profit–loss sharing procedures (Ramlan and Adnan 2016). But critics have questioned the sources of their profits and the sources of their funds (Kuran 2004; Aggarwal and Yousef 2000; Khan 2010; Minhat et al. 2021). Sometimes, Shariah-based banks act as debt-like financial institutions, violating their basic principles (Aggarwal and Yousef 2000). The scenario may worsen even further due to more competitive and fast-changing market conditions around the globe.

The profitability of banks is affected in several ways, but it is difficult to clearly predict whether it is influenced by the same factors as conventional banks' profitability, as there are so many remarkable macroeconomic and internal bank-specific factors contributing to banks' profitability (Karim et al. 2023b). The efficient use of a bank's assets and its operations are key factors in determining any bank's profitability. The amount of money a bank invests in acquiring assets influences its capacity to generate more revenue and profit (Jahan 2014). Both the bank-specific (bank size, adequacy of capital, credit risk, liquidity risk, leverage, operational efficiency, asset quality, and its management, etc.) and macroeconomic (interest/inflation/exchange rates, GDP, etc.) factors affect bank profitability. Chowdhury et al. (2017), Karim et al. (2010), Ramlan and Adnan (2016), Trad et al. (2017), and Zarrouk et al. (2016) investigated Islamic Sharia-based banks' profitability in different nations. They noticed that deposits, bank size, greater inflation, and economic growth positively stimulate the profitability of Sharia-based banks, whilst static operational efficiency and credit risk stimulate downsizing. Masood and Ashraf (2012) stated that a bank having a huge asset in addition to its effective and strategic management will still lead to higher bank profitability. Hakiim and Rafsanjani (2018) and Supiyadi et al. (2018), furthermore, evidence that liquidity and credit risk are the strong influencing factors of profitability. Sriyana (2015) argued that the main predictor of Sharia banks' profitability is their liquidity. The researcher also remarked on capital utilization and profit margin on which profitability is significantly dependent. The outputs of a study performed by Trad et al. (2017) revealed some variables that influence the profitability of Islamic Shariah-based banks, including the size of banks, risk-related credit, GDP, capital, and exchange rates, etc. Both bank-specific factors and the macroeconomic environment have varying implications on an organization's profitability (Jahan 2014). Rashid and Jabeen (2016) identified some macroeconomic and financial factors together with bank-specific factors that were continuously influencing the performance of the Pakistani banking industry. They concluded that the performance of conventional banks is stimulated by overhead costs, reserve, and operating efficiency, whereas the performance of Islamic banks is primarily

influenced by deposits, market concentrations, operating efficiency, etc. They added that fluctuations in GDP and interest rates negatively affect the performance of each bank.

Regarding this issue, the bulk of studies have been performed in countries that are economically advanced and functioning in an organized financial system. There have only been a few research works undertaken earlier which highlight the determinants of the Shariah-based banks' profitability in developing nations (Akhavein et al. 1997; Yuan et al. 2022; Ali and Puah 2019). Before this, however, academicians, researchers, and scholars performed several studies to investigate the influential determinants of profitability for the Shariah-based Islamic banks of Bangladesh, but they were mostly for the pre COVID-19 period, during which there was a comparatively different state of inflation and profit compared to the present time.

From the specific perspective of Bangladesh, it is notable that certain studies have primarily focused on either bank-specific factors or macroeconomic variables, thereby leaving a notable gap in comprehensively understanding the interplay between these two sets of determinants, particularly in the context of Islamic banks. Pointedly, Rahaman and Akhter (2016) and Jahan (2014) delved into the investigation of bank-specific factors' influence on profitability. While these studies offer valuable insights into the internal dynamics of banks, they do not provide a holistic understanding of profitability drivers, which necessitates a more nuanced examination. Moreover, a multitude of studies, such as those conducted by Gazi et al. (2021), Noman et al. (2015), Mahmud (2020), and Rahman et al. (2015), have explored the impact of both macroeconomic and bank-specific factors on the profitability of commercial banks in Bangladesh using panel regression analysis including the GMM. However, it is important to note that the focus of these investigations has primarily been on conventional commercial banks, thereby overlooking the distinct operational and regulatory framework within which Islamic Shariah-based banks operate. In addition to the aforementioned studies, recent research by Gazi et al. (2022) and Rekha and Hossain (2022) has underscored the significant impact of the COVID-19 pandemic on private commercial banks in Bangladesh. Notably, these studies have focused on the nuanced effects of the pandemic on the operational dynamics and financial performance of conventional commercial banks. However, a notable gap persists in understanding the distinct implications of the pandemic for Shariah-based commercial banks in Bangladesh. Indeed, while the broader banking sector has grappled with the repercussions of the COVID-19 crisis (Elnahass et al. 2021; Ramlal 2022; Gazi et al. 2022), there remains a dearth of research specifically elucidating the unique challenges and opportunities encountered by Shariah-based commercial banks within this context.

Therefore, against such backdrops, the contributions of the present study lie not only in shedding light on the specific determinants of profitability for Islamic Shariah-based banks but also in enriching the existing literature on the broader landscape of Islamic finance in Bangladesh. First, as the country strives for sustainable economic growth and financial stability, insights derived from this research can inform policymakers, regulatory bodies, and banking practitioners, facilitating informed decision-making and strategic planning within the Islamic banking sector. Second, the results of this study, encompassing the recovery time of banking services following the significant impact of the post-COVID-19 period, will prove advantageous for various stakeholders. Since the Shariah-based banks faced unique challenges related to asset quality and risk management during the pandemic (Safitri and Khasanah 2023), the economic downturn resulting from the pandemic has increased credit risk exposure and enhanced the vulnerability of profitability conditions. Third, unlike previous research, the current paper takes a different direction, proposing and integrating emerging factors affecting the profitability of Shariah-based commercial banks. As economic variables such as interest rates, inflation rates, and GDP growth directly influence the financial performance of banks, fluctuations in these macroeconomic indicators can affect asset quality, loan demand, and investment opportunities, consequently impacting Shariah-based banks' profitability. Finally, in terms of methodology, to enhance the robustness of the results, this study utilizes an advanced approach- the generalized

method of moments (GMM). The GMM is a widely recognized econometric technique that offers several advantages, particularly in addressing endogeneity issues inherent in panel data analysis (Chowdhury et al. 2017; Zarrouk et al. 2016; Rahman et al. 2020; Sarkar and Rakshit 2021). By employing the GMM, we can effectively mitigate potential biases arising from endogeneity, such as omitted variable bias and simultaneity, which could otherwise distort our estimation results.

The subsequent sections of this paper are organized as follows: Section 2 presents a review of earlier studies. Section 3 outlines the data sources and methodological details. Our empirical findings are presented and discussed in Section 4. The concluding annotations are presented in Section 5.

## 2. Literature Review

Many studies have been found regarding the profitability determinants of banks at home and abroad. We have included in this literature review the papers which are relevant to our study in terms of their study domain and the variables they studied, including context data analysis. Masood and Ashraf (2012) conducted a study in selected countries of different regions using panel regression models to see whether the macroeconomic and bank-specific metrics distress the Shariah-based Islamic banks' profitability and how it occurred. According to their study's findings, banks having greater asset volumes along with sound management generate higher ROA. The study showed how a bank's profitability was substantially influenced by diversified bank-specific factors like the effectiveness of management about operating expenses. Owoputi (2014) investigated the impacts of several notable factors like industry-specific, bank-specific, and macroeconomic elements that significantly affected bank profitability from 1998 to 2012 in Nigeria. They used panel regression models and revealed that while credit risk and liquidity ratios had a detrimental impact on profits, bank-specific factors such as adequacy of capital, size of the bank, and upward growth in productivity and deposits had a favorable and significant impact. Meanwhile, inflation, interest rates, GDP growth, etc., as macroeconomic factors, had a negative bearing on banks' profitability. Yet there was no proof to back up the impact of industry-specific determinants.

In Bangladesh, several studies have been carried out on the factors that contribute to the profitability of Shariah-based banks by several scholars at different times, and they have found mixed results. Jahan (2014) studied Bangladeshi Shariah-based banks using multiple regression models and concluded that the expenditures made in research and development by banks have a significant relationship with ROA; however, they were unable to find any connotation with operation efficiency and asset management. Rahaman and Akhter (2016) analyzed Bangladeshi Shariah-based Islamic banks using panel data analysis techniques, and they discovered that the shareholders' equity held a strong connection with bank profitability, while deposit and bank size had a substantial detrimental correlation with ROA. While Rasul (2013) found a positive impact of the investment-to-total-deposits ratio and cash-to-total-deposits on ROA, Sarker (2005) suggested that Islamic Shariah-based banks should spend more on research and development to improve manpower and avoid poor investment decisions. Yousuf et al. (2014) found that the Islamic Shariah-based banks of Bangladesh showed a promising performance concerning profitability, while Chakraborty et al. (2015) discovered that the Islami Bank Bangladesh, comprising the oldest Shariah-based banks in Bangladesh, held a better position regarding operational efficiency and profitability over time.

Both internal bank-specific attributes, such as the quality of assets, capital, non-traditional bank activities, management insights, liquidity, and bank size, etc., and external macroeconomic determinants, such as economic growth, financial crisis, and inflation, etc., are the influential variables of profitability. The majority of the literature on these subjects has indicated that the stated determinants held a clear impact on bank profitability globally (Sufian and Habibullah 2008; Athanasoglou et al. 2008; Bhatia et al. 2012; Nisar et al. 2015).

Considering the period from 2006 to 2012, Saeed (2014) examined several variables that might be associated with banks' profitability in the UK using correlation coefficient, multiple regression models, and ANOVA and showed that capital ratio, outstanding loans, deposit status, liquidity, and interest rate affected the ROE as well as ROA, whereas Abduh and Idrees (2012) demonstrated that bank size, development of financial markets, competitive intensity, and inflation all contribute significantly to bank profitability in Malaysia. A study undertaken by Al-Homaidi et al. (2018) depicted that macroeconomic variables such as GDP, interest rates, inflation rates, and exchange rates, as well as bank-specific variables such as bank size, asset quality, capital availability, liquidity status, deposits, leverage, asset management, and business efficiency, had a substantial negative impact on the profitability of Indian commercial banks. Ali and Puah (2019) also pointed out liquidity and financing risks, credit risk, bank size, etc., as needful determinants of a bank's profitability. Istiqomaha et al. (2020) found that bank-specific factors like non-performing financing (NPF), deposit total assets, and liabilities total assets, among others, had only marginally noteworthy impacts on bank profitability, and that macroeconomic indicators, particularly economic expansion, played a significant role in increasing the profitability of Indonesia's Islamic rural banks (BPRS) over the period 2010–2017. Ahmad and Noor (2004) depicted that among numerous variables such as credit risk, capital adequacy, liquidity, management expenses, and total assets, only bank size enhanced the profitability of Islamic Shariah-based banks. Al-Qudah and Jaradat (2013) also pointed out that the size of the bank had conclusively influenced ROE and ROA. Rahman et al. (2020) showed that capital adequacy among other important determinants accelerated the Pakistani banking industry's profitability by reducing the rate of bank failure.

Chowdhury and Salman (2021) researched some influential internal and external aspects that affected the liquidity of banks in Bangladesh. It was concluded that asset size held a negative link with ROE, while capital adequacy was linked with liquidity risk positively. The study also showed that inflation adversely affected the liquidity risk, whereas GDP and internal credit facilities had a positive influence. Research undertaken by Islam and Nishiyama (2016) in the South Asian region from 1997 to 2012 mostly relied on factors such as bank-specific, industry-specific, and macroeconomic factors. ROA, capital adequacy ratio, loan and advances growth rate, bank sizes, inflation, GDP, etc., had a negative relationship with default loans, whilst income–loan ratio, interest rate, etc., held a substantial positive relation with the bank default loans.

Despite the fact that there is a superabundance of literature in this review regarding the banking industry's performance and the determinants of its profitability, most of the literature only address conventional banks in Bangladesh and elsewhere. There has not been much investigation into the profitability of Islamic banks' with a Shariah foundation in Bangladesh. Thus, the present paper undeniably represents a novel contribution to the prevailing literature on Islamic Shariah-based banking studies of its kind in Bangladesh. This study differs from other studies due to the time frame, the factors taken into consideration in the paper's model, and the study populace. The main objective of the current research is to assess and examine the significantly varied determinants like bank-specific and macroeconomic factors that can affect the Bangladeshi Shariah-based Islamic banking sector's profitability and to become an empirical substantiation and benchmark for similar research work in the future.

### 3. Data and Methodology

*3.1. Data*

This research evaluates the profitability determinants of Islamic Shariah-based banks in Bangladesh. Out of eleven listed Shariah-based banks that operate in Bangladesh, eight banks have been selected for this study. The sample banks are selected based on their year of banking operations commencement and the year they were listed with the stock exchange in the country. As this study covers the time span of 2010 to 2022, we have excluded three banks due to data unavailability for the time covered. The macroeconomic

and bank-specific data have been drawn from various sources like the World Bank database, samples of banks' annual audited financial statements, etc. The World Bank database and the annual reports of respective banks are widely recognized for their comprehensive and reliable economic data sources. Several authors (da Silva et al. 2018; Gazi et al. 2022; Hasan et al. 2022) around the world have relied on the Word Bank database in conducting research. In addition, the annual reports of banks involve a comprehensive review of the banks' financial statements, internal controls, and accounting practices to ensure compliance with regulatory requirements and generally accepted accounting principles (GAAP), which are also duly audited by independent auditors. In this study, balanced panel data of eight banks over a period of thirteen years spanning from 2010 to 2022 have been considered. The banks have been selected based on factors such as data availability, performance, size, and significance in defining the country's economic circumstances.

### 3.2. Variables

Several bank-specific and macroeconomic metrics have been included to test their effects on the profitability of Shariah-based banks. The selection of variables has been made based on the available research papers in this field and their significance in determining the profitability of banks. For instance, ROA and ROE together offer a comprehensive assessment of a bank's profitability from both operational and shareholder perspectives (Dodi and Arief 2018; Owoputi 2014; Ara et al. 2021; Gazi et al. 2022). ROA focuses on the bank's ability to generate profits from its overall asset base, while ROE highlights the return earned on shareholders' equity. In addition, the interplay of capital adequacy, asset management quality, operating efficiency, credit risk, liquidity, and bank size factors can vary across banks and influence their ROE and ROA differently based on their business models, risk profiles, and market conditions. Effective management and strategic decision-making are essential for optimizing these factors to enhance profitability. The Table 1 represents the dependent profitability, bank-specific and macroeconomic independent variables, their notation, measurement formula, and the sources that have been used in the current paper.

**Table 1.** Variables of this study.

| | | Variable | Notation | Measure | Sources |
|---|---|---|---|---|---|
| Dependent Variables | | Return on Assets | ROA | Earnings before interest and taxes/total asset | Al-Homaidi et al. (2018); Dodi and Arief (2018); Owoputi (2014); Shah Khan et al. (2014); (Masood and Ashraf (2012); Gazi et al. (2022); Karim et al. (2023b) |
| | | Return on Equity | ROE | Earnings before interest and taxes/shareholders' equity | Al-Homaidi et al. (2018); Shah Khan et al. (2014); Owoputi (2014); Ara et al. (2021); Hossain and Ahamed (2015); Masood and Ashraf (2012) |
| Independent Variables | Bank-Specific Factors | Capital Adequacy | CAD | Shareholders' equity to total asset | Al-Homaidi et al. (2018); Ara et al. (2021); Owoputi (2014); Sriyana (2015) |
| | | Asset Management Quality | AMQ | Operating income/total asset | Hossain and Ahamed (2015); Trad et al. (2017); Zarrouk et al. (2016) |
| | | Operating Efficiency | OPEFF | Operating expense/interest income | Al-Homaidi et al. (2018); Liang et al. (2008); Samad (2015) |

**Table 1.** *Cont.*

| | | Variable | Notation | Measure | Sources |
|---|---|---|---|---|---|
| Independent Variables | Bank-Specific Factors | Credit Risk | CREDR | Percentage of the non-performing loans to total loans | Radivojevic and Jovovic (2017); Rehman and Rashid (2022); Saada (2018); Wójcik-Mazur and Szajt (2015) |
| | | Liquidity | LIQ | Liquid assets to total Assets | Al-Homaidi et al. (2018); Javaid (2016); Masood and Ashraf (2012); Owoputi (2014) |
| | | Bank Size | SIZE | Natural logarithm of total assets | Al-Homaidi et al. (2018); Javaid (2016); Chiahti et al. (2021); Samad (2015) |
| | Macroc Economic Factors | Economic Growth | EG | Annual growth of the GDP | Shah Khan et al. (2014); Sufian and Kamarudin (2012); Roy et al. (2014); Yuan et al. (2022) |
| | | Inflation Rates | INFL | Annual inflation rate | Al-Homaidi et al. (2018); Owoputi (2014); Ara et al. (2021); Zarrouk et al. (2016) |
| | | Interest Rates Spread | SPREAD | The differences between interest rates on loans and advances, and deposits | Roy et al. (2014); Safiuddin and Anisuzzaman (2015); Islam and Nishiyama (2016); Mohammed et al. (2022) |

### 3.3. Econometric Tools and Model Specification

According to Menicucci and Paolucci (2016), previous research used a functional linear approach to look at the issues with banks' profitability. They contend that this is the correct methodology for analyzing banks' profitability with panel data. Various studies have examined the diversified factors that influenced banks' profitability in the same setting via various models. While Rjoub et al. (2017); Narwal and Pathneja (2016); Gazi et al. (2022); and AL-Omar and AL-Mutairi (2008) employed linear regression models, pooled OLS, fixed effects (RE), or random effects (FE) models, some previous research works have examined the banking profitability influencing factors in various economic contexts by using GMM and linear regression models (Bougatef 2017; Chowdhury and Rasid 2016; Masood and Ashraf 2012; Rjoub et al. 2017; Rashid and Jabeen 2016; Yuan et al. 2022; Saona 2016). Thus, in keeping with previous research that used both GMM and linear regression models, the present paper employs similar methodologies to investigate the stimulating determinants by which the profitability of Bangladeshi Shariah-based Islamic banks is influenced. Two primary benefits, which have been supported by Hamil et al. (2023) and Baltagi (2005), justify the use of the panel technique in the current investigation.

Initially, to consider the importance of methodological aspects, the pooled OLS, FE, and RE regression models have been applied to determine how banking profitability is affected by different bank-specific and macroeconomic factors. The econometric model of this study can be expressed as follows:

$$\text{ROA}_{it} = \beta_0 + \beta_1 \text{CAD}_{it} + \beta_2 \text{AMQ}_{it} + \beta_3 \text{OPEFF}_{it} + \beta_4 \text{CREDR}_{it} + \beta_5 \text{LIQ}_{it} + \beta_6 \text{SIZE}_{it} + \beta_7 \text{EG}_{it} + \beta_8 \text{INFL}_{it} + \beta_9 \text{SPREAD}_{it} + \varepsilon, \quad (1)$$

$$\text{ROE}_{it} = \beta_0 + \beta_1 \text{CAD}_{it} + \beta_2 \text{AMQ}_{it} + \beta_3 \text{OPEFF}_{it} + \beta_4 \text{CREDR}_{it} + \beta_5 \text{LIQ}_{it} + \beta_6 \text{SIZE}_{it} + \beta_7 \text{EG}_{it} + \beta_8 \text{INFL}_{it} + \beta_9 \text{SPREAD}_{it} + \varepsilon, \quad (2)$$

where ROA and ROE are the profitability measures of the dependent variables, CAD stands for capital adequacy, AMQ is the asset management quality, OPEFF is the operational efficiency, CREDR stands for credit risk, LIQ is the liquidity, SIZE is the bank size, EG is the economic growth, INFL is the inflation rate, SPREAD is the interest rates spread, $\beta_0$ is the constant, and $\varepsilon$ is the error term.

After employing the panel ordinary least squares (OLS)-based regression models, we also apply the generalized method of moments (GMM) estimation to detect a more

robust relationship between the dependent and explanatory variables since, owing to the presence of endogeneity bias, the OLS method produces some disparities in the outcomes compared to the GMM technique (Ullah et al. 2018; Zaefarian et al. 2017). In addition, the GMM approach serves as a semi-parametric model capable of managing heteroskedasticity sources within the data, as outlined by Lim et al. (2023) and Roy et al. (2014). The econometric functions of the GMM model, considered in this study, can be expressed as follows:

$$Q(\theta) = \left\{ \frac{1}{N} \sum_{i=1}^{N} g(x_i, \theta) \right\} W \left\{ \frac{1}{N} \sum_{i=1}^{N} g(x_i, \theta) \right\}, \tag{3}$$

where $\theta$ represents the constraints to be estimated, $g(x_i, \theta)$ is a vector of moment conditions, $W$ is the weighting matrix, and $x_i$ designates vector of $p$ covariates.

For panel data, the moment conditions manifest as the following equations:

$$\left[ Q \int (x_i, \theta_0) = 0 \right],$$

to

$$Q(x_i \mu_i) = Q\left\{ x_i \left( y_i - x_i \check{\beta} \right) \right\} = 0. \tag{4}$$

## 4. Results

### 4.1. Descriptive Statistics

Table 2 presents the descriptive statistics for the variables. It provides details of the mean, standard deviation, minimum, and maximum values for both the dependent variable and its explanatory variables. Specifically, the mean values for ROA and ROE are 0.90% and 20.6%, respectively, with standard deviations of 0.022 and 0.090, respectively. This means that the ROA was more volatile in nature than the ROE during the study period. The profitability level of Islamic banks of Bangladesh, in terms of ROA and ROE, seems to be in a good position compared to that of other countries, although some studies showed somewhat higher metrics than this (Dodi and Arief 2018; Chowdhury 2015). Similarly, Table 2 also gives the descriptive statistics of the bank-specific and macroeconomic variables used in this study. The table reveals mean values of bank-specific variables, namely, CAD, AMQ, OPEFF, CREDR, LIQ, and SIZE, of −0.038, 0.014, 0.824, 0.129, 12.051, and 25.896, with SD of 0.301, 0.017, 0.364, 0.236, 12.143, and 1.214; while the macroeconomic variables of EG, INFL, and SPREAD have the mean values of 6.429, 6.546, and 3.207, respectively, with SD of 1.045, 1.651, and 1.015, respectively.

**Table 2.** Descriptive statistics.

| Variables | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| ROA | 0.009 | 0.022 | −0.099 | 0.047 |
| ROE | 0.206 | 0.090 | 0.014 | 0.439 |
| CAD | −0.038 | 0.301 | −1.158 | 0.132 |
| AMQ | 0.014 | 0.017 | −0.044 | 0.052 |
| OPEFF | 0.824 | 0.364 | 0.237 | 2.414 |
| CREDR | 0.129 | 0.236 | 0.010 | 0.840 |
| LIQ | 12.051 | 12.143 | 0.098 | 98.893 |
| SIZE | 25.896 | 1.214 | 23.066 | 28.240 |
| EG | 6.429 | 1.045 | 3.448 | 7.882 |
| INFL | 6.546 | 1.651 | 5.049 | 11.395 |
| SPREAD | 3.207 | 1.015 | 1.566 | 5.008 |

Notes: The number of observations is 104.

### 4.2. Correlation Matrix and Multicollinearity Diagnosis

Table 3 demonstrates the Pearson correlation matrix and the results of the diagnostics of the multicollinearity for all bank-specific, macroeconomic, and profitability factors. Regarding the bank-specific variables, CAD, AMQ, and SIZE have positive relationships

with both of the profitability metrics, ROA and ROE; while OPEFF, CREDR, and LIQ have negative relationships with ROA and ROE. These may indicate that the bank's profitability may be increased through the improvement of capital adequacy, asset management quality, and bank size; while the profitability of Bangladeshi Shariah-based Islamic banks may be reduced due to the increased level of interest expense, the high level of credit risk, and the liquidity level of the bank. All of the correlation coefficients among the independent variables are less than 0.80, which primarily reveals that the variables are free from multicollinearity (Gujarati 2003; Lind et al. 2012).

**Table 3.** Correlation matrix and diagnosis of multicollinearity.

| Variables | ROA | ROE | CAD | AMQ | OPEFF | CREDR | LIQ | SIZE | EG | INFL | SPREAD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ROA | 1.000 | | | | | | | | | | |
| ROE | 0.584 | 1.000 | | | | | | | | | |
| CAD | 0.643 | 0.621 | 1.000 | | | | | | | | |
| AMQ | 0.611 | 0.618 | 0.541 | 1.000 | | | | | | | |
| OPEFF | −0.490 | −0.292 | −0.649 | −0.349 | 1.000 | | | | | | |
| CREDR | −0.460 | −0.623 | −0.476 | −0.748 | 0.354 | 1.000 | | | | | |
| LIQ | −0.062 | −0.142 | −0.329 | −0.303 | 0.393 | 0.275 | 1.000 | | | | |
| SIZE | 0.554 | 0.327 | 0.569 | 0.466 | −0.492 | −0.402 | −0.247 | 1.000 | | | |
| EG | −0.045 | −0.050 | −0.025 | −0.046 | −0.007 | 0.023 | −0.106 | 0.061 | 1.000 | | |
| INFL | 0.081 | 0.385 | 0.110 | 0.269 | −0.072 | −0.067 | 0.082 | −0.284 | −0.176 | 1.000 | |
| SPREAD | 0.122 | 0.424 | 0.100 | 0.236 | −0.004 | −0.059 | 0.055 | −0.262 | 0.037 | 0.493 | 1.000 |
| **Diagnostics of Multicollinearity** | | | | | | | | | | | |
| VIF | | | 4.39 | 3.50 | 4.30 | 3.66 | 1.34 | 3.56 | 1.08 | 1.76 | 1.64 |
| Tolerance | | | 0.23 | 0.29 | 0.23 | 0.27 | 0.74 | 0.28 | 0.93 | 0.57 | 0.61 |

Table 3 also shows the results of the variance inflation factors (VIFs) and tolerance tests of all variables. The maximum value of the VIF of CAD is 4.39, with the lowest value of EG being 1.08 and a lowest tolerance being 0.29. The VIF value less than 5.00 can be treated as free of serious multicollinearity, and the variables are worthy of being used in regression analysis (Gujarati 2003), although some scholars suggest that the cut-off point of VIF is 10.00 (Kutner 2004). Thus, it can be said that there are no issues of multicollinearity in the variables.

*4.3. Stationarity Test Statistics*

Table 4 illustrates the outcomes of stationarity test statistics. Since the assessment of stationarity of the panel data is essential, the unit root test plays a vital role in this determination. In statistical analysis, this test ascertains whether a panel dataset exhibits a unit root (non-stationary) or not. Researchers specify research models based on the outcome of unit root tests when evaluating panel data. Failing to consider this specification may result in spurious regression outcomes (Kabir et al. 2023; Gazi et al. 2022; Danish et al. 2018). Therefore, in this study, we employ two approaches, namely, the Levin, Lin, and Chu (LLC), introduced by Lim et al. (2023), and the Augmented Dickey–Fuller–Fisher (ADF-Fisher) unit root tests, proposed by Maddala and Wu (1999). The established rules suggest that accepting the null hypothesis (H0) ($p > 5\%$) implies a unit root or non-stationarity, while accepting the alternative hypothesis (H1) ($p < 5\%$) indicates the absence of a unit root or the presence of stationarity in the dataset. Based on the statistical findings, we observe that every variable in our study is free from unit root at the relevant level as the probability value is below 0.05, indicating the rejection of the null hypothesis and the affirmation of the alternative hypothesis. Hence, we can proceed to employ the OLS-based regression.

**Table 4.** Unit root test statistics for panel data.

| Variables | Levin–Lin–Chu (LLC) | | ADF-Fisher | |
|---|---|---|---|---|
| | Statistic | *p*-Value | Statistic | *p*-Value |
| ROA | −6.772 | 0.000 *** | −3.870 | 0.000 *** |
| ROE | −6.472 | 0.000 *** | −4.769 | 0.000 *** |
| CAD | −6.713 | 0.000 *** | −8.867 | 0.000 *** |
| AMQ | −3.874 | 0.000 *** | −3.476 | 0.000 *** |
| OPEFF | −4.587 | 0.000 *** | −2.565 | 0.000 *** |
| CREDR | −3.199 | 0.000 *** | −1.435 | 0.000 *** |
| LIQ | −5.676 | 0.000 *** | −4.868 | 0.000 *** |
| SIZE | −11.142 | 0.000 *** | −5.593 | 0.000 *** |
| EG | −11.100 | 0.000 *** | −6.787 | 0.000 *** |
| INFL | −5.000 | 0.000 *** | −2.568 | 0.000 *** |
| SPREAD | −4.649 | 0.000 *** | −4.587 | 0.000 *** |

Notes: The symbol *** indicates significance at the 1% level. Both the Levin–Lin–Chu and Augmented Dickey–Fuller–Fisher tests are conducted at the relevant level.

### 4.4. Empirical Findings on the Profitability of Banks as Determined by ROA and ROE

The empirical findings from the estimated regression model—the pooled OLS, FE, and RE for Equations (1) and (2)—are shown in Table 5. It is evident that the adjusted r-squared values of 0.733, 0.731, and 0.715 are for pooled OLS, FE, and RE models, respectively, with ROA, which indicate that the variables are considered to contribute 71.1% to 73.3% of the profitability of the Islamic Shariah-based banks of Bangladesh. Table 5 also reveals the adjusted r-squared values of Equation (2), with the ROE being 0.576, 0.531 and 0.6131 for the pooled OLS, FE, and RE models stepwise. This indicates that the variables contribute 61.31% to 57.6% of the profitability of the sample banks of this study. Ultimately, this indicates that the macroeconomic and bank-specific variables considered in the present paper have a considerable impact on the profitability of Bangladesh's Islamic Shariah-based banks. Both of the regression models applied in this study, with all of their sub-models, i.e., pooled OLS, FE, and RE, produced *p*-values of less than 1%, which indicates that both of the models are significant and fit.

We have performed the Hausman specification in order to verify the estimated results for the FE and RE regression models. The FE model comparatively holds a better position over the RE model in describing a link between independent and dependent variables of both regression equations, as shown by the *p*-values of the obtained Hausman specification being less than 1% (Torres-Reyna 2007).

Regarding the bank-specific determinants of profitability measure, ROA and ROE, the selected FE regression results in Table 5 reveal that the CAD has a negative effect on ROA, but the effect on ROE is insignificant. The negative effect of the CAD on the ROA is at the 5% level of significance, while the negative coefficient of the CAD with ROE is statistically insignificant. The results demonstrate that the AMQ is positively related to ROA and ROE. The impact of the AMQ is significant at 5% with ROA, while it is significant at 1% with ROE. Also, LIQ has a significantly positive effect on ROA at the 5% level, while it has an insignificant positive impact on ROE. Regarding other important bank-specific factors which can affect the profitability on a large scale, SIZE and the volume of the assets of the sample banks, measured by the usual logarithm of the total assets of the banks, have been found to be negatively related to both of the profitability metrics.

Moreover, Table 5 demonstrates a positive relationship between the OPEFF—the operational costs to interest income ratio—and both profitability indices, which is significant at the 5% level. We have also found that the CREDR has a significant positive impact on the ROA, which is significant at the 1% level, while it has a statistically insignificant impact on ROE.

Regarding macroeconomic factors of profitability, Table 5 shows that the economic growth (EG), which is measured by the GDP growth rate, has a negative impact on both of the profitability indicators, ROA and ROE, but both regression coefficients are statistically

insignificant. The table of the results also shows that the INFL and the SPREAD have a positive impact on both of the profitability indicators. The coefficients of the INFL on ROA are insignificant, whereas coefficients with ROE are significant at the 10% level. Another important macroeconomic factor that could influence the whole banking industry of a country—the SPREAD of interests—has been found significant at 5% with ROA, while it is significant at 1% with ROE.

**Table 5.** Pooled OLS, fixed effects, and random effects regression results.

| Variables | ROA | | | | | | ROE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pooled | | Fixed | | Random | | Pooled | | Fixed | | Random | |
| | Coeff. | Prob. | Coeff. | Prob. | Coeff. | Prob. | Coeff. | Prob. | Coeff. | Prob. | Coeff. | Prob. |
| CAD | −0.078 | 0.000 *** | −0.039 | 0.020 ** | −0.078 | 0.000 *** | −0.170 | 0.133 | −0.185 | 0.131 | −0.17 | 0.130 |
| AMQ | 0.161 | 0.029 ** | 0.169 | 0.038 ** | 0.161 | 0.03 ** | 0.465 | 0.072 * | 1.986 | 0.009 *** | 0.465 | 0.093 * |
| OPEFF | 0.003 | 0.032 ** | 0.010 | 0.041 ** | 0.003 | 0.601 | 0.084 | 0.018 ** | 0.065 | 0.032 ** | 0.084 | 0.016 ** |
| CREDR | −0.195 | 0.000 *** | 0.133 | 0.005 *** | −0.195 | 0.000 *** | −0.337 | 0.023 ** | −0.512 | 0.131 | −0.337 | 0.021 ** |
| LIQ | 0.000 | 0.071 * | 0.000 | 0.010 ** | 0.000 | 0.067 * | 0.000 | 0.799 | 0.000 | 0.703 | 0.000 | 0.799 |
| SIZE | −0.006 | 0.007 *** | −0.009 | 0.001 *** | −0.006 | 0.006 *** | −0.006 | 0.053 * | −0.018 | 0.046 ** | −0.006 | 0.051 * |
| EG | 0.001 | 0.946 | −0.001 | 0.155 | 0.000 | 0.946 | −0.002 | 0.790 | −0.001 | 0.821 | −0.002 | 0.789 |
| INFL | −0.001 | 0.214 | 0.000 | 0.655 | −0.001 | 0.211 | 0.009 | 0.060 * | 0.009 | 0.096 * | 0.009 | 0.057 * |
| SPREAD | 0.001 | 0.032 ** | 0.002 | 0.046 ** | 0.001 | 0.091 * | 0.027 | 0.000 *** | 0.027 | 0.001 *** | 0.027 | 0.000 *** |
| Constant | 0.174 | 0.000 *** | 0.238 | 0.000 *** | 0.174 | 0.000 *** | 0.334 | 0.000 *** | −0.319 | 0.000 *** | 0.334 | 0.000 *** |
| Adj. R-Squared | 0.733 | | 0.731 | | 0.715 | | 0.576 | | 0.531 | | 0.6131 | |
| F statistic | 34.010 | | 15.849 | | 34.278 | | 16.550 | | 14.170 | | 19.340 | |
| Prob. > F | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| Durbin-Watson | 1.69 | | 1.83 | | 1.67 | | 2.17 | | 2.26 | | 2.12 | |
| Hausman Specification | | | 11.657 | 0.000 *** | | | | | 8.456 | 0.0023 *** | | |

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

### 4.5. Outcomes of GMM Estimation

Table 6 shows the estimated result summary using GMM, providing more robust and reliable results than the previously estimated regression models. The results show that except CAD, EG, and INFL, all the independent variables significantly affect the profitability of Shariah-based Bangladeshi banks. Usually, inflation erodes the real value of money over time, which can affect both the interest income a bank earns on loans and the interest expenses it pays on deposits. However, financial institutions, like banks, have the capability to modify interest rates in order to alleviate the effects of inflation to a certain degree, thereby aiding in the sustenance of their profitability under stable circumstances. While it is true that higher capital adequacy ratios can provide stability and resilience to a bank during economic downturns or financial crises, this does not mean that capital adequacy has no bearing on profitability. In fact, maintaining higher levels of capital can sometimes constrain a bank's ability to maximize returns on equity, as it reduces leverage and potentially limits the amount of risk a bank can take on to generate profits. Economic growth is generally associated with improved profitability for banks; the relationship is influenced by various factors and dynamics within the banking industry and the broader economy. However, economic growth alone may not guarantee immediate or uniform benefits for all banks, and other factors such as the quality of loan portfolios, interest rate environment, competition, and market dynamics play crucial roles in determining banks' profitability. Among the internal bank-specific determinants, AMQ, OPEFF, CREDR, and LIQ significantly favor both ROA and ROE. In the found results, it has been seen that the

only exception variable is CREDR, which has a positive relationship with both indicators of profitability; however, with ROE, the regression coefficient is not statistically significant. Nevertheless, CAD and SIZE have a negative impact on the bank's profitability, although only the negative influence of SIZE on profitability is significant.

**Table 6.** Results of GMM estimation.

| Variables | ROA | | ROE | |
|---|---|---|---|---|
| | Coefficient | Probability | Coefficient | Probability |
| L.DEP | 0.364 | 0.000 *** | 0.346 | 0.095 * |
| CAD | −0.539 | 0.220 | −0.645 | 0.351 |
| AMQ | 0.469 | 0.015 ** | 1.986 | 0.009 *** |
| OPEFF | 0.230 | 0.001 *** | 0.065 | 0.062 ** |
| CREDR | 0.133 | 0.056 * | 0.512 | 0.131 |
| LIQ | 0.345 | 0.034 ** | 0.154 | 0.036 ** |
| SIZE | −0.129 | 0.000 *** | −0.234 | 0.007 *** |
| EG | −0.001 | 0.195 | −0.131 | 0.126 |
| INFL | 0.084 | 0.655 | 0.146 | 0.231 |
| SPREAD | 0.032 | 0.011 ** | 0.321 | 0.000 *** |
| Constant | 0.353 | 0.000 *** | −0.123 | 0.015 ** |
| AR (1) | 0.035 | | 0.000 | |
| | $z = -4.85$ | | $z = -2.64$ | |
| AR (2) | 0.422 | | 0.283 | |
| | $z = 1.12$ | | $z = 0.79$ | |
| Number of obs. | 86 | | 78 | |

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. L.DEP is the lagged dependent variables.

However, among other macroeconomic variables, SPREAD has a considerable positive effect on both of the bank profitability metrics, while EG has a negligible negative impact among the macroeconomic determinants. However, the INFL does not significantly affect any of the profitability indicators.

Furthermore, the lagged of the dependent variables, represented by L.DEP, suggests that the profitability in the prior year had a significant positive bearing on profitability in the current year; we have found a positive coefficient with significant *p*-values ($p < 0.01$ with ROA, and $p < 0.10$ with ROE). More explicitly, the positive coefficient of the large dependent variables suggests a significant carryover effect from the prior year, indicating a certain level of persistence in bank profitability. This finding aligns with the notion that historical probability plays a role in shaping the current financial performance. The inclusion of lagged dependent variables aims to capture the temporal dynamics of profitability.

## 5. Discussion

Most of the determinants that have been considered in this study are significant factors for the profitability of Shariah-based banks in Bangladesh. We have found that the capital adequacy ratio of the banks, represented by the shareholders' equity to total assets, held a significant negative correlation with ROA, which indicates that the banks which are highly financed through equity capital are prone to reduce their profitability level. This may happen due to the availability of less-costly sources of financing banking services rather than the owners' equity. The liquidity level, another important bank-specific factor, is positively related to ROA. The conventional rule of thumb says that a firm with a higher liquidity level can reduce profitability as it has an idle cost. But for banks, this rule may not be appropriate as the many factors of the bank's success, including customer satisfaction, depend on the liquidity level of the bank (Nimer et al. 2015; Paul et al. 2020). This study has found that the quality of asset management is favorably correlated with the bank's performance, which indicates that the profitability of the bank has increased when the bank earned more operating profits through investing and using their assets. The banking operational efficiency, measured by the operating expenses

to interest income, has been found to be significantly positively related to profitability, which indicates that the bank's profitability depends significantly on the level of expenses made on the operation of banking. As the findings suggest, there is a scope to boost the profitability of Shariah-based banks through the efficient use of operating expenses. These results are empirically supported by many scholars in different social and economic settings (Abduh and Idrees 2012; Jara-Bertin et al. 2014; Al-Homaidi et al. 2018; Menicucci and Paolucci 2016; Masood and Ashraf 2012; Rahaman and Akhter 2016; Rashid and Jabeen 2016), while contradicting the results found by others (Owoputi 2014; Alpera and Anbar 2011; AL-Omar and AL-Mutairi 2008; Javaid 2016).

Moreover, credit risk has been found to be positively associated with the bank's profitability. This may be the reason that the banks that have high NPLs distributed far more loans to their customers and consequently earned more interest, which ultimately drove bank profitability upward. In addition, moderate levels of credit risk exposure, when managed effectively, can enhance a bank's overall risk-adjusted returns. By diversifying their loan portfolios across different sectors, industries, and geographical regions, banks can mitigate the adverse effects of credit risk on profitability while still capitalizing on potential revenue opportunities. This particular finding contradicts many of the available studies previously conducted in the conventional banking sectors in many countries (Chowdhury et al. 2017; Prakash and Poudel 2012; Kaaya and Pastory 2013; Boahene et al. 2012; Shah Khan et al. 2014), which have reported that several bank-specific variables like credit risk, equity ratios, and cost-efficiency ratios are insignificant in determining a bank's profitability, while this finding is supported by some of the available studies (Karim et al. 2023a; Trad et al. 2017; Ali and Puah 2019).

However, the macroeconomic determinants have also been found as important factors that could have a significant effect on the profitability of Islamic Shariah-based banks in Bangladesh. We have found that the growth of GDP does not have a mentionable effect on profitability, which is similar to some of the previous studies (Dodi and Arief 2018; Shah Khan et al. 2014; Ara et al. 2021). This indicates that the GDP growth and the profitability of Islamic Shariah-based banks in Bangladesh are not significantly influenced by the GDP growth of the country. It is stated that economic growth does not guarantee that all loans made by banks will perform well. During periods of economic expansion, banks may be more willing to extend credit, but this can also lead to a relaxation of lending standards and an increase in risky lending. If economic conditions deteriorate unexpectedly, or if certain sectors experience difficulties, banks may face higher levels of loan defaults and credit losses, which can offset the positive effects of economic growth on profitability. However, interest rate spread has a significant positive impact on the profitability of banks. It demonstrates that there is no meaningful relationship between GDP growth and Bangladeshi Shariah-based banks' profitability. However, the profitability of the banks can rise significantly in response to rising differences in interest rates between deposits made in banks and loans and advances given to their customers. Therefore, the banks can utilize every aspect of the interest rates spread in a significant way which could possibly increase their level of profitability. Our results are supported by the many previous empirical studies (Al-Homaidi et al. 2018; Louzis et al. 2012; Curak et al. 2012; Yuan et al. 2022), while they contrast with some available studies (Javaid 2016; Al-Homaidi et al. 2018; Chowdhury and Rasid 2016; Trad et al. 2017; Karim et al. 2010; Zarrouk et al. 2016). In summary, the factors considered in this study were found useful in determining the financial performance of banks that operating under Shariah-based principles in Bangladesh and provide meaningful insights to all stakeholders of banks and banking systems.

## 6. Conclusions

As an integral player in the Islamic finance domain, Bangladesh has witnessed the expansion of its Islamic banking sector in recent years, signaling the need for a comprehensive inspection of the factors shaping the financial performance of these institutions. Therefore, the factors that can determine the profitability of Bangladeshi Shariah-based

banks have been examined in the present study. Over thirteen years, from 2010 to 2022, six bank-specific and three macroeconomic factors were utilized as explanatory variables, while ROA and ROE, which serve as the explained variables, were used to quantify the profitability of the bank. The macroeconomic independent variables in the present research are GDP growth, inflation, and interest rate spread; whereas the bank-specific variables that have been employed include capital adequacy, asset management quality, operational efficiency, credit risk, liquidity, and bank size.

Regarding the factors unique to individual banks, this analysis showed that credit risk, liquidity, and asset management quality, are all positively associated with the financial performance of banks. This investigation also revealed a negative relationship between profitability and capital sufficiency, operational effectiveness, and bank size. The results concerning macroeconomic drivers showed that there is a substantial positive association between Shariah-based banks and both inflation and the interest rate spread. This research also discovered, however, that the Bangladeshi Shariah-based banks' profitability is not much impacted by GDP growth.

By providing fresh empirical data, the current research aimed to close a significant vacuum in the existing body of knowledge regarding the banking industry by converging on the particular bank-specific and macroeconomic factors that influence profitability. The results of this study have made a substantial contribution to the body of literature by providing a critical analysis of the profitability of Islamic Shariah-based banks in Bangladesh with a comprehensive explanation of how it currently stands. More precisely, this study offers proof of the variables that may impact the profitability of Bangladeshi Islamic banks between 2010 and 2022. Throughout this time, Bangladeshi Islamic Shariah-based banks have faced several difficulties, including a drop in their financial performance, changes to their MDs, changes in the boards of directors, and fraud charges that have affected several of their Islami Shariah-based branches.

It is suggested that regulators and policymakers take bank-specific and macroeconomic factors into account in order to improve the profitability of Bangladeshi Shariah-based banks. Our results disclose an insignificant relationship between economic growth and inflation rates and a bank's profitability. Hence, policymakers may need to reassess the effectiveness of monetary and fiscal policies aimed at stimulating economic growth or controlling inflation in influencing bank profitability. If these macroeconomic indicators have a limited impact on bank profitability, alternative policy measures may need to be considered to support the banking sector's financial health. Furthermore, bank managers, bankers, and other professionals need to pay more attention to the drivers that are distinctive to each bank to efficiently use resources and have a substantial, positive impact on the financial performance of Shariah-based banks. Specifically, the positive association between credit risk and a bank's profitability underscores the complex interplay between risk-taking behavior, risk management practices, and market dynamics within the banking sector. Therefore, the regulatory bodies should be concerned about the importance of balancing risk and return considerations in driving sustainable financial performance for banks.

Future studies in this area could look at a few more macroeconomic and bank-specific factors. It is also necessary to compare the bank-specific—not just macroeconomic—determinants that determine a bank's capacity to enhance profitability, comparing banks in the public and private sectors, highlighting the importance of considering a broader range of factors, and adopting adaptive strategies to navigate evolving economic landscapes effectively.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data will be provided upon request.

**Conflicts of Interest:** The authors declare no conflict of interest the results.

## Notes

[1] Quarterly Report on Islamic Banking in Bangladesh, available at https://www.bb.org.bd/pub/quaterly/islamic_banking/ibq_oct-dec2022.pdf (accessed on 27 November 2023).

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