

## Internal Determinants of Islamic Bank Profitability: Evidence from Bangladesh

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### Abstract

This paper empirically examines the impact of bank specific characteristics in determining the Islamic banking profitability in Bangladesh. Research period covers 2010–2017. Research method is a panel analysis. Fixed effects model is applied based on the Hausman test. The study takes return on assets (ROA) as the proxy of profitability. Company specific explanatory variables for the study are bank size, capital-to-risk assets (CRAR), investment-to-deposit (liquidity), non-performing investment (NPI), and cost-to-income. The study finds 4 out of 5 variables statistically significant. However, liquidity slightly misses the significance level. We have found CRAR and cost-to-income are negatively correlated, and liquidity is positively correlated to bank profitability as our expectation. On the other hand, estimation shows a negative correlation between bank size and profitability. Moreover, NPI is found to be positively correlated to ROA because Islamic banking industry's very low percentage of non-performing investment (3.3%) could not inversely affect the profitability.

**Keywords:** Bank profitability; Internal determinants; Panel data; Fixed effects model; Islamic banking industry.



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### 1. Introduction

The bank profitability and its determinants have been a widely chosen topic in the area of business research because banks play a very important role in the national economic growth. There are 59 scheduled banks in Bangladesh those operate under full control and supervision of Bangladesh Bank. Out of 59 banks, 8 banks are full-fledged Islamic banks.<sup>1</sup> Moreover, 19 Islamic banking branches of 9 conventional commercial banks and 25 Islamic banking windows of 7 conventional commercial banks also provide Islamic financial services in Bangladesh. Islamic banking covers 24% market share of the country's entire banking sector in terms of deposits and investments.<sup>2</sup> Naturally Islamic banks are more risk averse in its investment practices because religious depositors show greater sensitivity to bank's performance than conventional banks' clients (Abedifar *et al.*, 2012). Islamic banks run their activities according to Islami Shariah-based principles, i.e. Profit-Loss Sharing (PLS) mode. This study focuses on the Islamic banking sector of Bangladesh and attempts to identify the factors that influence the bank profitability. The study observes eight-year data of all the full-fledged Islamic banks in Bangladesh.

### 2. Literature Review

A number of researchers have attempted to identify the major determinants of bank profitability in their studies. Bank profitability is typically measured by Return on Assets (ROA), Return on Equity (ROE) and/or Net Investment Margin (Sufian and Habibullah, 2009). Whether it is a financial organization or a non-financial organization, both ROA and ROE measure an institution's ability to generate earnings from its investments. On the other hand, NIM gauges the percentage of net interest or investment income over the total earning asset for a financial organization. This study takes ROA as a measure of profitability.<sup>3</sup>

Researchers found that profitability is significantly correlated with company-specific and macro-level variables. This study focuses only on the bank-specific determinants. Under the bank-specific variables, most considered factors by the researchers are bank size, number of members in the board of directors, reserve requirement, capital adequacy, percentage of non-performing loans, liquidity, efficiency, and so on. Usually statistical models used in the analyses are pooled OLS regression, fixed effects, random effects and generalize method of moments (GMM). Most of the datasets of such studies are panel data.

A study based on Tunisia investigated on the bank profitability and found that bank profitability is negatively correlated with board size. It means when more number of officials are present in the board of directors, the bank performance becomes lower and vice versa. A larger board might result in ineffective initiatives instead of making wise decisions. On the other hand, they found that bank size is positively correlated with profitability. Moreover,

<sup>1</sup> Source: Bangladesh Bank Website

<sup>2</sup> Source: Dhaka Tribune (November 28, 2018)

<sup>3</sup> An earlier version Hassan (2017). The Determinants of Bank Profitability: A Study of Islamic Banking Industry in Bangladesh. of this paper incorporated ROA, ROE and NIM model to estimate the Islamic banks' profitability in Bangladesh. It was submitted to BRAC University in a partial fulfillment of the requirements for the degree of Bachelor of Business Administration (BBA). The full paper can be accessed here: <http://hdl.handle.net/10361/8790>

privatization is evidenced to be statistically significant and positively correlated to bank performance in the study. Therefore, reconsidering the option of being privatized would be a good option for government banks. They considered ROA, ROE and price-to-book value (P/B) ratio as the indicators of profitability. Other than board size, bank size and privatization, the study also considered cost of efficiency, capital-to-asset as bank specific variables but no significant relationship is found between bank profitability and these variables. The study used panel data and applied random effects model to estimate relationship between endogenous and exogenous variables (Chouikh and Blagui, 2017).

Another study based on Latvian and Lithuanian banking sector showed that there is a statistically significant positive relationship between bank profitability and bank size when profitability and bank size are expressed by ROE and volume of deposits respectively. In addition to that the study found a statistically significant positive relationship between cost-to-income and bank profitability when profitability is measured by NIM. Moreover, their estimation indicated a negative relationship between commission income and number of branches. The study applied a multiple linear regression analysis to estimate their model (Titko *et al.*, 2015).

A study on Croatian banking industry considering the 2002–2010 data stated that bank size, solvency risk and intermediation are statistically significant variables with a positive influence on bank profitability while credit risk and operating expenses have negative and statistically significant impact on profitability. The study measured profitability with ROA and applied Generalized Method of Moment estimation proposed by Arellano–Bond (Pervan *et al.*, 2015).

A research based on the banking industry of Bangladesh claimed that loan-to-deposit, credit risk, capital risk and bank efficiency are significant factors for determining the profitability of banking industry in the country. The author used ROA to measure the profitability. Panel ordinary least square is applied for estimating the impact of determinants on the bank profitability (Samad, 2015).

Another study on the same banking industry found that interest income, non-interest income, capital, loans & advances, operating expenditure, deposit, bank size and non-performing loans have some significant impact on the profitability. The study uses ROA, ROE and NIM as the measure of profitability. The study considered top 15 conventional private commercial banks' data over the period 2012–2016. The authors applied mixed effect model to test the hypotheses (Hossain and Ahamed, 2015).

A study on EU 27 banking systems assessed the main determinants of banks' profitability. The study highlighted that credit and liquidity risk, management efficiency and the diversification of business have influence on bank profitability. The profitability is measured by ROA and ROE. They used Hausman test to select the appropriate estimation method between fixed effects and random effects model for their dataset (Hossain and Ahamed, 2015).

Another study based on Macedonian banks concluded that profitability is positively affected by productivity, bank size, balance sheet structure, capitalization and non-interest income, and negatively affected by operating expenses, credit and liquidity risk. In the study, ROA was used as the endogenous variable and the author applied the simple ordinary least squares (OLS) method. The study suggested that development of the Macedonian banking system depends on its efficiency, profitability and competitiveness and banks need to find a way to make the optimal utilization of their resources, while minimizing the expenses and losses (Iloska, 2014).

Another research claimed that bank-specific variables such as capital ratio, loans and deposits are positively correlated to bank performance when the performance is measured by ROA. However, when ROE is used as the measure of performance, they found a negative relationship between capital ratio and ROE. On the other hand, they estimated that bank size is positively correlated with bank profitability when small-sized and large banks are taken into consideration. For medium-sized banks, the study found a negative relationship between size and profitability (Zhang and Dong, 2011).

A Bangladesh based study stated that loans intensity, credit risk and cost have positive and significant impacts on bank performance while non-interest income exhibits negative relationship with bank profitability. The study used ROA, ROE and NIM as dependent variables. They applied multiple linear regression model to estimate the relationship between bank profitability and the factors which affect the profitability (Sufian and Habibullah, 2009).

Another study found that Islamic banks' profitability is positively correlated to equity-to-total assets ratio and negatively to bank size and loan ratios. The study also indicated the importance short-term funding, non-interest earning assets and overhead in promoting profits. The authors suggested that reserve requirement does not have a significant impact on the profitability measures. The study used four measures of performance, i.e. net non-interest margin, profit margin, return on assets and returns on equity. Data used in the study were cross-country bank-level data (Hassan and Bashir, 2005).

Moreover, Brahmaiah and Ranajee (2018), Kawshala and Panditharathna (2017), Mohanty (2017), Shah and Khan (2017), Menicucci and Paolucci (2016), Mahmud *et al.* (2016), Duraj and Moci (2015), Gremi (2013), Gul *et al.* (2011), Alexiou and Sofoklis (2009), Naceur and Goaid (2008) and others have studied on the determinants of bank performance and found significant relationship between profitability and bank-specific factors.

### 3. Material and Method

#### 3.1. Data

Eight-year (2010–2017) data of all the Islamic banks from the banking industry of Bangladesh have been taken for the study.<sup>4</sup> Data that used in the study are secondary data.<sup>5</sup> For the bank size, natural logarithm of total assets is considered. The type of the data used for the research is unbalanced panel data.

#### 3.2. The Variables

##### 3.2.1. The Endogenous Variable

We have taken Return on Assets (ROA) as a measure of profitability. ROA has been used in most banks' performance studies (Kosmidou, 2008). It is a better proxy of bank profitability because ROA does not ignore financial leverage (Flamini *et al.*, 2015). It is not distorted by high equity multipliers and it also reflects the ability of management to utilize the bank's financial and real investment resources to generate profits (Iloska, 2014). ROA equals net income after tax divided by total assets over a given period. A ROA of 2% means that the company generates \$2 of net profit by employing every \$100 of assets. The higher ROA indicates the more efficiency about using its assets.

Table-1. Endogenous Variable

| Variable               | Formula                 |
|------------------------|-------------------------|
| Return on Assets (ROA) | Net Income/Total Assets |

##### 3.2.2. The Exogenous Variables

Five bank-specific variables are considered as independent factors. Studies suggest that these variables have significant impacts on the profitability of banking institutions. The variables and their expected relationship with bank profitability are discussed below.

###### 3.2.2.1. Bank Size

Typically natural logarithm of total assets, total investments or total deposits over a given period is considered as the size of a bank (Samad, 2015). This study takes logarithm of total assets as a proxy of size. It is expected that a larger bank can attain economy of scale and reduce the operating cost (Boyd and Runkle, 1993). Therefore,  $\partial\pi/\partial\text{SIZE}>0$

###### 3.2.2.2. Capital-to-Risk Assets Ratio (CRAR)

CRAR equals bank's Tier 1 capital plus Tier 2 capital divided by total risk-weighted assets over a given period. Tier 1 capital is bank's core capital, i.e. common equity and retained earnings. Tier 2 capital is bank's supplementary capital, i.e. subordinated debt instruments. Total risk weighted assets are calculated by multiplying bank's earning assets by appropriate risk-weight. For example, an Islamic bank can assign 100% risk-weight to corporate investments and 20% risk-weight to interbank deposits. CRAR ensures the efficiency and stability of a nation's financial system by lowering the risk of becoming insolvent. The ratio is calculated under the Basel framework. Under the latest framework (Basel III), CRAR standard was 11.875% till 2018 and it is 12.50% from 2019.<sup>6</sup> A higher ratio indicates the risk aversion of a bank and the risk aversion means low profits. So, it is expected that  $\partial\pi/\partial\text{CRAR}<0$

###### 3.2.2.3. Liquidity

The liquidity of a bank can be measured by several ratios. In this study, investment-to-deposit ratio over a given period is taken as a measure of bank's liquidity. The ratio can be assessed by dividing the bank's total investments by its total deposits. In conventional banking, it is called loan-to-deposit ratio. When a bank transforms a higher percentage of its deposit into investments, the bank is expected to generate more profits, thus  $\partial\pi/\partial\text{LQDTY}>0$

###### 3.2.2.4. Non-Performing Investment (NPI)

Percentage of NPI equals non-performing investment divided by total investment over a specific period. Non-performing investment is also called classified investment. It is called non-performing loan (NPL) or classified loan in conventional banking. It is a measure of bank's credit risk. Higher NPI reduces the profit, therefore,  $\partial\pi/\partial\text{NPI}<0$

###### 3.2.2.5. Cost-to-Income

Cost-to-Income is calculated by dividing the operating expense by operating income over a given period. It shows how efficiently a bank can generate profit from its operations. It is expected that higher operating expense per dollar of income, lowers the bank profit, so,  $\partial\pi/\partial\text{CI}<0$

<sup>4</sup> For Union Bank Limited, five-year data have been taken as it started its operation in 2013

<sup>5</sup> Data Source: Financial Statements & Author's Calculations

<sup>6</sup> Source: Guidelines on Risk Based Capital Adequacy: Revised Regulatory Capital Framework for banks in line with Basel III, Bangladesh Bank (2014).

**Table-2.** List of Bank-Specific Exogenous Variables

| Variable       | Formula                                    | Expected Effect |
|----------------|--|-----------------|
| Bank Size      | Natural Logarithm of Total Asset           | +               |
| CRAR           | Capital/Risk Weighted Assets               | -               |
| Liquidity      | Total Investment/Total Deposit             | +               |
| NPI            | Non-Performing Investment/Total Investment | -               |
| Cost-to-Income | Operating Expense/Operating Income         | -               |

### 3.2.3. Summary of Variables

The following table shows the summary of endogenous and exogenous variables over eight years.

**Table-3.** Summary of Variables

|         | ROA   | Size  | CRAR   | LQDTY  | NPI   | CI     |
|---------|-------|-------|--------|--------|-------|--------|
| Maximum | 3.54% | 27.53 | 34.46% | 98.26% | 8.20% | 76.00% |
| Minimum | 0.22% | 23.56 | 9.07%  | 60.08% | 0.00% | 23.50% |
| Mean    | 1.32% | 25.89 | 12.51% | 86.67% | 3.35% | 46.39% |
| SD      | 0.74% | 0.76  | 3.44%  | 5.63%  | 1.86% | 13.75% |

In the above summary, we have excluded the data for ICB Islamic Bank Limited because of its very poor performance for eight consecutive years, i.e. negative equity.<sup>7</sup> Considering the ICB bank data in the table would misrepresent the summary.

### 3.2.4. The Hypotheses

Five hypotheses have been formed for the study. A hypothesis will be completely accepted if the coefficient estimate is statistically significant and its sign is found as our expectation. It will be partially accepted if the coefficient estimate is slightly insignificant but the sign is as predicted. Otherwise, a hypothesis will be rejected.

**Table-4.** List of Hypotheses

| Hypothesis | Description   |
|------------|---|
| H1         | Profitability is positively and significantly correlated to bank size                   |
| H2         | Profitability is negatively and significantly correlated to capital-to-risk assets      |
| H3         | Profitability is positively and significantly correlated to investment-to-deposit ratio |
| H4         | Profitability is negatively and significantly correlated to non-performing investment   |
| H5         | Profitability is negatively and significantly correlated to cost-to-income ratio        |

### 3.2.5. Model of the Study

The model of the study attempts to measure the relationship between the endogenous variable (bank profitability, i.e. ROA) and the company specific exogenous variables. The general model is estimated by the following equation.

$$ROA_t = \delta_0 + \delta_1 (SIZE_t) + \delta_2 (CRAR_t) + \delta_3 (LQDTY_t) + \delta_4 (NPI_t) + \delta_5 (CI_t) + E_t$$

In the above equation, ROA is the measure of profitability,  $\delta_0$  is the intercept or constant of the model,  $\delta_k$  ( $k=1,2,\dots,5$ ) are the coefficients to be estimated and E is the error term of the equation. All variables are measured at an individual time t.

A significantly positive coefficient estimate shows a statistically significant positive relationship between the bank profitability and the corresponding factors. On the other hand, a significantly negative coefficient estimate indicates a statistically significant negative relationship between the bank profitability and the corresponding factors.

### 3.2.6. Methods for Data Analysis

To analyze panel data, researchers generally use pooled regression, fixed effects or LSDV model and random effects model. If the pooled regression is used, it will not distinguish between the various banks that the data set have. Simply put, the model will combine all the banks together and will deny the heterogeneity or individuality that may exist among the eight banks. On the other hand, fixed effects model allows the heterogeneity or individuality among the banks by allowing to have its own intercept value. However, if all the banks have a common mean value for the intercept, the random effects model will be appropriate for the dataset. The pooled regression model will not be considered for this study due to its major pitfall. The study will use fixed effects or random effects model to estimate the relationship among endogenous and exogenous variables. Hausman test will be applied to choose the appropriate model between fixed effects and random effects.<sup>8</sup>

<sup>7</sup> ICB Islamic Bank Limited still shows a positive ROE due to its negative equity and net loss. It actually indicates loss on net debt. ICB's eight-year data have been incorporated in our data analysis.

<sup>8</sup> This study uses EViews® 10 to run the equations and related tests. All the hypotheses have been checked at a significance level of 0.05.

## 4. Results and Discussion

We have conducted Hausman test to choose between random effects and fixed effects.

**Table-5.** Hypotheses for Hausman Test

|                        |                                     |
|------------------------|-------------------------------------|
| Null Hypothesis        | Random effects model is appropriate |
| Alternative Hypothesis | Fixed effects model is appropriate  |

The following table shows the Hausman test results for our dataset.

**Table-6.** Results for Hausman Test

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 158.495624        | 5            | 0.0000 |

Based on the Hausman test, we cannot accept the null hypothesis. The estimation of the model using fixed effects generates the following output.

**Table-7.** Model Estimation using Fixed Effects

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | 0.305744    | 0.048189   | 6.344687    | 0.0000 |
| SIZE     | -0.013631   | 0.002064   | -6.603771   | 0.0000 |
| CRAR     | -0.071000   | 0.013653   | -5.200251   | 0.0000 |
| LQDTY    | 0.031896    | 0.018278   | 1.744993    | 0.0874 |
| NPI      | 0.210487    | 0.053350   | 3.945419    | 0.0003 |
| CI       | -0.007340   | 0.001872   | -3.920904   | 0.0003 |

According to the estimation, we found that the intercept, bank size, capital-to-risk assets, non-performing investments and cost-to-income ratio are statistically significant at a level of 5%. On the other hand, liquidity followed a certain trend toward significance (p-value is equal to 0.0874). Adjusted R-squared for the model was 0.932934. The following table summarizes the acceptance or rejection of hypotheses based on the model estimation.

**Table-8.** Hypothesis Acceptance or Rejection based on the Model

| Hypothesis | Determinant | Statistical Significance | Expected Effect | Estimated Effect | Result             |
|------------|-------------|--------------------------|-----------------|------------------|--------------------|
| H1         | SIZE        | Significant              | Positive        | Negative         | Rejected           |
| H2         | CRAR        | Significant              | Negative        | Negative         | Accepted           |
| H3         | LQDTY       | Insignificant            | Positive        | Positive         | Partially Accepted |
| H4         | NPI         | Significant              | Negative        | Positive         | Rejected           |
| H5         | CI          | Significant              | Negative        | Negative         | Accepted           |

In this study, capital-to-risk assets ratio is found to be negatively correlated to profitability. It can be stated that when a bank is more risk averse, it makes less profit. In addition, cost-to-income ratio is observed to be negatively correlated to profitability as the higher the operating cost lowers the return. Moreover, liquidity, which is measured by investment-to-deposit ratio, shows positive relationship with bank profitability but it approached the borderline of statistical significance. It is obvious that when a bank makes more quality investment, it can generate more profit. On the other hand, we found the bank size to be positively correlated to bank profitability. In this study, we measured bank size by the total assets which is a sum of profit earning assets and non-profit earning assets. Banks need to own non-profit earning assets for their operations, i.e. fixed assets. These assets cannot directly generate income, instead they incur direct expenses. If the percentage of non-profit earning assets goes high, it can decrease the bank profitability. On the other side, a larger bank might face diseconomies of scale (Samad, 2015). In addition to that our model shows a positive relationship between non-performing investments and profitability. Excluding the outlier (ICB Islamic Bank Limited), the average NPI of Islamic Banking Industry is very low (3.3%) compared to NPL of overall banking industry of Bangladesh (10.4%).<sup>9</sup> Therefore, such tight control of investment losses could not affect the profitability severely.

## 5. Conclusion

The study aims to find the determinants of Islamic banking profitability in Bangladesh over a period 2010–2017 and estimates the relationship between the bank profitability and five candidate exogenous variables. Bank profitability is measured by ROA. The study uses panel data. Fixed effects model is applied based on Hausman test to estimate the model equation. In our study, capital-to-risk assets and cost-to-income are found to be statistically significant and negatively correlated to profitability. In addition, liquidity appeared slightly insignificant but showed positive relationship with bank profitability. On the other hand, bank size and non-performing investment are

<sup>9</sup> Source: CEIC Data (2018)

observed significant but no positive relationship is found between profitability and size, and no negative relationship is estimated with non-performing investment to profitability. The study recommends to maintain a CRAR of around the standard (12.50%) and an investment-to-deposit ratio of around 80-90%. A very high investment-to-deposit ratio, i.e. 95% will indicate that the bank might not have enough liquidity to cover any unforeseen fund requirements. In addition to that Islamic banks should control the operating cost by embracing efficient technology, centralizing the operating activities and replacing mass marketing with targeted promotions. It is also suggested that as higher percentage of non-performing investment can severely affect the profitability, by proper client profiling and efficient collateral management, banks should take control over the classified investments. Finally, banks should focus on reshaping their portfolios by adding higher percentage of profit earning assets while trying to keep the non-profit earning assets as low as possible because non-profit earning assets generates no direct income but cost.

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